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Air Quality Analysis for the EDCO Recovery & Transfer Station Facility Expansion Project San Diego, California

Project No. 515674

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ATTACHMENT

Acronyms

°F	degrees Fahrenheit
$\mu g/m^3$	micrograms per cubic meter
AAQS	Ambient Air Quality Standards
AB	Assembly Bill
AD	anaerobic digestion
CAA	Clean Air Act
CCAA	California Clean Air Act
CAAQS	California Ambient Air Quality Standards
CalEEMod	California Emissions Estimator Model
CARB	California Air Resources Board
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CMG	compressed natural gas
CO	carbon monoxide
DPM	diesel particulate matter
DSD	Department of Development Service
ERT	EDCO Recovery & Transfer
H&SC	Health & Safety Code
NAAQS	National Ambient Air Quality Standards
NO_2	nitrogen dioxide
NO_X	oxides of nitrogen
OEHHA	Office of Environmental Health Hazard Assessment
Pb	lead
PM_{10}	particulate matter with an aerodynamic diameter of 10 microns or less
$PM_{2.5}$	particulate matter with an aerodynamic diameter of 2.5 microns or less
ppb	parts per billion
ppm	parts per million
RAQS	Regional Air Quality Strategy
ROG	reactive organic gas
SANDAG	San Diego Association of Governments
SDAB	San Diego Air Basin
SDAPCD	San Diego Air Pollution Control District
SIP	State Implementation Plan
SO_2	sulfur dioxide
SO_X	oxides of sulfur
TACs	toxic air contaminants
TCM	Transportation Control Measures
tpd	tons per day
tpy	tons per year
U.S. EPA	United States Environmental Protection Act
USC	United States Code
VMT	vehicle miles travelled
VOC	volatile organic compounds

Executive Summary

This report evaluates potential local and regional air quality impacts associated with the proposed EDCO Recovery & Transfer Station Facility Expansion Project (project) located at 3660 Dalbergia Street, San Diego, California. The project site includes the existing EDCO Recovery & Transfer (ERT) facility, the alley to the northeast of the existing ERT facility, and the parcel to the northwest of the ERT facility at 3608 Dalbergia Street. The purpose of the project is to expand and enhance the existing ERT facility to increase solid waste diversion. In addition to the expansion of the existing ERT facility, the project would also construct an anaerobic digestion facility.

The purpose of this report is to assess potential short-term and long-term local and regional air quality impacts resulting from development of the project. Thresholds used to evaluate potential impacts to air quality are based on applicable criteria in the California Environmental Quality Act (CEQA) Guidelines Appendix G and the City of San Diego Significance Determination Thresholds.

The project was evaluated for consistency with the San Diego Air Pollution Control District's (SDAPCD) Regional Air Quality Strategy (RAQS). The primary goal of the RAQS is to reduce ozone precursor emissions. The project would include industrial use that is consistent with the land use designation. Therefore, the project would not result in an increase in emissions beyond those assumed in the RAQS. The project would not obstruct or conflict with implementation of the RAQS.

Emissions associated with construction and operation of the project were calculated in order to determine if the project would result in emissions that would violate any air quality standard or contribute substantially to an existing or projected air quality violation, and to determine if the project would result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard. As calculated in this analysis, project construction emissions would not exceed the applicable City of San Diego significance thresholds. These thresholds are designed to provide limits below which project emissions would not significantly change regional air quality. As project emissions would be well below these limits, project construction would not result in regional emissions that would exceed the National Ambient Air Quality Standards (NAAQS) or California Ambient Air Quality Standards (CAAQS) or contribute to existing violations. Additionally, construction emissions would be temporary, intermittent, and would cease at the end of project construction.

The project was evaluated to determine if it would expose sensitive receptors to substantial pollutant concentration, including air toxics such as diesel particulate matter (DPM) and carbon monoxide (CO) hot spots. Sensitive receptors in the project vicinity include residences at 3657 Dalbergia Street and 2004 Vesta Street immediately south across Dalbergia Street, and 3704 Dalbergia Street and 1929 Vesta Street immediately southeast across Vesta Street. Various other single- and multi-family residences are intermixed throughout the neighborhood or located across Interstate 5. Construction of the project would result in the generation of DPM emissions from the use of off-road diesel equipment. However, generation of DPM from construction would only last for approximately a year, which is roughly 3 to 4 percent of the total exposure period used for health risk calculation. Relative to the exposures at which cancer risks are typically assessed, the project exposure would be significantly more short term. Due to the short-term nature of construction, the project is not anticipated to result in cancer risk that exceeds SDAPCD Rule 1210 thresholds for incremental cancer risk. Heavy truck traffic associated with the ERT facility generates DPM emissions. As the project would not result in an increase in heavy truck traffic or solid waste throughput as compared to the existing ERT facility, the project would not expose sensitive receptors to increase DPM emissions. Additionally, the project would not result in a significant increase (5 percent or more) in traffic volumes at any signalized intersection; thus, the project would not result in or contribute to a CO hotspot. Localized air quality impacts would be less than significant.

In addition to the expansion of the existing ERT facility, the project would also construct an anaerobic digestion facility. The anaerobic digestion process generates numerous potent odorants during the decomposition of organics. As stated previously, there are sensitive receptors near the ERT facility. Without mitigation, the project may generate objectionable odors that affect a substantial number of people. Mitigation measures AIR-1 and AIR-2 would require odor minimization design features including negative pressure systems, biofilters, and odor minimization practices. With incorporation of mitigation measures AIR-1 and AIR-2, the project would not expose a substantial number of people to objectionable odors. Odor impacts would be less than significant with mitigation incorporated.

1.0 Introduction

The purpose of this report is to assess potential short-term and long-term local and regional air quality impacts resulting from development of the proposed EDCO Recovery & Transfer Station Facility Expansion Project (project).

The project site is located within the San Diego Air Basin (SDAB), one of 15 air basins that geographically divide the state of California. The SDAB is currently classified as a federal non-attainment area for ozone, and a state non-attainment area for particulate matter less than 10 microns (PM_{10}), particulate matter less than 2.5 microns ($PM_{2.5}$), and ozone.

Air quality impacts can result from the construction and operation of the project. Construction impacts are short term and result from fugitive dust, equipment exhaust, and indirect effects associated with construction workers and deliveries. Operational impacts can occur on two levels: regional impacts resulting from growth-inducing development or local hot-spot effects stemming from sensitive receivers being placed close to highly congested roadways.

The analysis of impacts is based on federal and state Ambient Air Quality Standards (AAQS) and is assessed in accordance with the guidelines, policies, and standards established by the San Diego Air Pollution Control District (SDAPCD). Project compatibility with the adopted air quality plan for the area is also assessed. Measures are recommended, as required, to reduce potentially significant impacts.

2.0 Project Description

The existing EDCO Recovery & Transfer (ERT) facility is located at 3660 Dalbergia Street in San Diego, California. The existing ERT facility consists of 1.60 acres and is bounded by Vesta Street to the southeast, Dalbergia Street to the southeast, 3608 Dalbergia Street to the northwest, and an alleyway abutting Interstate 5 to the northeast. The existing ERT facility has been operating since 2002. Hours of operation of the existing ERT facility are Monday through Saturday, from 6:00 a.m. up to 7:00 p.m. Hours of operation of the proposed ERT facility are Monday through Sunday, from 5:00 a.m. up to 7:00 p.m. The design capacity of the existing ERT facility is 1,716 tons per day. Existing ERT permits including Barrio Logan Planned District Permit, Coastal Development Permit Number 8488, Site Development Permit Number 8489, and the Solid Waste Facility Permit Number 37-AA-0105. Pursuant to existing permits, the ERT facility accepts up to 1,500 tons per day (tpd) of mixed solid waste from a combination of permitted haulers, contractors and public self-haulers and has a maximum permitted traffic volume of 1,506 passenger car equivalent vehicles per day. Recyclable materials such as large pieces or concrete, wood, green waste, and drywall must be separated from other solid waste. The maximum allowable hold time for solid waste is restricted to 48 hours, after which recyclable materials are transferred to a designated recycling facility and remaining solid waste is transferred to a final disposal site, such as the Miramar Landfill. Figure 1 shows the regional location of the project site. Figure 2 shows an aerial photograph of the project site and vicinity.

The purpose of the project is to expand and enhance the existing ERT facility to increase solid waste diversion and thereby support City of San Diego (City) Zero Waste goals identified in the Climate Action Plan. These Zero Waste Goals are to achieve 75 percent waste diversion by 2020, 90 percent waste diversion by 2035, and zero landfilled waste by 2040. Proposed facility enhancements include:

- Expand the existing ERT facility to incorporate the northwest-adjacent parcel and the northeast adjacent alley.
- Enhance existing traffic flows with additional on-site scales.
- Install a mechanized processing line to recover additional commodities
- Install an Anaerobic Digestion (AD) facility to create renewable natural gas
- Install a loading dock for the movement of recycling commodities
- Installation of enhanced engineering controls for storm water treatment
- Increase the size of the existing ERT building
- Re-locate the existing office structure
- Allow for internal processing up to 24 hours per day with standard hours of 5:00 a.m. to 7:00 p.m.

The project does not propose increased daily tonnage or increased daily heavy truck traffic; the ERT facility would still operate within the existing permitted capacity of 1,500 tpd. The total number of ERT facility staff would increase and would result in a corresponding increase employee trips. Organics would be separated and sent to the proposed AD facility. Organics are present in the throughput of the existing ERT facility; no increase in daily tonnage of organics is anticipated. The expansion of the existing ERT facility would increase size of site from 1.60 acres to 2.06 acres. The expansion of the existing ERT building would increase the floor area from 28,850 square feet to 60,680 square feet. Proposed facility expansion and enhancement is anticipated to increase diversion of solid waste by allowing greater recovery of cardboard, mixed paper, mixed rigid plastics, steel, asphalt, concrete, wood, and green waste. Table 1 summarizes existing and proposed building areas and Figure 3 shows the proposed site plan for the project.

Table 1
Existing and Proposed ERT Facility Buildings
(square feet)

Space	Existing Area	Proposed Area
Transfer Station, Tipping and Waste Separation Area, and Anaerobic Digestion Facility	28,850	51,650
Support Offices	-	3,150
Loadout Tunnel	-	5,800
Scale House	-	80
Total	**28,850**	**60,680**

✳ Project Location

FIGURE 1
Regional Location

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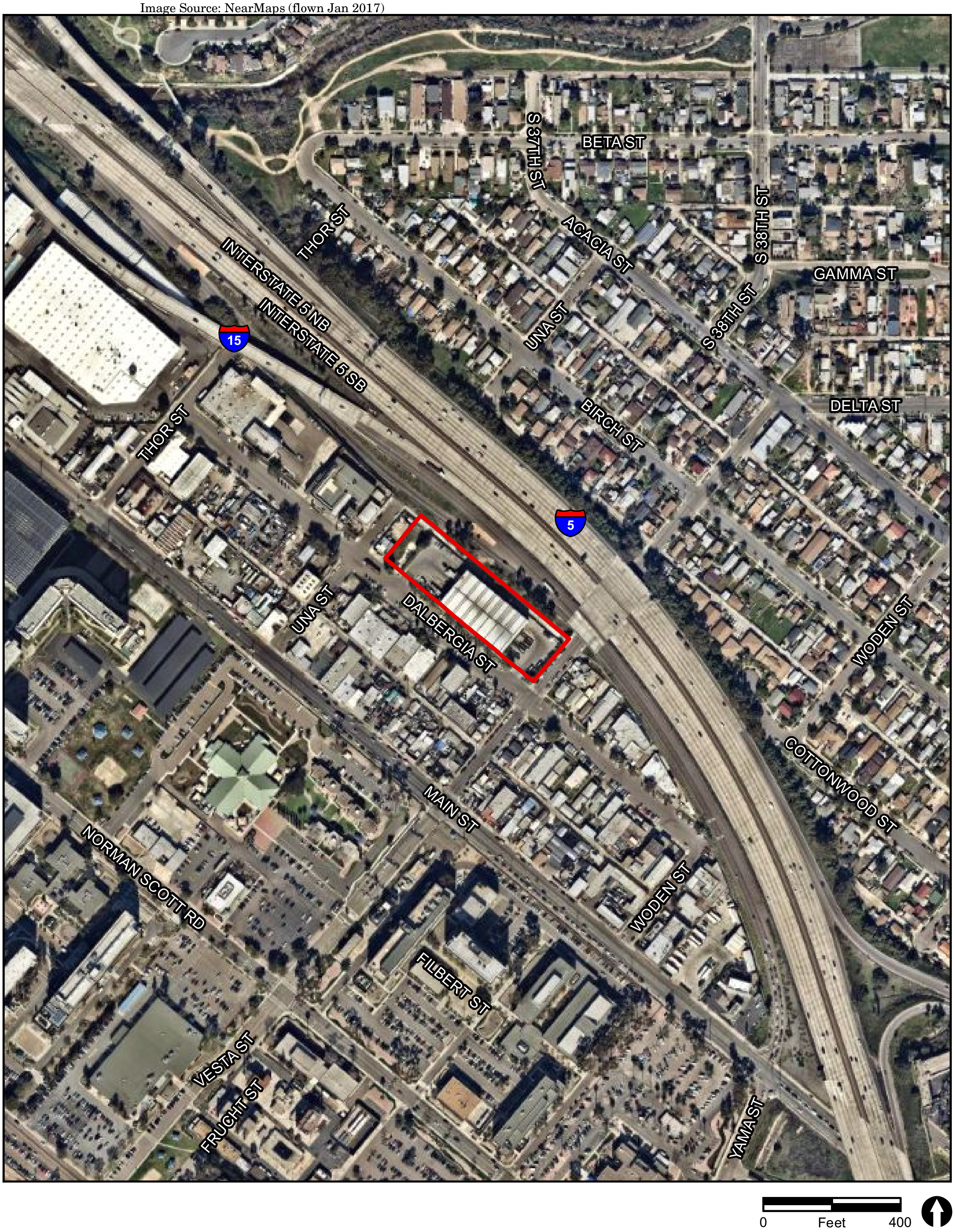
Image Source: NearMaps (flown Jan 2017)



🟥 Project Site

FIGURE 2

Project Location on Aerial Photograph

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Map Source: JRMA Architects Engineers

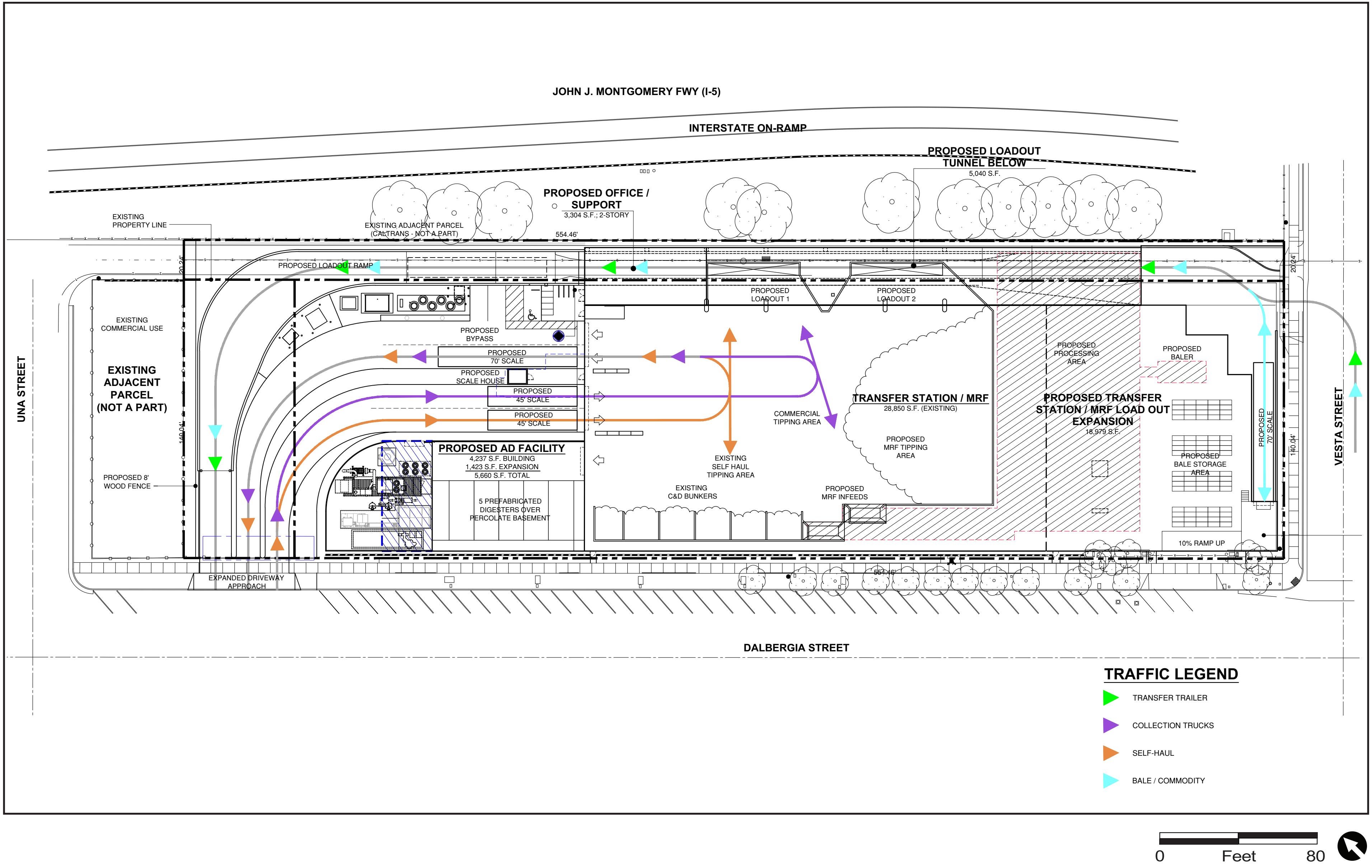

FIGURE 3

Site Plan

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2.1 Anaerobic Digestion Facility

Anaerobic digestion is the process by which bacteria break down organics in an oxygen-free environment. The primary product of anaerobic digestion is typically between 60 to 70 percent methane, 30 to 40 percent carbon dioxide, and trace amounts of other gases. This product is commonly known as biogas or renewable natural gas. Biogas may then be used to generate electricity or as a renewable fuel for waste collection vehicles. Remaining solids that are not decomposed in the AD process are referred to as digestate, and are commonly used as fertilizer.

The proposed AD facility would be would be accessed from inside the transfer station through a rollup door. Natural gas produced by the AD facility would be used to either generate electricity or fuel waste collection vehicles. The AD facility is anticipated to generate approximately 160 kilowatt hours per ton of organic waste processed or 13.5 diesel gallon equivalent of natural gas per ton of organic waste processed. The average throughput of the AD facility is anticipated to be between 100 and 200 tons of organic waste per day. Thus, the AD facility is anticipated to generate approximately 5.8 to 11.7 gigawatt hours per year or 490,000 to 980,000 diesel gallon equivalent per year.

3.0 Regulatory Framework

3.1 Federal Regulations

AAQS represent the maximum levels of background pollution considered safe, with an adequate margin of safety, to protect the public health and welfare. The federal Clean Air Act (CAA) was enacted in 1970 and amended in 1977 and 1990 [42 United States Code (USC) 7401] for the purposes of protecting and enhancing the quality of the nation's air resources to benefit public health, welfare, and productivity. In 1971, in order to achieve the purposes of Section 109 of the CAA [42 USC 7409], the United States Environmental Protection Agency (U.S. EPA) developed primary and secondary National Ambient Air Quality Standards (NAAQS).

Six criteria pollutants of primary concern have been designated: ozone, carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), lead (Pb), and respirable particulate matter (PM_{10} and $PM_{2.5}$). The primary NAAQS ". . . in the judgment of the Administrator, based on such criteria and allowing an adequate margin of safety, are requisite to protect the public health . . . " and the secondary standards ". . . protect the public welfare from any known or anticipated adverse effects associated with the presence of such air pollutant in the ambient air" [42 USC 7409(b)(2)]. The primary NAAQS were established, with a margin of safety, considering long-term exposure for the most sensitive groups in the general population (i.e., children, senior citizens, and people with breathing difficulties). The NAAQS are presented in Table 2 (California Air Resources Board [CARB] 2016a).

Table 2
Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[1]		National Standards[2]		
		Concentration[3]	Method[4]	Primary[3,5]	Secondary[3,6]	Method[7]
Ozone[8]	1 Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	–	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.07 ppm (137 µg/m^3)		0.070 ppm (137 µg/m^3)		
Respirable Particulate Matter (PM$_{10}$)[9]	24 Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		–		
Fine Particulate Matter (PM$_{2.5}$)[9]	24 Hour	No Separate State Standard		35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	12 µg/m^3	15 µg/m^3	
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m^3)	Non-dispersive Infrared Photometry	35 ppm (40 mg/m^3)	–	Non-dispersive Infrared Photometry
	8 Hour	9.0 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)	–	
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		–	–	
Nitrogen Dioxide (NO$_2$)[10]	1 Hour	0.18 ppm (339 µg/m^3)	Gas Phase Chemiluminescence	100 ppb (188 µg/m^3)	–	Gas Phase Chemiluminescence
	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)		0.053 ppm (100 µg/m^3)	Same as Primary Standard	
Sulfur Dioxide (SO$_2$)[11]	1 Hour	0.25 ppm (655 µg/m^3)	Ultraviolet Fluorescence	75 ppb (196 µg/m^3)	–	Ultraviolet Fluorescence; Spectrophotometry (Pararosaniline Method)
	3 Hour	–		–	0.5 ppm (1,300 µg/m^3)	
	24 Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (for certain areas)[11]	–	
	Annual Arithmetic Mean	–		0.030 ppm (for certain areas)[11]	–	
Lead[12,13]	30 Day Average	1.5 µg/m^3	Atomic Absorption	–	–	High Volume Sampler and Atomic Absorption
	Calendar Quarter	–		1.5 µg/m^3 (for certain areas)[12]	Same as Primary Standard	
	Rolling 3-Month Average	–		0.15 µg/m^3		
Visibility Reducing Particles[14]	8 Hour	See footnote 14	Beta Attenuation and Transmittance through Filter Tape	No National Standards		
Sulfates	24 Hour	25 µg/m^3	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride[12]	24 Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

See footnotes on next page.

Table 2
Ambient Air Quality Standards

ppm = parts per million; ppb = parts per billion; $\mu g/m^3$ = micrograms per cubic meter; – = not applicable.

[1] California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, particulate matter (PM_{10}, $PM_{2.5}$, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

[2] National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 $\mu g/m^3$ is equal to or less than one. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the U.S. EPA for further clarification and current national policies.

[3] Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

[4] Any equivalent measurement method which can be shown to the satisfaction of the Air Resources Board to give equivalent results at or near the level of the air quality standard may be used.

[5] National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

[6] National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[7] Reference method as described by the U.S. EPA. An “equivalent method” of measurement may be used but must have a “consistent relationship to the reference method” and must be approved by the U.S. EPA.

[8] On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm.

[9] On December 14, 2012, the national annual $PM_{2.5}$ primary standard was lowered from 15 $\mu g/m^3$ to 12.0 $\mu g/m^3$. The existing national 24-hour $PM_{2.5}$ standards (primary and secondary) were retained at 35 $\mu g/m^3$, as was the annual secondary standards of 15 $\mu g/m^3$. The existing 24-hour PM_{10} standards (primary and secondary) of 150 $\mu g/m^3$ also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.

[10] To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national standards are in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national standards to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.

[11] On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.
Note that the 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.

[12] The ARB has identified lead and vinyl chloride as ‘toxic air contaminants’ with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

[13] The national standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard (1.5 $\mu g/m^3$ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

[14] In 1989, the ARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are “extinction of 0.23 per kilometer” and “extinction of 0.07 per kilometer” for the statewide and Lake Tahoe Air Basin standards, respectively.

SOURCE: CARB 2016a.

An area within a state is designated as either attainment or non-attainment for a particular pollutant. States are required to adopt enforceable plans, known as a State Implementation Plan (SIP), to achieve and maintain air quality meeting the NAAQS. State plans also must control emissions that drift across state lines and harm air quality in downwind states. Once a non-attainment area has achieved the NAAQS for a particular pollutant, it is redesignated as an attainment area for that pollutant. To be redesignated, the area must meet air quality standards for three consecutive years. After redesignation to attainment, the area is known as a maintenance area and must develop a 10-year plan for continuing to meet and maintain air quality standards, as well as satisfy other requirements of the CAA.

3.2 State Regulations

3.2.1 Criteria Pollutants

The California Clean Air Act (CCAA) was enacted in 1988 (California Health & Safety Code (H&SC) §39000 et seq.). Under the CCAA, CARB has developed the California Ambient Air Quality Standards (CAAQS) and generally has set more stringent limits on the criteria pollutants than the NAAQS (see Table 2). In addition to the federal criteria pollutants, the CAAQS also specify standards for visibility-reducing particles, sulfates, hydrogen sulfide, and vinyl chloride (see Table 2).

The state of California is divided geographically into 15 air basins for managing the air resources of the state on a regional basis. Areas within each air basin are considered to share the same air masses and, therefore, are expected to have similar ambient air quality. Similar to the CAA, the state classifies these specific geographic areas as either “attainment” or “nonattainment” areas for each pollutant based on the comparison of measured data with the CAAQS. The SDAB is a non-attainment area for the state ozone standards, the state PM_{10} standard, and the state $PM_{2.5}$ standard.

3.2.2 Toxic Air Contaminants

The public’s exposure to toxic air contaminants (TACs) is a significant public health issue in California. Diesel-exhaust particulate matter emissions have been established as TACs. In 1983, the California Legislature enacted a program to identify the health effects of TACs and to reduce exposure to these contaminants to protect the public health (Assembly Bill [AB] 1807: Health and Safety Code Sections 39650–39674). The Legislature established a two-step process to address the potential health effects from TACs. The first step is the risk assessment (or identification) phase. The second step is the risk management (or control) phase of the process.

The California Air Toxics Program establishes the process for the identification and control of TACs and includes provisions to make the public aware of significant toxic exposures and for reducing risk. Additionally, the Air Toxics “Hot Spots” Information and Assessment Act (AB 2588, 1987, Connelly Bill) was enacted in 1987 and requires stationary sources to report the types and quantities of certain substances routinely released into the air. The goals of the Air Toxics “Hot Spots” Act are to collect emission data, to identify facilities having localized impacts, to ascertain health risks, to notify nearby residents of significant risks, and to reduce those significant risks to acceptable levels.

The Children’s Environmental Health Protection Act, California Senate Bill 25 (Chapter 731, Escutia, Statutes of 1999), focuses on children’s exposure to air pollutants. The act requires CARB to review its air quality standards from a children’s health perspective, evaluate the statewide air monitoring network, and develop any additional air toxic control measures needed to protect children’s health. Locally, toxic air pollutants are regulated through the SDAPCD’s Regulation XII. Of particular concern statewide are diesel-exhaust particulate matter emissions. Diesel-exhaust particulate matter was established as a TAC in 1998, and is estimated to represent a majority of the cancer risk from TACs statewide (based on the statewide average). Diesel exhaust is a complex mixture of gases, vapors, and fine particles. This complexity makes the evaluation of health effects of diesel exhaust a complex scientific issue. Some of the chemicals in diesel exhaust, such as benzene and formaldehyde, have been previously identified as TACs by the CARB and are listed as carcinogens either under the state's Proposition 65 or under the federal Hazardous Air Pollutants program.

Following the identification of diesel particulate matter (DPM) as a TAC in 1998, CARB has worked on developing strategies and regulations aimed at reducing the risk from DPM. The overall strategy for achieving these reductions is found in the Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles (CARB 2000). A stated goal of the plan is to reduce the statewide cancer risk arising from exposure to DPM by 85 percent by 2020.

In April 2005, CARB published the Air Quality and Land Use Handbook: A Community Health Perspective (CARB 2005). The handbook makes recommendations directed at protecting sensitive land uses from air pollutant emissions while balancing a myriad of other land use issues (e.g., housing, transportation needs, economics, etc.). It notes that the handbook is not regulatory or binding on local agencies and recognizes that application takes a qualitative approach. As reflected in the CARB Handbook, there is currently no adopted standard for the significance of health effects from mobile sources. Therefore, the CARB has provided guidelines for the siting of land uses near heavily traveled roadways. Of pertinence to this study, the CARB guidelines indicate that siting new sensitive land uses within 500 feet of a freeway or urban roads with 100,000 or more vehicles/day should be avoided when possible.

As an ongoing process, CARB will continue to establish new programs and regulations for the control of diesel particulate and other air-toxics emissions as appropriate. The continued development and implementation of these programs and policies will ensure that the public’s exposure to DPM will continue to decline.

3.2.3 State Implementation Plan

The SIP is a collection of documents that set forth the state's strategies for achieving the NAAQS. In California, the SIP is a compilation of new and previously submitted plans, programs (such as air quality management plans, monitoring, modeling, permitting, etc.), district rules, state regulations, and federal controls. The CARB is the lead agency for all purposes related to the SIP under federal law. Local air districts and other agencies, such as the Department of Pesticide Regulation and the Bureau of Automotive Repair, prepare SIP elements and submit them to CARB for review and approval. The CARB then forwards SIP revisions to the EPA for approval and publication in the Federal Register. All of the items included in the California SIP are listed in the Code of Federal Regulations (CFR) at 40 CFR 52.220.

The SDAPCD is responsible for preparing and implementing the portion of the SIP applicable to the SDAB. The SIP plans for San Diego County specifically include the Redesignation Request and Maintenance Plan for the 1997 National Ozone Standard for San Diego County (2012), and the 2004 Revision to the California State Implementation Plan for Carbon Monoxide – Updated Maintenance Plan for Ten Federal Planning Areas.

3.2.4 The California Environmental Quality Act

Section 15125(d) of the California Environmental Quality Act (CEQA) Guidelines requires discussion of any inconsistencies between the project and applicable general plans and regional plans, including the applicable air quality attainment or maintenance plan (or SIP).

3.2.5 Senate Bill 1383 Compliance

The waste sector aspects of Senate Bill 1383 ultimately require California to reduce the disposal of organic waste by 75 percent, and to recover 20 percent of edible food currently disposed, by 2025. Achieving these targets is the shared responsibility of the public, industry, local governments, and the state.

3.3 San Diego Air Pollution Control District

The SDAPCD is the agency that regulates air quality in the SDAB. The SDAPCD prepared the Regional Air Quality Strategy (RAQS) to address state requirements, pursuant to the CCAA of 1988 (California H&SC §39000 et seq.). The CCAA requires areas that are designated nonattainment of state ambient air quality standards for ozone, CO, SO_2, or NO_2 to prepare and implement state plans to attain the standards by the earliest practicable date (H&SC §40911(a)). With the exception of state ozone standards, each of these standards has been attained in the SDAB (SDAPCD 2016).

Included in the RAQS are the Transportation Control Measures (TCMs) prepared by the San Diego Association of Governments (SANDAG) that control emissions from mobile sources (SDAPCD 2016). The RAQS and TCM set forth the steps needed to accomplish attainment of CAAQS for ozone. The most recent update of the RAQS and corresponding TCMs were adopted in 2016.

The SDAPCD has also established a set of rules and regulations initially adopted on January 1, 1969, and periodically reviewed and updated. These rules and regulations are available for review on the agency's website.

4.0 Environmental Setting

4.1 Geographic Setting

The project is located in San Diego, approximately 0.7 mile east of the San Diego Bay and 3.2 miles east of the Pacific Ocean. The site is relatively flat; elevations range between approximately 22 feet above mean sea level to 28 feet above mean sea level.

4.2 Climate

The project site, like the rest of San Diego County, has a Mediterranean climate characterized by warm, dry summers and mild, wet winters. Based on meteorological data recorded at the San Diego International Airport, which is approximately 4.5 miles northwest of the project site, the local temperature range is relatively limited, with winter low temperatures along the coast averaging about 49 degrees Fahrenheit (°F), and summer high temperatures average about 74°F. The average annual precipitation is 10.1 inches, falling primarily from December to March. Snowfall is infrequent (Western Regional Climate Center [WRCC] 2017).

The dominant meteorological feature affecting the region is the Pacific High Pressure Zone, which produces the prevailing westerly to northwesterly winds. These winds tend to blow pollutants away from the coast toward the inland areas. Consequently, air quality near the coast is generally better than that what occurs at the base of the coastal mountain range.

Fluctuations in the strength and pattern of winds from the Pacific High Pressure Zone interacting with the daily local cycle produce periodic temperature inversions that influence the dispersal or containment of air pollutants in the SDAB. Beneath the inversion layer pollutants become "trapped" as their ability to disperse diminishes. The mixing depth is the area under the inversion layer. Generally, the morning inversion layer is lower than the afternoon inversion layer. The greater differences between the morning and afternoon mixing depths correspond to increased dispersion of pollutants in the atmosphere.

Throughout the year, the height of the temperature inversion in the afternoon varies between approximately 1,500 and 2,500 feet above mean sea level. In winter, the morning inversion layer is about 800 feet above mean sea level. In summer, the morning inversion layer is about 1,100 feet above mean sea level. Therefore, air quality generally tends to be better in the winter than in the summer.

The prevailing westerly wind pattern is sometimes interrupted by regional “Santa Ana” conditions. A Santa Ana occurs when a strong high pressure develops over the Nevada–Utah area and overcomes the prevailing westerly coastal winds, sending strong, steady, hot, dry northeasterly winds over the mountains and out to sea.

Strong Santa Ana winds tend to blow pollutants out over the ocean, producing clear days. However, at the onset or during breakdown of these conditions, or if the Santa Ana is weak, local air quality may be adversely affected. In these cases, emissions from the South Coast Air Basin to the north are blown out over the ocean, and low pressure over Baja California draws this pollutant-laden air mass southward. As the high pressure weakens, prevailing northwesterly winds reassert themselves and send this cloud of contamination ashore in the SDAB. When this event occurs, the combination of transported and locally produced contaminants produce the worst air quality measurements recorded in the basin.

4.3 Existing Air Quality

Air quality at a particular location is a function of the kinds, amounts, and dispersal rates of pollutants being emitted into the air locally and throughout the basin. The major factors affecting pollutant dispersion are wind speed and direction, the vertical dispersion of pollutants (which is affected by inversions), and the local topography.

Air quality is commonly expressed as the number of days in which air pollution levels exceed state standards set by the CARB or federal standards set by the U.S. EPA. The SDAPCD maintains 10 air-quality monitoring stations located throughout the greater San Diego metropolitan region. Air pollutant concentrations and meteorological information are continuously recorded at these stations. Measurements are then used by scientists to help forecast daily air pollution levels.

The nearest active monitoring station is the San Diego Beardsley Monitoring Station, approximately 2.2 miles northwest of the project site. The San Diego Beardsley Monitoring Station measures ozone, CO, NO_2, PM_{10}, and $PM_{2.5}$. Table 3 provides a summary of measurements collected at the San Diego Beardsley Monitoring Station for the years 2013 through 2015.

4.3.1 Ozone

Nitrogen oxides and hydrocarbons (reactive organic gases [ROG]) are known as the chief “precursors” of ozone. These compounds react in the presence of sunlight to produce ozone, which is the primary air pollution problem in the SDAB. Because sunlight plays such an important role in its formation, ozone pollution—or smog—is mainly a concern during the daytime in summer months. The SDAB is currently designated a federal and state non-attainment area for ozone. During the past 25 years, San Diego had experienced a decline in the number of days with unhealthy levels of ozone despite the region’s growth in population and vehicle miles traveled (SDAPCD 2013).

About half of smog-forming emissions come from automobiles. Population growth in San Diego has resulted in a large increase in the number of automobiles expelling ozone-forming pollutants while operating on area roadways. In addition, the occasional transport of smog-filled air from the South Coast Air Basin only adds to the SDAB's ozone problem. Stricter automobile emission controls, including more efficient automobile engines, have played a large role in why ozone levels have steadily decreased.

Table 3
Air Quality Measurements at the San Diego Beardsley Monitoring Station

Pollutant/Standard	2013	2014	2015
Ozone			
Days State 1-hour Standard Exceeded (0.09 ppm)	0	0	0
Days State 8-hour Standard Exceeded (0.07 ppm)	0	2	0
Days Federal 8-hour Standard Exceeded (0.075 ppm)	0	0	0
Max. 1-hr (ppm)	0.063	0.093	0.089
Max 8-hr (ppm)	0.053	0.072	0.067
Carbon Monoxide			
Days Federal 8-hour Standard Exceeded (35 ppm)	Na	Na	Na
Days State 8-hour Standard Exceeded (20 ppm)	Na	Na	Na
Max. 1-hr (ppm)	Na	Na	Na
Max. 8-hr (ppm)	Na	Na	Na
Nitrogen Dioxide			
Days State 1-hour Standard Exceeded (0.18 ppm)	0	0	0
Days Federal 1-hour Standard Exceeded (0.100 ppm)	0	0	0
Max 1-hr (ppm)	0.072	0.075	0.062
Annual Average (ppm)	0.014	0.013	0.014
PM$_{10}$			
Measured Days State 24-hour Standard Exceeded (50 μg/m^3)	1	0	1
Calculated* Days State 24-hour Standard Exceeded (50 μg/m^3)	6.0	0	5.7
Days Federal 24-hour Standard Exceeded (150 μg/m^3)	0	0	0
State Max. Daily (μg/m^3)	92.0	41.0	53.0
State Annual Average (μg/m^3)	25.4	23.8	23.2
Federal Annual Average (μg/m^3)	24.9	23.3	23.0
PM$_{2.5}$			
Measured Days Federal 24-hour Standard Exceeded (35 μg/m^3)	1	1	0
Calculated* Days Federal 24-hour Standard Exceeded (35 μg/m^3)	1.1	1.0	0.0
Federal Max. Daily (μg/m^3)	37.4	36.7	33.4
State Annual Average (μg/m^3)	10.4	10.2	10.2
Federal Annual Average (μg/m^3)	10.3	10.1	9.3

SOURCE: CARB 2016b.

* Calculated days are the estimated number of days that a measurement would have exceeded the standard had measurements been collected every day. The calculated days that exceeded the standard is not necessarily the number of violations of the standard for the year.

In order to address adverse health effects due to prolonged exposure, the EPA phased out the national 1-hour ozone standard and replaced it with the more protective 8-hour ozone standard. The SDAB is currently a non-attainment area for the previous (1997) national 8-hour standard, and is recommended as a non-attainment area for the revised (2008) national 8-hour standard of 0.075 parts per million (ppm).

Not all of the ozone within the SDAB is derived from local sources. Under certain meteorological conditions, such as during Santa Ana wind events, ozone and other pollutants are transported from the Los Angeles Basin and combine with ozone formed from local emission sources to produce elevated ozone levels in the SDAB.

Local agencies can control neither the source nor the transportation of pollutants from outside the air basin. The SDAPCD's policy, therefore, has been to control local sources effectively enough to reduce locally produced contamination to clean air standards. Through the use of air pollution control measures outlined in the RAQS, the SDAPCD has effectively reduced ozone levels in the SDAB.

Actions that have been taken in the SDAB to reduce ozone concentrations include:

- **Transportation control measures if vehicle travel and emissions exceed attainment demonstration levels.** Transportation control measures are strategies that will reduce transportation-related emissions by reducing vehicle use or improving traffic flow.

- **Enhanced motor vehicle inspection and maintenance program.** The smog check program is overseen by the Bureau of Automotive Repair. The program requires most vehicles to pass a smog test once every two years before registering in the state of California. The smog check program monitors the amount of pollutants automobiles produce. One focus of the program is identifying "gross polluters," or vehicles that exceed two times the allowable emissions for a particular model. Regular maintenance and tune-ups, changing the oil, and checking tire inflation can improve gas mileage and lower air pollutant emissions. It can also reduce traffic congestion due to preventable breakdowns, further lowering emissions.

- **Air Quality Improvement Program.** This program, established by AB 118, is a voluntary incentive program administered by the CARB to fund clean vehicle and equipment projects, research on biofuels production and the air quality impacts of alternative fuels, and workforce training.

4.3.2 Carbon Monoxide

The SDAB is classified as a state attainment area and as a federal maintenance area for CO. Until 2003, no violations of the state standard for CO had been recorded in the SDAB since 1991, and no violations of the national standard had been recorded in the SDAB since 1989. The violations that took place in 2003 were likely the result of massive wildfires that occurred throughout the county. No violations of the state or federal CO standards have occurred since 2003.

Small-scale, localized concentrations of CO above the state and national standards have the potential to occur at intersections with stagnation points such as those that occur on major highways and heavily traveled and congested roadways. Localized high concentrations of CO are referred to as "CO hot spots" and are a concern at congested intersections, where automobile engines burn fuel less efficiently and their exhaust contains more CO.

4.3.3 Particulate Matter

Particulate matter is a complex mixture of microscopic solid or liquid particles including chemicals, soot, and dust. Anthropogenic sources of direct particulate emissions include crushing or grinding operations, dust stirred up by vehicle traffic, and combustion sources such as motor vehicles, power plants, wood burning, forest fires, agricultural burning and industrial processes. Additionally, indirect emissions may be formed when aerosols react with compounds found in the atmosphere.

Health studies have shown a significant association between exposure to particulate matter and premature death in people with heart or lung diseases. Other important effects include aggravation of respiratory and cardiovascular disease, lung disease, decreased lung function, asthma attacks, and certain cardiovascular problems such as heart attacks and irregular heartbeat (U.S. EPA 2016).

As its properties vary based on the size of suspended particles, particulate matter is generally categorized as PM_{10} or $PM_{2.5}$.

4.3.3.1 PM_{10}

PM_{10}, occasionally referred to as “inhalable coarse particles” has an aerodynamic diameter of about one-seventh of the diameter of a human hair. High concentrations of PM_{10} are often found near roadways, construction, mining, or agricultural operations.

4.3.3.2 $PM_{2.5}$

$PM_{2.5}$, occasionally referred to as “inhalable fine particles” has an aerodynamic diameter of about one-thirtieth of the diameter of a human hair. $PM_{2.5}$ is the main cause of haze in many parts of the United States. Federal standards applicable to $PM_{2.5}$ were first adopted in 1997.

4.3.4 Other Criteria Pollutants

The national and state standards for NO_2, oxides of sulfur (SO_X), and the previous standard for lead are being met in the SDAB, and the latest pollutant trends suggest that these standards will not be exceeded in the foreseeable future. As discussed above, new standards for these pollutants have been adopted, and new designations for the SDAB will be determined in the future. The SDAB is also in attainment of the state standards for vinyl chloride, hydrogen sulfides, sulfates, and visibility-reducing particulates.

5.0 Thresholds of Significance

Thresholds used to evaluate potential impacts to air quality are based on applicable criteria in the CEQA Guidelines Appendix G and the City of San Diego Significance Determination Thresholds. The project would have a significant air quality impact if it would (City of San Diego 2016):

1. Obstruct or conflict with the implementation of the RAQS.
2. Result in emissions that would violate any air quality standard or contribute substantially to an existing or projected air quality violation.
3. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including the release of emissions which exceed quantitative thresholds for ozone precursors).
4. Expose sensitive receptors to substantial pollutant concentration including air toxics such as diesel particulates.
5. Create objectionable odors affecting a substantial number of people.

The SDAPCD does not provide specific numeric thresholds for determining the significance of air quality impacts under CEQA. However, the SDAPCD does specify Air Quality Impact Analysis trigger levels for new or modified stationary sources (SDAPCD Rules 20.1, 20.2, and 20.3). The SDAPCD does not consider these trigger levels to represent adverse air quality impacts, rather, if these trigger levels are exceeded by a project, the SDAPCD requires an air quality analysis to determine if a significant air quality impact would occur. While these trigger levels do not generally apply to mobile sources or general land development projects, for comparative purposes these levels are used to evaluate the increased emissions that would be discharged to the SDAB if the project were approved.

The SDAPCD trigger levels are also utilized by the City of San Diego in their Significance Determination Thresholds (City of San Diego 2016) as one of the considerations when determining the potential significance of air quality impacts for projects within the city. The air quality impact screening criteria used in this analysis are shown in Table 4.

Table 4
Air Quality Impact Screening Criteria

Pollutant	Emission Rate		
	Pounds/Hour	Pounds/Day	Tons/Year
NO_X	25	250	40
SO_X	25	250	40
CO	100	550	100
PM_{10}	--	100	15
Lead	--	3.2	0.6
VOC, ROG[1]	--	250	15
$PM_{2.5}$[2]	--	67	10

SOURCE: City of San Diego 2016.

[1] SDAPCD Resolution 16-041 was adopted on April 27, 2016. It amended Rules 20.1, 20.2, and 20.3 and relaxed the Air Quality Impact Analysis trigger level for ROG from 137 to 250 pounds per day. City of San Diego significance thresholds have not been updated to reflect this amendment.

[2] The City does not specify a threshold for $PM_{2.5}$. Threshold here is based on SDAPCD, Rules 20.2 and 20.3.

NOx = oxides of nitrogen; SOx = oxides of sulfur; CO = carbon monoxide; PM_{10} = 10-micron particulate matter; VOC = volatile organic compounds; ROG = reactive organic gas; $PM_{2.5}$ = 2.5-micron particulate matter

6.0 Air Quality Assessment

Air emissions were calculated using California Emissions Estimator Model (CalEEMod) 2016.3.2 (California Air Pollution Control Officers Association 2017). The CalEEMod program is a tool used to estimate air emissions resulting from land development projects based on California-specific emission factors. The model estimates mass emissions from two basics sources: construction sources and operational sources (i.e., area and mobile sources).

Inputs to CalEEMod include such items as the air basin containing the project, land uses, trip generation rates, trip lengths, vehicle fleet mix (percentage of autos, medium truck, etc.), trip destination (i.e., percent of trips from home to work, etc.), duration of construction phases, construction equipment usage, grading areas, season, and ambient temperature, as well as other parameters. The CalEEMod output files contained in Attachment 1 indicate the specific outputs for each model run. Emissions of NO_x, CO, SO_x, PM_{10}, $PM_{2.5}$, and ROG are calculated. Emission factors are not available for lead, and consequently, lead emissions are not calculated. The SDAB is currently in attainment of the state and federal lead standards. Furthermore, fuel used in construction equipment and most other vehicles is not leaded.

6.1 Construction Emissions

Construction-related activities are temporary, short-term sources of air emissions. Sources of construction-related air emissions include:

- Fugitive dust from grading activities;
- Construction equipment exhaust; and
- Construction-related trips by workers and material-hauling trucks.

Construction-related pollutants result from dust raised during demolition and grading, emissions from construction vehicles, and chemicals used during construction. Fugitive dust emissions vary greatly during construction and are dependent on the amount and type of activity, silt content of the soil, and the weather. Vehicles moving over paved and unpaved surfaces, demolition, excavation, earth movement, grading, and wind erosion from exposed surfaces are all sources of fugitive dust.

Heavy-duty construction equipment is usually diesel powered. In general, emissions from diesel-powered equipment contain more NO_X, SO_X, and particulate matter than gasoline-powered engines. However, diesel-powered engines generally produce less CO and less ROG than do gasoline-powered engines. Standard construction equipment includes backhoe loaders, rubber-tired dozers, excavators, graders, cranes, forklifts, rollers, paving equipment, generator sets, welders, cement and mortar mixers, and air compressors.

Construction emissions were modeled assuming construction would begin in January 2018 and is anticipated to last for 12 to 13 months. Primary inputs are the numbers of each piece of equipment and the length of each construction stage. Specific construction phasing and equipment parameters are not available at this time. However, CalEEMod can estimate the required construction equipment when project-specific information is unavailable. The estimates are based on surveys, performed by the South Coast Air Quality Management District and the Sacramento Metropolitan Air Quality Management District, of typical construction projects which provide a basis for scaling equipment needs and schedule with a project's size. Air emission estimates in CalEEMod are based on the duration of construction phases; construction equipment type, quantity, and usage; grading area; season; and ambient temperature, among other parameters. Project construction would occur in six stages: demolition, site preparation, grading/excavation, building construction, paving, and architectural coatings. Grading cut and fill would necessitate approximately 6,000 cubic yards of soil export.

Architectural coatings would comply with SDAPCD Rule 67, which limits the volatile organic compounds (VOC) content of paints sold within San Diego County. An architectural coating VOC limit of 100 grams per liter was modeled for interior coatings and 150 grams per liter for exterior coatings was used to reflect the requirements of SDAPCD Rule 67.

Table 5 shows the total projected construction maximum daily emission levels for each criteria pollutant. The CalEEMod output files for construction emissions are contained in Attachment 1.

Table 5
Summary of Worst-case Construction Emissions
(pounds per day)

	Pollutant					
	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
2018	66	64	20	>1	10	5
2019	66	2	2	>1	>1	>1
Maximum Daily Emissions	**66**	**64**	**20**	>1	**10**	**5**
Significance Threshold	*250*	*250*	*550*	*250*	*100*	*67*

ROG = reactive organic gas; NOx = oxides of nitrogen; CO = carbon monoxide; SOx = oxides of sulfur; PM_{10} = 10-micron particulate matter; $PM_{2.5}$ = 10-micron particulate matter

For assessing the significance of the air quality emissions resulting during construction of the project, the construction emissions were compared to the significance thresholds shown in Table 5. As shown, maximum daily construction emissions are projected to be less than the applicable thresholds for all criteria pollutants.

6.2 Operation Emissions

Operation emissions are long term and include mobile and area sources. Sources of operational emissions include:

- Vehicle trips generated by the project;
- Natural gas use for space and water heating;
- Dust from waste material movement;
- Consumer products and architectural coatings;
- Landscaping equipment; and
- Emissions from operation of the AD facility and subsequent emissions from generation of electricity or fueling of waste collection vehicles.

As discussed previously, the project would renovate and expand the existing ERT facility. This analysis assesses all consumer product, architectural coating, and landscaping equipment emissions associated with the proposed ERT facility. The project would not propose increased daily tonnage or increased daily heavy truck traffic; however it would result in an increase in trip generation due to additional staff. Based on the project Parking and Trip Generation Study, the project would generate 158 additional vehicle trips per day (Kimley-Horn 2017). An average regional trip length of 5.8 miles for urban areas was used to determine vehicle miles traveled (VMT) based on SANDAG regional data (SANDAG 2014).

Natural gas produced by the AD facility may be used either to generate electricity or a fuel for waste collection vehicles. Emissions associated with both the generation of electricity and fueling of waste collection vehicles are included in the assessment.

Dust from waste material movement would be generated when waste materials are deposited on the tipping floor. As this would occur indoors, nuisance dust control practices would minimize release from the facility.

The project would use natural gas for space and water heating. Natural gas use values were calculated in CalEEMod and are based on energy values from the CEC-sponsored California Commercial End Use Survey, which identifies energy use by building type and climate zone.

Area sources of emissions can include the use of hearths (fireplaces), consumer products, architectural coatings, and landscaping equipment. There are no hearths or woodstoves associated with the project. Use of consumer products and landscaping equipment is estimated based on land use. As with construction, 100 grams per liter was modeled for interior coatings and 150 grams per liter for exterior coatings was used to reflect the requirements of SDAPCD Rule 67. Table 6 summarizes emissions associated with project energy use and area sources other than the AD facility.

Table 6
Project Operational Emissions without AD Facility
(pounds per day)

Source	Pollutant					
	ROG	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
Area Sources	1	>1	>1	>1	>1	>1
Energy Sources	>1	>1	>1	>1	>1	>1
Mobile Sources	>1	1	3	>1	1	>1
Total	2	1	3	>1	1	>1
Significance Threshold	*250*	*250*	*550*	*250*	*100*	*67*
Exceeds Threshold?	**No**	**No**	**No**	**No**	**No**	**No**

NOTE: Totals may vary due to independent rounding.
ROG = reactive organic gas; NOx = oxides of nitrogen; CO = carbon monoxide; SOx = oxides of sulfur; PM_{10} = 10-micron particulate matter; $PM_{2.5}$ = 10-micron particulate matter

The AD facility could be a substantial source of criteria pollutant emissions. Specific AD facility components that are sources of emissions include the generator used for the production of electricity or the boiler used to pretreat natural gas for use in compressed natural gas (CNG) fueled waste collection vehicles. An Emissions Estimate, Organics Management Report was prepared for a similar EDCO AD facility in Escondido in January 2014. The report assessed the potential air quality emissions from a 31,200 tons per year (tpy) (120 tons per weekday) AD facility and associated components for electricity or CNG production (Edgar & Associates 2014). According to the report, processes and associated emissions would vary depending on whether natural gas from the AD facility is used to produce electricity or produce CNG for waste collection vehicles. If natural gas from an AD facility is used for electricity generation, natural gas would be flared (burned) to produce electricity and would thereby generates criteria pollutant emissions. If natural gas is used for CNG-fueled vehicles, on-site emissions would result from flaring of waste gas and heating of the AD facility and off-site emissions would result from combustion of CNG as vehicle fuel. Table 7 summarizes overall (on-site and off-site) criteria pollutant emissions rates under each AD facility output scenario.

Table 7
Anaerobic Digester Facility Emission Rates
(pounds per thousand tons)

Pollutant	Emissions by Biogas Use[1]	
	Electricity Generation	Vehicle-Fuel
ROG	176	74
NO_x	680	54
CO	1,540	160
SO_x	385	26
PM_{10}[2]	0	2
$PM_{2.5}$[2]	0	2

SOURCE: Edgar & Associates 2014
[1] Reported emissions divided by the annual tonnage (31,200 tpy) of the assessed facility.
[2] Report gives PM values. Conservatively assumed all PM is $PM_{2.5}$.
ROG = reactive organic gas; NOx = oxides of nitrogen; CO = carbon monoxide;
SOx = oxides of sulfur; PM_{10} = 10-micron particulate matter;
$PM_{2.5}$ = 10-micron particulate matter

The average throughput of the AD facility is anticipated be between 100 and 200 tons of organic waste per day. This analysis assesses maximum daily emissions associated with 200 tons of organic waste per day. Table 8 summarizes daily AD facility emissions that would occur under each scenario. Table 8 also summarizes the total project operational emissions under each scenario.

Table 8
Project Emissions with Anaerobic Digester
(pounds per day)

Pollutant	Emissions by Biogas Use[1]		Total Emissions[2]		Significance Thresholds	Exceeds?
	Electricity	Vehicle-Fuel	Electricity	Vehicle-Fuel		
ROG	35	15	37	17	250	No/No
NO_x	136	11	137	12	250	No/No
CO	309	32	312	35	550	No/No
SO_x	77	5	77	5	250	No/No
PM_{10}[3]	0	>1	1	1	100	No/No
$PM_{2.5}$[3]	0	>1	>1	1	67	No/No

SOURCE: Edgar & Associates 2014.
[1] Reported emissions assume 200 tons per day of material is processed by AD Facility.
[2] Emissions from biogas use were added to project operational emissions without AD facility (See Table 6). Totals may vary due to independent rounding.
[3] Report gives PM values. Conservatively assumed all PM is $PM_{2.5}$.
ROG = reactive organic gas; NOx = oxides of nitrogen; CO = carbon monoxide; SOx = oxides of sulfur;
PM_{10} = 10-micron particulate matter; PM = 10-micron particulate matter

As shown in Table 8, regardless of whether natural gas produced by the AD facility would be used to generate electricity or fuel waste collection vehicles, project emissions would be less than applicable significance thresholds for all criteria pollutants.

6.3 Impact Analysis

1. Would the project obstruct or conflict with the implementation of the San Diego RAQS?

The CAA and CCAA require areas that are designated as non-attainment areas of ambient air quality standards for ozone, CO, SO_2, and NO_2 to prepare and implement plans to attain the standards. The SDAB is designated as a non-attainment area for the state ozone standard. Accordingly, the RAQS was developed to identify feasible emission control measures and provide expeditious progress toward attaining the state standards for ozone. The two pollutants addressed in the RAQS are ROG and NOx, which are precursors to the formation of ozone. Projected increases in motor vehicle usage, population, and growth create challenges in controlling emissions and, by extension, to maintaining and improving air quality. The RAQS, in conjunction with the transportation control measures, were most recently adopted in 2016 as the air quality plan for the region. The RAQS emissions budgets and reductions are based on emissions information from CARB and population growth and vehicle miles traveled (VMT) projections prepared by SANDAG.

SANDAG growth projections are based on land use plans developed by local jurisdictions. These are used to develop population growth projections and increase in regional VMT. As such, projects that propose development that is consistent with the growth anticipated by the local land use plan would be consistent with the SANDAG's growth projections and the RAQS emissions estimates. In the event that a project would propose development that is less dense than anticipated by the growth projections, the project would likewise be consistent with the RAQS. In the event a project proposes development that is greater than anticipated in the growth projections, further analysis would be warranted to determine if the project would exceed the growth projections used in the RAQS for the specific subregional area.

The project would not change the land use of the existing ERT facility parcels. The project would increase the size of the site from 1.60 acres to 2.06 acres through the vacation and appropriation of the alley to the northeast of the existing ERT facility and the incorporation of the parcel to the northwest of the existing ERT facility. Thus, the project would change the land use of the alley to the northeast of the existing ERT facility and the parcel to the northwest of the existing ERT facility. The parcels and the ally (which is considered part of the City's right-of-way) have Residential/Commercial/Industrial land use designation as identified in the Barrio Logan Harbor 101 Community Plan. As the project would include industrial use that is consistent with the land use designation, the project would be consistent with growth anticipated by the City's General Plan and thus SANDAG's population growth and VMT projections. As RAQS emissions forecasts are based on land use assumptions from the City General Plan and SANDAG growth projections, the project is also accounted for in the RAQS emissions estimates. Therefore, the project would not obstruct or conflict with implementation of the San Diego RAQS. Impacts to the San Diego RAQS would be less than significant.

2. *Would the project result in emissions that would violate any air quality standard or contribute substantially to an existing or projected air quality violation?*

As shown in Tables 5 and 8, air emissions associated with project construction and operation would not exceed the applicable City significance thresholds. These thresholds are designed to provide limits below which project emissions would not significantly change regional air quality. Therefore, as project air emissions would be below these limits, the project would not result in regional emissions exceeding the NAAQS or CAAQS or contributing to existing violations. Impacts to air quality standards would be less than significant.

3. *Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including release emissions which exceed quantitative thresholds for ozone precursors)?*

The region is classified as attainment for all criteria pollutants except ozone under both the CAA and CCAA. The region is also classified as non-attainment under the CAA for PM_{10}, and $PM_{2.5}$. Ozone is not emitted directly, but is a result of atmospheric activity on precursors. NO_X and ROG are known as the chief "precursors" of ozone. These compounds react in the presence of sunlight to produce ozone. The majority of sources of PM_{10} and $PM_{2.5}$ emissions include crushing or grinding operations, dust stirred up by vehicle traffic, and combustion sources such as motor vehicles, power plants, wood burning, forest fires, agricultural burning, and industrial processes.

As discussed under threshold 2, emissions of ozone precursors (ROG and NO_X), PM_{10}, and $PM_{2.5}$ from construction and operation would be below the City's significance thresholds. The City's significance thresholds reflect the SDAPCD's Air Quality Impact Analysis trigger levels. The SDAPCD developed AQIA trigger levels to identify sources with emissions that are too small to cause or substantially contribute to violations of NAAQS or CAAQS and therefore do not warrant further air quality analysis or permitting. Because project emissions would not exceed SDAPCD air quality impact analysis trigger levels, the project would not generate emissions in quantities that would substantially contribute to a cumulatively considerable net increase of ozone, PM_{10}, or $PM_{2.5}$. Impacts to regional attainment of air quality standards would be less than significant.

4. *Would the project expose sensitive receptors to substantial pollutant concentration including air toxics such as diesel particulates?*

The term "sensitive receptor" refers to a person in the population who is more susceptible to health effects due to exposure to an air contaminant than the population at large or to a land use that may reasonably be associated with such a person. Examples include residences, schools, childcare centers, retirement homes, long-term health care facilities, and outdoor recreation areas, such as athletic fields.

Sensitive receptors in the project vicinity include residences at 3657 Dalbergia Street and 2004 Vesta Street immediately south across Dalbergia Street, and 3704 Dalbergia Street and 1929 Vesta Street immediately southeast across Vesta Street. Various other single- and multi-family residences are intermixed throughout the neighborhood or located across Interstate 5.

CO Hot Spots

A CO hot spot is a localized area where CO standards are exceeded. CO hot spots typically occur as a result of severe vehicle congestion at signalized intersections of major roadways. An appropriate qualitative screening procedure is provided in the procedures and guidelines contained in Transportation Project-Level Carbon Monoxide Protocol (the Protocol) to determine whether a project poses the potential for a CO hot spot to occur (U.C. Davis Institute of Transportation Studies 1997).

According to the Protocol, a project may result in or contribute to a CO hotspot if it increases traffic volumes significantly over existing volumes (5 percent or more), or otherwise worsens traffic flow. The project would result in a trip generation increase of 158 trips due to the increased number of employees. This limited increase is not anticipated to result in a significant increase (5 percent or more) in existing traffic volumes at any signalized intersection. Therefore, the project would not result in or contribute to a CO hotspot. Localized air quality impacts from CO hotspots would be less than significant.

Construction-related Diesel Particulate Matter

Construction of the project would result in the generation of diesel-exhaust DPM emissions from the use of off-road diesel equipment required for site grading and excavation, paving, and other construction activities and on-road diesel equipment used to bring materials to and from the project site.

Generation of DPM from construction projects typically occurs in a single area for a short period. Construction of the project would occur over an approximate 13-month period. The dose to which the receptors are exposed is the primary factor used to determine health risk. Dose is a function of the concentration of a substance or substances in the environment and the extent of exposure that person has with the substance. Dose is positively correlated with time, meaning that a longer exposure period would result in a higher exposure level for the Maximally Exposed Individual. The risks estimated for a Maximally Exposed Individual are higher if a fixed exposure occurs over a longer period of time. According to the Office of Environmental Health Hazard Assessment (OEHHA), health risk assessments, which determine the exposure of sensitive receptors to toxic emissions, should be based on a 30-year exposure period; however, such assessments should be limited to the period/duration of activities associated with the project (OEHHA 2015). Thus, if the duration of proposed construction activities near any specific sensitive receptor was 13-months, the exposure would be three to four percent of the total exposure period used for health risk calculation.

SDAPCD Rule 1210 establishes a health risk public notification threshold for incremental cancer risk of 10 in 1 million. DPM generated by project construction is not expected to create conditions where the probability is greater than 10 in 1 million of contracting cancer for the Maximally Exposed Individual or to generate ground-level concentrations of noncarcinogenic TACs that exceed a Hazard Index greater than 1 for the Maximally Exposed Individual. Additionally, with ongoing implementation of U.S. EPA and CARB requirements for cleaner fuels; off-road diesel engine retrofits; and new, low-emission diesel engine types, the DPM emissions of individual equipment would be substantially reduced over the years as the project construction continues. Therefore, project construction would not expose sensitive receptors to a substantial pollutant concentration. Localized air quality impacts from construction-related DPM emissions would be less than significant.

Operations-related Diesel Particulate Matter

Vehicles (primarily heavy-duty trucks) emit diesel particulates through the combustion of diesel fuel. During operation, heavy trucks delivering waste are currently diesel-fueled. The project would not result in increased daily heavy truck traffic as compared to the existing ERT facility. Therefore, the project would not result in an increase of DPM emissions. Project operation would not expose sensitive receptors to substantial pollutant concentration. Localized air quality impacts from operation-related DPM emissions would be less than significant.

5. *Would the project create objectionable odors affecting a substantial number of people?*

As discussed previously, sensitive receptors in the project vicinity include residences at 3657 Dalbergia Street and 2004 Vesta Street immediately south across Dalbergia Street, and 3704 Dalbergia Street and 1929 Vesta Street immediately southeast across Vesta Street. Various other single- and multi-family residences are intermixed throughout the neighborhood or located across Interstate 5. The project site is not in proximity to other non-sensitive receptors at which a substantial number of people may gather (e.g. promenades, parks, schools, etc.).

Based on meteorological data recorded at the San Diego International Airport, meteorological conditions at the project site are commonly characterized by westerly onshore winds. Mean wind speeds range from 5.6 to 7.9 miles per hour and are westerly-northwesterly (WRCC 2017). The prevailing westerly wind pattern is sometimes interrupted by regional “Santa Ana” conditions. Under “Santa Ana” conditions, easterly winds may occur.

The existing ERT facility is a waste transfer station. As transfer stations store and process solid waste, odor is a common concern associated with transfer stations. The project would expand the existing ERT building to accommodate a larger tipping area and increased waste diversion. The project would not alter existing odor control practices implemented at the ERT facility. As odors associated with materials tipping and separation are already associated with the ERT facility and the project would not alter existing waste odor control practices implemented at the ERT facility, the expansion of the ERT building is not anticipated to result in additional odors that affect a substantial number of people.

The project proposes an AD facility. The AD process involves the decomposition of food waste, green waste, and other organic materials in anaerobic condition. Whereas the hold time for the other waste streams would be limited to 48 hours, organic waste processed at the AD facility would remain onsite for approximately 21 days. The AD process generates numerous potent odorants during the decomposition of organics. Primary odorants of concern include ammonia (NH_3) and hydrogen sulfide (H_2S). Without odor mitigation, the project may generate objectionable odors that affect a substantial number of people.

Mitigation measures AIR-1 and AIR-2 would address the project's potential odor impacts.

AIR-1: Odor Minimization through Site Design

Requirements on Applicant

Prior to operation of the anaerobic digestion facility, the Applicant (EDCO Disposal Corporation) shall demonstrate to the satisfaction of City's Director of the Department of Development Service (DSD) staff that the following measures have been incorporated into the project:

- The anaerobic digestion facility including the anaerobic digesters and the area where feedstock will be received shall be enclosed.
- A separate exhaust air system shall be installed to maintain an inward air flow from all entrances to the anaerobic digestion facility and outflow through a biofilter exhaust system.
- The biofilter exhaust system shall be equipped with ammonia and hydrogen sulfide removal components.
- Exhaust flares shall be designed such that natural gas generated by the anaerobic digestion facility may be supplemented with utility-provided natural gas to maintain uninterrupted combustion of exhaust gases during all phases of operation of the anaerobic digestion facility.
- Compressed natural gas intended for use as vehicle fuel shall be processed to remove odorous compounds such as hydrogen sulfide.

AIR-2: Odor Minimization through Management Practices

Requirements on Applicant

Prior to operation of the anaerobic digestion facility, the Applicant shall submit an Odor Impact Management Plan or Best Odor Management Practice Feasibility Report for the review and approval of the LEA consistent with California Code of Regulations Title 14 Sections 17896.30 or 17896.31.The Applicant shall notify the Director of DSD of any changes to management practices outlined in the odor minimization plan prior to implementation of changes as feasible. The odor minimization plan shall outline implementation of the following management practices including, but not limited to the following:

- The applicant shall designate and train staff members responsible for response to odor complaints. Upon receipt of a complaint, a designated staff member shall:
    - Document the odor complaint.
    - Go to the location at which the odor complaint originated or the nearest property line to the location at which the complaint originated.
    - Investigate equipment possible sources of odors.
    - Where an odor source is identified, promptly implement reasonable control measures to reduce or eliminate the source of the odor.
    - Where an odor source is identified and control measures do not eliminate the source of the odor the staff member shall notify and consult with San Diego Air Pollution Control District staff within 24 hours.
- The exhaust air system shall be active at all times when doors to the anaerobic digestion facility are open as needed to control odor.
- Implement best management practices to prevent and/or promptly remove standing water from the site.
- Where loads are overly contaminated and/or odoriferous and may release odors upon tipping, loads shall be rerouted to landfills.

With incorporation of mitigation measures AIR-1 and AIR-2, the AD Facility would be placed under negative pressure that would draw any potential odors through a biofilter exhaust system. Biofilters have been proven effective at removing odors from air that are caused by decomposition of organics associated with green waste and food waste handling and processing (South Coast Air Quality Management District 2002). Mitigation measures AIR-1 and AIR-2 would minimize odor potential associated with ERT facility operations including operation of the AD Facility. Odors from these sources are not anticipated to affect a substantial number of people with the implementation of mitigation measures AIR-1 and AIR-2. Project odor impacts would be less than significant with mitigation incorporated.

7.0 Conclusions

The project was evaluated for consistency with the RAQS. The project would include industrial uses that is consistent with the land use designation. Therefore, the project would not obstruct or conflict with implementation of the RAQS.

As shown in Tables 5 and 8, emissions associated with construction and operation of the project would not exceed the applicable City significance thresholds. These thresholds are designed to provide limits below which project emissions would not significantly change regional air quality. Therefore, as project emissions would be well below these limits, project construction would not result in regional emissions that would exceed NAAQS or CAAQS or contribute to existing violations. Impacts to regional air quality would be less than significant.

The project was evaluated to determine if it would expose sensitive receptors to substantial pollutant concentration, including air toxics such as DPM or CO hot spots. Sensitive receptors in the project vicinity include residences at 3657 Dalbergia Street and 2004 Vesta Street immediately south across Dalbergia Street, and 3704 Dalbergia Street and 1929 Vesta Street immediately southeast across Vesta Street. Various other single- and multi-family residences are intermixed throughout the neighborhood or located across Interstate 5. Construction of the project would result in the generation of diesel-exhaust DPM emissions from the use of off-road diesel equipment. However, generation of DPM from construction would only last for approximately a year, which is roughly 3 to 4 percent of the total exposure period used for health risk calculation. Relative to the exposures at which cancer risks are typically assessed, the project exposure would be significantly more short term. Due to the short-term nature of construction, the project is not anticipated to result in cancer risk that exceeds SDAPCD Rule 1210 thresholds for incremental cancer risk. The project would not result in an increase of heavy truck traffic as compared to the existing ERT facility. Therefore, the project would not expose sensitive receptors to increase DPM emissions. Additionally, as the project would not result in a significant increase (5 percent or more) in traffic volumes at any signalized intersection, the project would not result in or contribute to a CO hotspot. Localized air quality impacts would be less than significant.

The project includes construction of an AD Facility. The AD process generates numerous potent odorants during the decomposition of organics. As stated in Section 6.3, there are sensitive receptors adjacent the ERT facility. Without mitigation, the project may generate objectionable odors that could affect a substantial number of people. Mitigation measures AIR-1 and AIR-2 would require a negative pressure system, a biofilter exhaust system, and an odor minimization plan. With incorporation of mitigation measures AIR-1 and AIR-2, the project would not expose a substantial number of people to objectionable odors. Odor impacts would be less than significant with mitigation incorporated.

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ATTACHMENT 1

CalEEMod Output – Project Emissions

Summary Book - Emissions other than AD Facility

Air Quality

Air Quality Emissions Estimate		Pollutant (lbs/day)					
		ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Summer	Construction	66	64	19	0	10	5
	Area	1	0	0	0	0	0
	Energy	0	0	0	0	0	0
	Mobile	0	1	3	0	1	0
Winter	Construction	66	65	20	0	10	5
	Area	1	0	0	0	0	0
	Energy	0	0	0	0	0	0
	Mobile	0	1	3	0	1	0

Unmitigated Air Quality Emissions Estimate	Pollutant (lbs/day)					
	ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Maximum Daily Construction Emissions	**66**	**65**	**20**	**0**	**10**	**5**
Maximum Daily Operation Emissions	**2**	**1**	**3**	**0**	**1**	**0**

AD Facility Calculations

31,200 TPY AD Facility (tpy)		
Pollutant	Electricity Generation	Vehicle Fuel
VOC	2.74	1.16
NO_X	10.6	0.84
CO	24.1	2.5
SO_2	6	0.4
PM	0	0.03

31,200 TPY AD Facility (lb per 1,000 tons)		
Pollutant	Electricity Generation	Vehicle Fuel
VOC	175.641	74.359
NO_X	679.487	53.846
CO	1544.872	160.256
SO_2	384.615	25.641
PM	0.000	1.923

Project Emissions (lbs per day with 200 tpd organics)		
Pollutant	Electricity Generation	Vehicle Fuel
VOC	35	15
NO_X	136	11
CO	309	32
SO_2	77	5
PM_{10}	0	0.38
$PM_{2.5}$	0	0.38

EDCO Material Recovery & Transfer Station Expansion Project

San Diego County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	3.20	1000sqft	0.07	3,200.00	0
General Heavy Industry	57.50	1000sqft	1.32	57,500.00	0
Other Non-Asphalt Surfaces	0.07	Acre	0.07	3,049.20	0
Parking Lot	0.62	Acre	0.62	27,007.20	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	40
Climate Zone	13			**Operational Year**	2020
Utility Company	San Diego Gas & Electric				
CO2 Intensity (lb/MWhr)	720.49	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Land Use - Project Total Area = 60,680 sf; 3,150 sf offices and 57,530 sf other. Project site = 2.04 acres; 1.35 acre building, 0.07 acre landscaping, remaining 0.62 acres paved.

Demolition - 34,000 sf of asphalt removal, 6 inches depth = 17,000 cubic feet; 145 lbs/foot; 1,233 tons

Grading - 6,000 cubic yards of soil export

Architectural Coating - SDAPCD Rule 67.0

Vehicle Trips - Employee trips would increase by 158 trips per day (158 trips / 3.2 ksf = 49.4 tips/ksf).

Area Coating - SDAPCD Rule 67.0

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	250.00	150.00
tblArchitecturalCoating	EF_Nonresidential_Interior	250.00	100.00
tblAreaCoating	Area_EF_Nonresidential_Exterior	250	150
tblAreaCoating	Area_EF_Nonresidential_Interior	250	100
tblGrading	MaterialExported	0.00	6,000.00
tblVehicleTrips	ST_TR	1.50	0.00
tblVehicleTrips	ST_TR	2.46	49.40
tblVehicleTrips	SU_TR	1.50	0.00
tblVehicleTrips	SU_TR	1.05	49.40
tblVehicleTrips	WD_TR	1.50	0.00
tblVehicleTrips	WD_TR	11.03	49.40

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	65.7244	64.0793	18.9228	0.1221	8.9593	1.4449	10.2846	4.0092	1.3509	5.2342	0.0000	13,101.6209	13,101.6209	1.6137	0.0000	13,141.9631
2019	65.6896	1.8573	2.0889	3.6700e-003	0.0657	0.1292	0.1950	0.0174	0.1292	0.1466	0.0000	351.0640	351.0640	0.0260	0.0000	351.7139
Maximum	**65.7244**	**64.0793**	**18.9228**	**0.1221**	**8.9593**	**1.4449**	**10.2846**	**4.0092**	**1.3509**	**5.2342**	**0.0000**	**13,101.6209**	**13,101.6209**	**1.6137**	**0.0000**	**13,141.9631**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	65.7244	64.0793	18.9228	0.1221	8.9593	1.4449	10.2846	4.0092	1.3509	5.2342	0.0000	13,101.6209	13,101.6209	1.6137	0.0000	13,141.9631
2019	65.6896	1.8573	2.0889	3.6700e-003	0.0657	0.1292	0.1950	0.0174	0.1292	0.1466	0.0000	351.0640	351.0640	0.0260	0.0000	351.7139
Maximum	**65.7244**	**64.0793**	**18.9228**	**0.1221**	**8.9593**	**1.4449**	**10.2846**	**4.0092**	**1.3509**	**5.2342**	**0.0000**	**13,101.6209**	**13,101.6209**	**1.6137**	**0.0000**	**13,141.9631**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.4894	6.0000e-005	6.3100e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		0.0134	0.0134	4.0000e-005		0.0143
Energy	0.0216	0.1959	0.1646	1.1800e-003		0.0149	0.0149		0.0149	0.0149		235.0711	235.0711	4.5100e-003	4.3100e-003	236.4680
Mobile	0.2814	1.1199	3.0762	9.9300e-003	0.8011	9.6000e-003	0.8107	0.2141	9.0100e-003	0.2231		1,007.6313	1,007.6313	0.0541		1,008.9845
Total	**1.7923**	**1.3158**	**3.2471**	**0.0111**	**0.8011**	**0.0245**	**0.8256**	**0.2141**	**0.0239**	**0.2380**		**1,242.7158**	**1,242.7158**	**0.0587**	**4.3100e-003**	**1,245.4668**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.4894	6.0000e-005	6.3100e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		0.0134	0.0134	4.0000e-005		0.0143
Energy	0.0216	0.1959	0.1646	1.1800e-003		0.0149	0.0149		0.0149	0.0149		235.0711	235.0711	4.5100e-003	4.3100e-003	236.4680
Mobile	0.2814	1.1199	3.0762	9.9300e-003	0.8011	9.6000e-003	0.8107	0.2141	9.0100e-003	0.2231		1,007.6313	1,007.6313	0.0541		1,008.9845
Total	**1.7923**	**1.3158**	**3.2471**	**0.0111**	**0.8011**	**0.0245**	**0.8256**	**0.2141**	**0.0239**	**0.2380**		**1,242.7158**	**1,242.7158**	**0.0587**	**4.3100e-003**	**1,245.4668**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2018	1/26/2018	5	20	
2	Site Preparation	Site Preparation	1/27/2018	1/31/2018	5	3	
3	Grading	Grading	2/1/2018	2/8/2018	5	6	
4	Building Construction	Building Construction	2/9/2018	12/13/2018	5	220	
5	Paving	Paving	12/14/2018	12/27/2018	5	10	
6	Architectural Coating	Architectural Coating	12/28/2018	1/10/2019	5	10	

Acres of Grading (Site Preparation Phase): 4.5

Acres of Grading (Grading Phase): 3

Acres of Paving: 0.69

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 91,050; Non-Residential Outdoor: 30,350; Striped Parking Area:

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Rubber Tired Dozers	1	8.00	247	0.40
Demolition	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Site Preparation	Graders	1	8.00	187	0.41
Site Preparation	Scrapers	1	8.00	367	0.48
Site Preparation	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	2	7.00	97	0.37
Building Construction	Cranes	1	8.00	231	0.29
Building Construction	Forklifts	2	7.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Building Construction	Welders	3	8.00	46	0.45
Paving	Cement and Mortar Mixers	1	8.00	9	0.56
Paving	Pavers	1	8.00	130	0.42
Paving	Paving Equipment	1	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	5	13.00	0.00	122.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	3	8.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	10.00	0.00	750.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	8	38.00	15.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	8.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.3357	0.0000	1.3357	0.2023	0.0000	0.2023			0.0000			0.0000
Off-Road	2.4838	24.3641	15.1107	0.0241		1.4365	1.4365		1.3429	1.3429		2,391.1659	2,391.1659	0.6058		2,406.3105
Total	**2.4838**	**24.3641**	**15.1107**	**0.0241**	**1.3357**	**1.4365**	**2.7722**	**0.2023**	**1.3429**	**1.5452**		**2,391.1659**	**2,391.1659**	**0.6058**		**2,406.3105**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0558	1.9403	0.4002	4.9100e-003	0.1066	7.6300e-003	0.1142	0.0292	7.3000e-003	0.0365		533.6003	533.6003	0.0470		534.7762
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0553	0.0399	0.4450	1.1700e-003	0.1068	7.7000e-004	0.1076	0.0283	7.1000e-004	0.0290		116.6392	116.6392	3.9900e-003		116.7390
Total	**0.1112**	**1.9801**	**0.8452**	**6.0800e-003**	**0.2134**	**8.4000e-003**	**0.2218**	**0.0575**	**8.0100e-003**	**0.0656**		**650.2395**	**650.2395**	**0.0510**		**651.5152**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.3357	0.0000	1.3357	0.2023	0.0000	0.2023			0.0000			0.0000
Off-Road	2.4838	24.3641	15.1107	0.0241		1.4365	1.4365		1.3429	1.3429	0.0000	2,391.1659	2,391.1659	0.6058		2,406.3105
Total	**2.4838**	**24.3641**	**15.1107**	**0.0241**	**1.3357**	**1.4365**	**2.7722**	**0.2023**	**1.3429**	**1.5452**	**0.0000**	**2,391.1659**	**2,391.1659**	**0.6058**		**2,406.3105**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0558	1.9403	0.4002	4.9100e-003	0.1066	7.6300e-003	0.1142	0.0292	7.3000e-003	0.0365		533.6003	533.6003	0.0470		534.7762
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0553	0.0399	0.4450	1.1700e-003	0.1068	7.7000e-004	0.1076	0.0283	7.1000e-004	0.0290		116.6392	116.6392	3.9900e-003		116.7390
Total	**0.1112**	**1.9801**	**0.8452**	**6.0800e-003**	**0.2134**	**8.4000e-003**	**0.2218**	**0.0575**	**8.0100e-003**	**0.0656**		**650.2395**	**650.2395**	**0.0510**		**651.5152**

3.3 Site Preparation - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Fugitive Dust					1.5908	0.0000	1.5908	0.1718	0.0000	0.1718			0.0000			0.0000
Off-Road	1.8995	23.6201	12.7461	0.0245		0.9540	0.9540		0.8777	0.8777		2,468.4131	2,468.4131	0.7685		2,487.6244
Total	**1.8995**	**23.6201**	**12.7461**	**0.0245**	**1.5908**	**0.9540**	**2.5448**	**0.1718**	**0.8777**	**1.0494**		**2,468.4131**	**2,468.4131**	**0.7685**		**2,487.6244**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0341	0.0245	0.2739	7.2000e-004	0.0657	4.7000e-004	0.0662	0.0174	4.4000e-004	0.0179		71.7780	71.7780	2.4600e-003		71.8394
Total	**0.0341**	**0.0245**	**0.2739**	**7.2000e-004**	**0.0657**	**4.7000e-004**	**0.0662**	**0.0174**	**4.4000e-004**	**0.0179**		**71.7780**	**71.7780**	**2.4600e-003**		**71.8394**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.5908	0.0000	1.5908	0.1718	0.0000	0.1718			0.0000			0.0000
Off-Road	1.8995	23.6201	12.7461	0.0245		0.9540	0.9540		0.8777	0.8777	0.0000	2,468.4131	2,468.4131	0.7685		2,487.6244

Total	**1.8995**	**23.6201**	**12.7461**	**0.0245**	**1.5908**	**0.9540**	**2.5448**	**0.1718**	**0.8777**	**1.0494**	**0.0000**	**2,468.4131**	**2,468.4131**	**0.7685**		**2,487.6244**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0341	0.0245	0.2739	7.2000e-004	0.0657	4.7000e-004	0.0662	0.0174	4.4000e-004	0.0179		71.7780	71.7780	2.4600e-003		71.8394
Total	**0.0341**	**0.0245**	**0.2739**	**7.2000e-004**	**0.0657**	**4.7000e-004**	**0.0662**	**0.0174**	**4.4000e-004**	**0.0179**		**71.7780**	**71.7780**	**2.4600e-003**		**71.8394**

3.4 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.6929	0.0000	6.6929	3.3888	0.0000	3.3888			0.0000			0.0000
Off-Road	2.1515	24.2895	10.3804	0.0206		1.1683	1.1683		1.0748	1.0748		2,077.4666	2,077.4666	0.6467		2,093.6352
Total	**2.1515**	**24.2895**	**10.3804**	**0.0206**	**6.6929**	**1.1683**	**7.8612**	**3.3888**	**1.0748**	**4.4636**		**2,077.4666**	**2,077.4666**	**0.6467**		**2,093.6352**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.1442	39.7592	8.2001	0.1006	2.1843	0.1564	2.3407	0.5986	0.1496	0.7483		10,934.4318	10,934.4318	0.9639		10,958.5287
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0426	0.0307	0.3423	9.0000e-004	0.0822	5.9000e-004	0.0827	0.0218	5.5000e-004	0.0223		89.7225	89.7225	3.0700e-003		89.7992
Total	**1.1868**	**39.7898**	**8.5424**	**0.1015**	**2.2664**	**0.1570**	**2.4234**	**0.6204**	**0.1502**	**0.7706**		**11,024.1543**	**11,024.1543**	**0.9670**		**11,048.3279**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.6929	0.0000	6.6929	3.3888	0.0000	3.3888			0.0000			0.0000
Off-Road	2.1515	24.2895	10.3804	0.0206		1.1683	1.1683		1.0748	1.0748	0.0000	2,077.4666	2,077.4666	0.6467		2,093.6352
Total	**2.1515**	**24.2895**	**10.3804**	**0.0206**	**6.6929**	**1.1683**	**7.8612**	**3.3888**	**1.0748**	**4.4636**	**0.0000**	**2,077.4666**	**2,077.4666**	**0.6467**		**2,093.6352**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Hauling	1.1442	39.7592	8.2001	0.1006	2.1843	0.1564	2.3407	0.5986	0.1496	0.7483		10,934.4318	10,934.4318	0.9639		10,958.5287
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0426	0.0307	0.3423	9.0000e-004	0.0822	5.9000e-004	0.0827	0.0218	5.5000e-004	0.0223		89.7225	89.7225	3.0700e-003		89.7992
Total	**1.1868**	**39.7898**	**8.5424**	**0.1015**	**2.2664**	**0.1570**	**2.4234**	**0.6204**	**0.1502**	**0.7706**		**11,024.1543**	**11,024.1543**	**0.9670**		**11,048.3279**

3.5 Building Construction - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.9127	20.7077	15.7183	0.0250		1.2575	1.2575		1.2051	1.2051		2,329.7759	2,329.7759	0.5019		2,342.3232
Total	**2.9127**	**20.7077**	**15.7183**	**0.0250**		**1.2575**	**1.2575**		**1.2051**	**1.2051**		**2,329.7759**	**2,329.7759**	**0.5019**		**2,342.3232**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0774	1.9763	0.5233	4.1800e-003	0.1016	0.0155	0.1170	0.0292	0.0148	0.0440		447.2848	447.2848	0.0355		448.1711
Worker	0.1618	0.1165	1.3008	3.4200e-003	0.3122	2.2500e-003	0.3144	0.0828	2.0700e-003	0.0849		340.9453	340.9453	0.0117		341.2370
Total	**0.2391**	**2.0928**	**1.8242**	**7.6000e-003**	**0.4137**	**0.0177**	**0.4314**	**0.1120**	**0.0169**	**0.1289**		**788.2301**	**788.2301**	**0.0471**		**789.4081**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.9127	20.7077	15.7183	0.0250		1.2575	1.2575		1.2051	1.2051	0.0000	2,329.7759	2,329.7759	0.5019		2,342.3232
Total	**2.9127**	**20.7077**	**15.7183**	**0.0250**		**1.2575**	**1.2575**		**1.2051**	**1.2051**	**0.0000**	**2,329.7759**	**2,329.7759**	**0.5019**		**2,342.3232**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0774	1.9763	0.5233	4.1800e-003	0.1016	0.0155	0.1170	0.0292	0.0148	0.0440		447.2848	447.2848	0.0355		448.1711
Worker	0.1618	0.1165	1.3008	3.4200e-003	0.3122	2.2500e-003	0.3144	0.0828	2.0700e-003	0.0849		340.9453	340.9453	0.0117		341.2370
Total	**0.2391**	**2.0928**	**1.8242**	**7.6000e-003**	**0.4137**	**0.0177**	**0.4314**	**0.1120**	**0.0169**	**0.1289**		**788.2301**	**788.2301**	**0.0471**		**789.4081**

3.6 Paving - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4046	14.2518	11.9787	0.0178		0.8505	0.8505		0.7836	0.7836		1,774.2430	1,774.2430	0.5419		1,787.7896
Paving	0.1624					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.5671**	**14.2518**	**11.9787**	**0.0178**		**0.8505**	**0.8505**		**0.7836**	**0.7836**		**1,774.2430**	**1,774.2430**	**0.5419**		**1,787.7896**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0639	0.0460	0.5135	1.3500e-003	0.1232	8.9000e-004	0.1241	0.0327	8.2000e-004	0.0335		134.5837	134.5837	4.6100e-003		134.6988
Total	**0.0639**	**0.0460**	**0.5135**	**1.3500e-003**	**0.1232**	**8.9000e-004**	**0.1241**	**0.0327**	**8.2000e-004**	**0.0335**		**134.5837**	**134.5837**	**4.6100e-003**		**134.6988**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4046	14.2518	11.9787	0.0178		0.8505	0.8505		0.7836	0.7836	0.0000	1,774.2430	1,774.2430	0.5419		1,787.7896

Paving	0.1624					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.5671**	**14.2518**	**11.9787**	**0.0178**		**0.8505**	**0.8505**		**0.7836**	**0.7836**	**0.0000**	**1,774.2430**	**1,774.2430**	**0.5419**		**1,787.7896**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0639	0.0460	0.5135	1.3500e-003	0.1232	8.9000e-004	0.1241	0.0327	8.2000e-004	0.0335		134.5837	134.5837	4.6100e-003		134.6988
Total	**0.0639**	**0.0460**	**0.5135**	**1.3500e-003**	**0.1232**	**8.9000e-004**	**0.1241**	**0.0327**	**8.2000e-004**	**0.0335**		**134.5837**	**134.5837**	**4.6100e-003**		**134.6988**

3.7 Architectural Coating - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	65.3917					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2986	2.0058	1.8542	2.9700e-003		0.1506	0.1506		0.1506	0.1506		281.4485	281.4485	0.0267		282.1171
Total	**65.6904**	**2.0058**	**1.8542**	**2.9700e-003**		**0.1506**	**0.1506**		**0.1506**	**0.1506**		**281.4485**	**281.4485**	**0.0267**		**282.1171**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0341	0.0245	0.2739	7.2000e-004	0.0657	4.7000e-004	0.0662	0.0174	4.4000e-004	0.0179		71.7780	71.7780	2.4600e-003		71.8394
Total	**0.0341**	**0.0245**	**0.2739**	**7.2000e-004**	**0.0657**	**4.7000e-004**	**0.0662**	**0.0174**	**4.4000e-004**	**0.0179**		**71.7780**	**71.7780**	**2.4600e-003**		**71.8394**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	65.3917					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2986	2.0058	1.8542	2.9700e-003		0.1506	0.1506		0.1506	0.1506	0.0000	281.4485	281.4485	0.0267		282.1171
Total	**65.6904**	**2.0058**	**1.8542**	**2.9700e-003**		**0.1506**	**0.1506**		**0.1506**	**0.1506**	**0.0000**	**281.4485**	**281.4485**	**0.0267**		**282.1171**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0341	0.0245	0.2739	7.2000e-004	0.0657	4.7000e-004	0.0662	0.0174	4.4000e-004	0.0179		71.7780	71.7780	2.4600e-003		71.8394
Total	**0.0341**	**0.0245**	**0.2739**	**7.2000e-004**	**0.0657**	**4.7000e-004**	**0.0662**	**0.0174**	**4.4000e-004**	**0.0179**		**71.7780**	**71.7780**	**2.4600e-003**		**71.8394**

3.7 Architectural Coating - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	65.3917					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2664	1.8354	1.8413	2.9700e-003		0.1288	0.1288		0.1288	0.1288		281.4481	281.4481	0.0238		282.0423
Total	**65.6582**	**1.8354**	**1.8413**	**2.9700e-003**		**0.1288**	**0.1288**		**0.1288**	**0.1288**		**281.4481**	**281.4481**	**0.0238**		**282.0423**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0314	0.0219	0.2475	7.0000e-004	0.0657	4.7000e-004	0.0662	0.0174	4.3000e-004	0.0179		69.6160	69.6160	2.2200e-003		69.6716
Total	**0.0314**	**0.0219**	**0.2475**	**7.0000e-004**	**0.0657**	**4.7000e-004**	**0.0662**	**0.0174**	**4.3000e-004**	**0.0179**		**69.6160**	**69.6160**	**2.2200e-003**		**69.6716**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	65.3917					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2664	1.8354	1.8413	2.9700e-003		0.1288	0.1288		0.1288	0.1288	0.0000	281.4481	281.4481	0.0238		282.0423
Total	**65.6582**	**1.8354**	**1.8413**	**2.9700e-003**		**0.1288**	**0.1288**		**0.1288**	**0.1288**	**0.0000**	**281.4481**	**281.4481**	**0.0238**		**282.0423**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0314	0.0219	0.2475	7.0000e-004	0.0657	4.7000e-004	0.0662	0.0174	4.3000e-004	0.0179		69.6160	69.6160	2.2200e-003		69.6716
Total	**0.0314**	**0.0219**	**0.2475**	**7.0000e-004**	**0.0657**	**4.7000e-004**	**0.0662**	**0.0174**	**4.3000e-004**	**0.0179**		**69.6160**	**69.6160**	**2.2200e-003**		**69.6716**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.2814	1.1199	3.0762	9.9300e-003	0.8011	9.6000e-003	0.8107	0.2141	9.0100e-003	0.2231		1,007.6313	1,007.6313	0.0541		1,008.9845
Unmitigated	0.2814	1.1199	3.0762	9.9300e-003	0.8011	9.6000e-003	0.8107	0.2141	9.0100e-003	0.2231		1,007.6313	1,007.6313	0.0541		1,008.9845

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Heavy Industry	0.00	0.00	0.00		
General Office Building	158.08	158.08	158.08	377,772	377,772
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Total	158.08	158.08	158.08	377,772	377,772

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
General Heavy Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
General Office Building	9.50	7.30	7.30	33.00	48.00	19.00	77	19	4
Other Non-Asphalt Surfaces	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
General Heavy Industry	0.588316	0.042913	0.184449	0.110793	0.017294	0.005558	0.015534	0.023021	0.001902	0.002024	0.006181	0.000745	0.001271
General Office Building	0.588316	0.042913	0.184449	0.110793	0.017294	0.005558	0.015534	0.023021	0.001902	0.002024	0.006181	0.000745	0.001271

Other Non-Asphalt Surfaces	0.588316	0.042913	0.184449	0.110793	0.017294	0.005558	0.015534	0.023021	0.001902	0.002024	0.006181	0.000745	0.001271
Parking Lot	0.588316	0.042913	0.184449	0.110793	0.017294	0.005558	0.015534	0.023021	0.001902	0.002024	0.006181	0.000745	0.001271

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0216	0.1959	0.1646	1.1800e-003		0.0149	0.0149		0.0149	0.0149		235.0711	235.0711	4.5100e-003	4.3100e-003	236.4680
NaturalGas Unmitigated	0.0216	0.1959	0.1646	1.1800e-003		0.0149	0.0149		0.0149	0.0149		235.0711	235.0711	4.5100e-003	4.3100e-003	236.4680

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
General Heavy Industry	1821.1	0.0196	0.1785	0.1500	1.0700e-003		0.0136	0.0136		0.0136	0.0136		214.2466	214.2466	4.1100e-003	3.9300e-003	215.5197
General Office Building	177.008	1.9100e-003	0.0174	0.0146	1.0000e-004		1.3200e-003	1.3200e-003		1.3200e-003	1.3200e-003		20.8245	20.8245	4.0000e-004	3.8000e-004	20.9483
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0216**	**0.1959**	**0.1646**	**1.1700e-003**		**0.0149**	**0.0149**		**0.0149**	**0.0149**		**235.0711**	**235.0711**	**4.5100e-003**	**4.3100e-003**	**236.4680**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
General Heavy Industry	1.8211	0.0196	0.1785	0.1500	1.0700e-003		0.0136	0.0136		0.0136	0.0136		214.2466	214.2466	4.1100e-003	3.9300e-003	215.5197
General Office Building	0.177008	1.9100e-003	0.0174	0.0146	1.0000e-004		1.3200e-003	1.3200e-003		1.3200e-003	1.3200e-003		20.8245	20.8245	4.0000e-004	3.8000e-004	20.9483
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0216**	**0.1959**	**0.1646**	**1.1700e-003**		**0.0149**	**0.0149**		**0.0149**	**0.0149**		**235.0711**	**235.0711**	**4.5100e-003**	**4.3100e-003**	**236.4680**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.4894	6.0000e-005	6.3100e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		0.0134	0.0134	4.0000e-005		0.0143

Unmitigated	1.4894	6.0000e-005	6.3100e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		0.0134	0.0134	4.0000e-005		0.0143

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.1792					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.3096					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.9000e-004	6.0000e-005	6.3100e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		0.0134	0.0134	4.0000e-005		0.0143
Total	**1.4894**	**6.0000e-005**	**6.3100e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**		**0.0134**	**0.0134**	**4.0000e-005**		**0.0143**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.1792					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.3096					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.9000e-004	6.0000e-005	6.3100e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		0.0134	0.0134	4.0000e-005		0.0143
Total	**1.4894**	**6.0000e-005**	**6.3100e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**		**0.0134**	**0.0134**	**4.0000e-005**		**0.0143**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

EDCO Material Recovery & Transfer Station Expansion Project

San Diego County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	3.20	1000sqft	0.07	3,200.00	0
General Heavy Industry	57.50	1000sqft	1.32	57,500.00	0
Other Non-Asphalt Surfaces	0.07	Acre	0.07	3,049.20	0
Parking Lot	0.62	Acre	0.62	27,007.20	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	40
Climate Zone	13			**Operational Year**	2020
Utility Company	San Diego Gas & Electric				
CO2 Intensity (lb/MWhr)	720.49	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Land Use - Project Total Area = 60,680 sf; 3,150 sf offices and 57,530 sf other. Project site = 2.04 acres; 1.35 acre building, 0.07 acre landscaping, remaining 0.62 acres paved.

Demolition - 34,000 sf of asphalt removal, 6 inches depth = 17,000 cubic feet; 145 lbs/foot; 1,233 tons

Grading - 6,000 cubic yards of soil export

Architectural Coating - SDAPCD Rule 67.0

Vehicle Trips - Employee trips would increase by 158 trips per day (158 trips / 3.2 ksf = 49.4 tips/ksf).

Area Coating - SDAPCD Rule 67.0

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	250.00	150.00
tblArchitecturalCoating	EF_Nonresidential_Interior	250.00	100.00
tblAreaCoating	Area_EF_Nonresidential_Exterior	250	150
tblAreaCoating	Area_EF_Nonresidential_Interior	250	100
tblGrading	MaterialExported	0.00	6,000.00
tblVehicleTrips	ST_TR	1.50	0.00
tblVehicleTrips	ST_TR	2.46	49.40
tblVehicleTrips	SU_TR	1.50	0.00
tblVehicleTrips	SU_TR	1.05	49.40
tblVehicleTrips	WD_TR	1.50	0.00
tblVehicleTrips	WD_TR	11.03	49.40

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	65.7288	64.5083	19.5217	0.1204	8.9593	1.4450	10.2883	4.0092	1.3511	5.2377	0.0000	12,914.6839	12,914.6839	1.6497	0.0000	12,955.9251
2019	65.6937	1.8600	2.0752	3.6300e-003	0.0657	0.1292	0.1950	0.0174	0.1292	0.1466	0.0000	346.8012	346.8012	0.0259	0.0000	347.4482
Maximum	**65.7288**	**64.5083**	**19.5217**	**0.1204**	**8.9593**	**1.4450**	**10.2883**	**4.0092**	**1.3511**	**5.2377**	**0.0000**	**12,914.6839**	**12,914.6839**	**1.6497**	**0.0000**	**12,955.9251**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	65.7288	64.5083	19.5217	0.1204	8.9593	1.4450	10.2883	4.0092	1.3511	5.2377	0.0000	12,914.6839	12,914.6839	1.6497	0.0000	12,955.9251
2019	65.6937	1.8600	2.0752	3.6300e-003	0.0657	0.1292	0.1950	0.0174	0.1292	0.1466	0.0000	346.8012	346.8012	0.0259	0.0000	347.4482
Maximum	**65.7288**	**64.5083**	**19.5217**	**0.1204**	**8.9593**	**1.4450**	**10.2883**	**4.0092**	**1.3511**	**5.2377**	**0.0000**	**12,914.6839**	**12,914.6839**	**1.6497**	**0.0000**	**12,955.9251**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.4894	6.0000e-005	6.3100e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		0.0134	0.0134	4.0000e-005		0.0143
Energy	0.0216	0.1959	0.1646	1.1800e-003		0.0149	0.0149		0.0149	0.0149		235.0711	235.0711	4.5100e-003	4.3100e-003	236.4680
Mobile	0.2737	1.1509	3.0601	9.4100e-003	0.8011	9.6800e-003	0.8108	0.2141	9.0800e-003	0.2232		955.1406	955.1406	0.0546		956.5043
Total	**1.7846**	**1.3468**	**3.2310**	**0.0106**	**0.8011**	**0.0246**	**0.8257**	**0.2141**	**0.0240**	**0.2381**		**1,190.2251**	**1,190.2251**	**0.0591**	**4.3100e-003**	**1,192.9866**

Mitigated Operational

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Area	1.4894	6.0000e-005	6.3100e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		0.0134	0.0134	4.0000e-005		0.0143
Energy	0.0216	0.1959	0.1646	1.1800e-003		0.0149	0.0149		0.0149	0.0149		235.0711	235.0711	4.5100e-003	4.3100e-003	236.4680
Mobile	0.2737	1.1509	3.0601	9.4100e-003	0.8011	9.6800e-003	0.8108	0.2141	9.0800e-003	0.2232		955.1406	955.1406	0.0546		956.5043
Total	**1.7846**	**1.3468**	**3.2310**	**0.0106**	**0.8011**	**0.0246**	**0.8257**	**0.2141**	**0.0240**	**0.2381**		**1,190.2251**	**1,190.2251**	**0.0591**	**4.3100e-003**	**1,192.9866**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2018	1/26/2018	5	20	
2	Site Preparation	Site Preparation	1/27/2018	1/31/2018	5	3	
3	Grading	Grading	2/1/2018	2/8/2018	5	6	
4	Building Construction	Building Construction	2/9/2018	12/13/2018	5	220	
5	Paving	Paving	12/14/2018	12/27/2018	5	10	
6	Architectural Coating	Architectural Coating	12/28/2018	1/10/2019	5	10	

Acres of Grading (Site Preparation Phase): 4.5

Acres of Grading (Grading Phase): 3

Acres of Paving: 0.69

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 91,050; Non-Residential Outdoor: 30,350; Striped Parking Area:

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Rubber Tired Dozers	1	8.00	247	0.40
Demolition	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Site Preparation	Graders	1	8.00	187	0.41
Site Preparation	Scrapers	1	8.00	367	0.48
Site Preparation	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	2	7.00	97	0.37
Building Construction	Cranes	1	8.00	231	0.29
Building Construction	Forklifts	2	7.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Building Construction	Welders	3	8.00	46	0.45
Paving	Cement and Mortar Mixers	1	8.00	9	0.56
Paving	Pavers	1	8.00	130	0.42
Paving	Paving Equipment	1	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	5	13.00	0.00	122.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	3	8.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	10.00	0.00	750.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	8	38.00	15.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	8.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.3357	0.0000	1.3357	0.2023	0.0000	0.2023			0.0000			0.0000
Off-Road	2.4838	24.3641	15.1107	0.0241		1.4365	1.4365		1.3429	1.3429		2,391.1659	2,391.1659	0.6058		2,406.3105
Total	**2.4838**	**24.3641**	**15.1107**	**0.0241**	**1.3357**	**1.4365**	**2.7722**	**0.2023**	**1.3429**	**1.5452**		**2,391.1659**	**2,391.1659**	**0.6058**		**2,406.3105**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0574	1.9610	0.4303	4.8300e-003	0.1066	7.8100e-003	0.1144	0.0292	7.4700e-003	0.0367		524.7457	524.7457	0.0488		525.9656
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0625	0.0448	0.4221	1.1000e-003	0.1068	7.7000e-004	0.1076	0.0283	7.1000e-004	0.0290		109.5026	109.5026	3.7900e-003		109.5974
Total	**0.1200**	**2.0058**	**0.8524**	**5.9300e-003**	**0.2134**	**8.5800e-003**	**0.2220**	**0.0575**	**8.1800e-003**	**0.0657**		**634.2482**	**634.2482**	**0.0526**		**635.5631**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.3357	0.0000	1.3357	0.2023	0.0000	0.2023			0.0000			0.0000
Off-Road	2.4838	24.3641	15.1107	0.0241		1.4365	1.4365		1.3429	1.3429	0.0000	2,391.1659	2,391.1659	0.6058		2,406.3105
Total	**2.4838**	**24.3641**	**15.1107**	**0.0241**	**1.3357**	**1.4365**	**2.7722**	**0.2023**	**1.3429**	**1.5452**	**0.0000**	**2,391.1659**	**2,391.1659**	**0.6058**		**2,406.3105**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0574	1.9610	0.4303	4.8300e-003	0.1066	7.8100e-003	0.1144	0.0292	7.4700e-003	0.0367		524.7457	524.7457	0.0488		525.9656
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0625	0.0448	0.4221	1.1000e-003	0.1068	7.7000e-004	0.1076	0.0283	7.1000e-004	0.0290		109.5026	109.5026	3.7900e-003		109.5974
Total	**0.1200**	**2.0058**	**0.8524**	**5.9300e-003**	**0.2134**	**8.5800e-003**	**0.2220**	**0.0575**	**8.1800e-003**	**0.0657**		**634.2482**	**634.2482**	**0.0526**		**635.5631**

3.3 Site Preparation - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Fugitive Dust					1.5908	0.0000	1.5908	0.1718	0.0000	0.1718			0.0000			0.0000
Off-Road	1.8995	23.6201	12.7461	0.0245		0.9540	0.9540		0.8777	0.8777		2,468.4131	2,468.4131	0.7685		2,487.6244
Total	**1.8995**	**23.6201**	**12.7461**	**0.0245**	**1.5908**	**0.9540**	**2.5448**	**0.1718**	**0.8777**	**1.0494**		**2,468.4131**	**2,468.4131**	**0.7685**		**2,487.6244**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0385	0.0275	0.2598	6.8000e-004	0.0657	4.7000e-004	0.0662	0.0174	4.4000e-004	0.0179		67.3862	67.3862	2.3400e-003		67.4446
Total	**0.0385**	**0.0275**	**0.2598**	**6.8000e-004**	**0.0657**	**4.7000e-004**	**0.0662**	**0.0174**	**4.4000e-004**	**0.0179**		**67.3862**	**67.3862**	**2.3400e-003**		**67.4446**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.5908	0.0000	1.5908	0.1718	0.0000	0.1718			0.0000			0.0000
Off-Road	1.8995	23.6201	12.7461	0.0245		0.9540	0.9540		0.8777	0.8777	0.0000	2,468.4131	2,468.4131	0.7685		2,487.6244

Total	**1.8995**	**23.6201**	**12.7461**	**0.0245**	**1.5908**	**0.9540**	**2.5448**	**0.1718**	**0.8777**	**1.0494**	**0.0000**	**2,468.4131**	**2,468.4131**	**0.7685**		**2,487.6244**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0385	0.0275	0.2598	6.8000e-004	0.0657	4.7000e-004	0.0662	0.0174	4.4000e-004	0.0179		67.3862	67.3862	2.3400e-003		67.4446
Total	**0.0385**	**0.0275**	**0.2598**	**6.8000e-004**	**0.0657**	**4.7000e-004**	**0.0662**	**0.0174**	**4.4000e-004**	**0.0179**		**67.3862**	**67.3862**	**2.3400e-003**		**67.4446**

3.4 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.6929	0.0000	6.6929	3.3888	0.0000	3.3888			0.0000			0.0000
Off-Road	2.1515	24.2895	10.3804	0.0206		1.1683	1.1683		1.0748	1.0748		2,077.4666	2,077.4666	0.6467		2,093.6352
Total	**2.1515**	**24.2895**	**10.3804**	**0.0206**	**6.6929**	**1.1683**	**7.8612**	**3.3888**	**1.0748**	**4.4636**		**2,077.4666**	**2,077.4666**	**0.6467**		**2,093.6352**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.1770	40.1844	8.8165	0.0989	2.1843	0.1601	2.3444	0.5986	0.1532	0.7518		10,752.9846	10,752.9846	1.0000		10,777.9842
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0481	0.0344	0.3247	8.5000e-004	0.0822	5.9000e-004	0.0827	0.0218	5.5000e-004	0.0223		84.2327	84.2327	2.9200e-003		84.3057
Total	**1.2251**	**40.2188**	**9.1413**	**0.0997**	**2.2664**	**0.1607**	**2.4271**	**0.6204**	**0.1537**	**0.7741**		**10,837.2173**	**10,837.2173**	**1.0029**		**10,862.2899**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.6929	0.0000	6.6929	3.3888	0.0000	3.3888			0.0000			0.0000
Off-Road	2.1515	24.2895	10.3804	0.0206		1.1683	1.1683		1.0748	1.0748	0.0000	2,077.4666	2,077.4666	0.6467		2,093.6352
Total	**2.1515**	**24.2895**	**10.3804**	**0.0206**	**6.6929**	**1.1683**	**7.8612**	**3.3888**	**1.0748**	**4.4636**	**0.0000**	**2,077.4666**	**2,077.4666**	**0.6467**		**2,093.6352**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Hauling	1.1770	40.1844	8.8165	0.0989	2.1843	0.1601	2.3444	0.5986	0.1532	0.7518		10,752.9846	10,752.9846	1.0000		10,777.9842
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0481	0.0344	0.3247	8.5000e-004	0.0822	5.9000e-004	0.0827	0.0218	5.5000e-004	0.0223		84.2327	84.2327	2.9200e-003		84.3057
Total	**1.2251**	**40.2188**	**9.1413**	**0.0997**	**2.2664**	**0.1607**	**2.4271**	**0.6204**	**0.1537**	**0.7741**		**10,837.2173**	**10,837.2173**	**1.0029**		**10,862.2899**

3.5 Building Construction - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.9127	20.7077	15.7183	0.0250		1.2575	1.2575		1.2051	1.2051		2,329.7759	2,329.7759	0.5019		2,342.3232
Total	**2.9127**	**20.7077**	**15.7183**	**0.0250**		**1.2575**	**1.2575**		**1.2051**	**1.2051**		**2,329.7759**	**2,329.7759**	**0.5019**		**2,342.3232**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0806	1.9797	0.5790	4.0800e-003	0.1016	0.0157	0.1173	0.0292	0.0150	0.0443		436.0469	436.0469	0.0377		436.9902
Worker	0.1827	0.1308	1.2340	3.2200e-003	0.3122	2.2500e-003	0.3144	0.0828	2.0700e-003	0.0849		320.0844	320.0844	0.0111		320.3617
Total	**0.2633**	**2.1105**	**1.8130**	**7.3000e-003**	**0.4137**	**0.0180**	**0.4317**	**0.1120**	**0.0171**	**0.1291**		**756.1313**	**756.1313**	**0.0488**		**757.3519**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.9127	20.7077	15.7183	0.0250		1.2575	1.2575		1.2051	1.2051	0.0000	2,329.7759	2,329.7759	0.5019		2,342.3232
Total	**2.9127**	**20.7077**	**15.7183**	**0.0250**		**1.2575**	**1.2575**		**1.2051**	**1.2051**	**0.0000**	**2,329.7759**	**2,329.7759**	**0.5019**		**2,342.3232**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0806	1.9797	0.5790	4.0800e-003	0.1016	0.0157	0.1173	0.0292	0.0150	0.0443		436.0469	436.0469	0.0377		436.9902
Worker	0.1827	0.1308	1.2340	3.2200e-003	0.3122	2.2500e-003	0.3144	0.0828	2.0700e-003	0.0849		320.0844	320.0844	0.0111		320.3617
Total	**0.2633**	**2.1105**	**1.8130**	**7.3000e-003**	**0.4137**	**0.0180**	**0.4317**	**0.1120**	**0.0171**	**0.1291**		**756.1313**	**756.1313**	**0.0488**		**757.3519**

3.6 Paving - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4046	14.2518	11.9787	0.0178		0.8505	0.8505		0.7836	0.7836		1,774.2430	1,774.2430	0.5419		1,787.7896
Paving	0.1624					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.5671**	**14.2518**	**11.9787**	**0.0178**		**0.8505**	**0.8505**		**0.7836**	**0.7836**		**1,774.2430**	**1,774.2430**	**0.5419**		**1,787.7896**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0721	0.0516	0.4871	1.2700e-003	0.1232	8.9000e-004	0.1241	0.0327	8.2000e-004	0.0335		126.3491	126.3491	4.3800e-003		126.4586
Total	**0.0721**	**0.0516**	**0.4871**	**1.2700e-003**	**0.1232**	**8.9000e-004**	**0.1241**	**0.0327**	**8.2000e-004**	**0.0335**		**126.3491**	**126.3491**	**4.3800e-003**		**126.4586**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4046	14.2518	11.9787	0.0178		0.8505	0.8505		0.7836	0.7836	0.0000	1,774.2430	1,774.2430	0.5419		1,787.7896

Paving	0.1624					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.5671**	**14.2518**	**11.9787**	**0.0178**		**0.8505**	**0.8505**		**0.7836**	**0.7836**	**0.0000**	**1,774.2430**	**1,774.2430**	**0.5419**		**1,787.7896**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0721	0.0516	0.4871	1.2700e-003	0.1232	8.9000e-004	0.1241	0.0327	8.2000e-004	0.0335		126.3491	126.3491	4.3800e-003		126.4586
Total	**0.0721**	**0.0516**	**0.4871**	**1.2700e-003**	**0.1232**	**8.9000e-004**	**0.1241**	**0.0327**	**8.2000e-004**	**0.0335**		**126.3491**	**126.3491**	**4.3800e-003**		**126.4586**

3.7 Architectural Coating - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	65.3917					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2986	2.0058	1.8542	2.9700e-003		0.1506	0.1506		0.1506	0.1506		281.4485	281.4485	0.0267		282.1171
Total	**65.6904**	**2.0058**	**1.8542**	**2.9700e-003**		**0.1506**	**0.1506**		**0.1506**	**0.1506**		**281.4485**	**281.4485**	**0.0267**		**282.1171**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0385	0.0275	0.2598	6.8000e-004	0.0657	4.7000e-004	0.0662	0.0174	4.4000e-004	0.0179		67.3862	67.3862	2.3400e-003		67.4446
Total	**0.0385**	**0.0275**	**0.2598**	**6.8000e-004**	**0.0657**	**4.7000e-004**	**0.0662**	**0.0174**	**4.4000e-004**	**0.0179**		**67.3862**	**67.3862**	**2.3400e-003**		**67.4446**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	65.3917					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2986	2.0058	1.8542	2.9700e-003		0.1506	0.1506		0.1506	0.1506	0.0000	281.4485	281.4485	0.0267		282.1171
Total	**65.6904**	**2.0058**	**1.8542**	**2.9700e-003**		**0.1506**	**0.1506**		**0.1506**	**0.1506**	**0.0000**	**281.4485**	**281.4485**	**0.0267**		**282.1171**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0385	0.0275	0.2598	6.8000e-004	0.0657	4.7000e-004	0.0662	0.0174	4.4000e-004	0.0179		67.3862	67.3862	2.3400e-003		67.4446
Total	**0.0385**	**0.0275**	**0.2598**	**6.8000e-004**	**0.0657**	**4.7000e-004**	**0.0662**	**0.0174**	**4.4000e-004**	**0.0179**		**67.3862**	**67.3862**	**2.3400e-003**		**67.4446**

3.7 Architectural Coating - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	65.3917					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2664	1.8354	1.8413	2.9700e-003		0.1288	0.1288		0.1288	0.1288		281.4481	281.4481	0.0238		282.0423
Total	**65.6582**	**1.8354**	**1.8413**	**2.9700e-003**		**0.1288**	**0.1288**		**0.1288**	**0.1288**		**281.4481**	**281.4481**	**0.0238**		**282.0423**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0355	0.0246	0.2339	6.6000e-004	0.0657	4.7000e-004	0.0662	0.0174	4.3000e-004	0.0179		65.3531	65.3531	2.1100e-003		65.4058
Total	**0.0355**	**0.0246**	**0.2339**	**6.6000e-004**	**0.0657**	**4.7000e-004**	**0.0662**	**0.0174**	**4.3000e-004**	**0.0179**		**65.3531**	**65.3531**	**2.1100e-003**		**65.4058**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	65.3917					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2664	1.8354	1.8413	2.9700e-003		0.1288	0.1288		0.1288	0.1288	0.0000	281.4481	281.4481	0.0238		282.0423
Total	**65.6582**	**1.8354**	**1.8413**	**2.9700e-003**		**0.1288**	**0.1288**		**0.1288**	**0.1288**	**0.0000**	**281.4481**	**281.4481**	**0.0238**		**282.0423**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0355	0.0246	0.2339	6.6000e-004	0.0657	4.7000e-004	0.0662	0.0174	4.3000e-004	0.0179		65.3531	65.3531	2.1100e-003		65.4058
Total	**0.0355**	**0.0246**	**0.2339**	**6.6000e-004**	**0.0657**	**4.7000e-004**	**0.0662**	**0.0174**	**4.3000e-004**	**0.0179**		**65.3531**	**65.3531**	**2.1100e-003**		**65.4058**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.2737	1.1509	3.0601	9.4100e-003	0.8011	9.6800e-003	0.8108	0.2141	9.0800e-003	0.2232		955.1406	955.1406	0.0546		956.5043
Unmitigated	0.2737	1.1509	3.0601	9.4100e-003	0.8011	9.6800e-003	0.8108	0.2141	9.0800e-003	0.2232		955.1406	955.1406	0.0546		956.5043

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Heavy Industry	0.00	0.00	0.00		
General Office Building	158.08	158.08	158.08	377,772	377,772
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Total	158.08	158.08	158.08	377,772	377,772

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
General Heavy Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
General Office Building	9.50	7.30	7.30	33.00	48.00	19.00	77	19	4
Other Non-Asphalt Surfaces	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
General Heavy Industry	0.588316	0.042913	0.184449	0.110793	0.017294	0.005558	0.015534	0.023021	0.001902	0.002024	0.006181	0.000745	0.001271
General Office Building	0.588316	0.042913	0.184449	0.110793	0.017294	0.005558	0.015534	0.023021	0.001902	0.002024	0.006181	0.000745	0.001271

Other Non-Asphalt Surfaces	0.588316	0.042913	0.184449	0.110793	0.017294	0.005558	0.015534	0.023021	0.001902	0.002024	0.006181	0.000745	0.001271
Parking Lot	0.588316	0.042913	0.184449	0.110793	0.017294	0.005558	0.015534	0.023021	0.001902	0.002024	0.006181	0.000745	0.001271

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0216	0.1959	0.1646	1.1800e-003		0.0149	0.0149		0.0149	0.0149		235.0711	235.0711	4.5100e-003	4.3100e-003	236.4680
NaturalGas Unmitigated	0.0216	0.1959	0.1646	1.1800e-003		0.0149	0.0149		0.0149	0.0149		235.0711	235.0711	4.5100e-003	4.3100e-003	236.4680

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
General Heavy Industry	1821.1	0.0196	0.1785	0.1500	1.0700e-003		0.0136	0.0136		0.0136	0.0136		214.2466	214.2466	4.1100e-003	3.9300e-003	215.5197
General Office Building	177.008	1.9100e-003	0.0174	0.0146	1.0000e-004		1.3200e-003	1.3200e-003		1.3200e-003	1.3200e-003		20.8245	20.8245	4.0000e-004	3.8000e-004	20.9483
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0216**	**0.1959**	**0.1646**	**1.1700e-003**		**0.0149**	**0.0149**		**0.0149**	**0.0149**		**235.0711**	**235.0711**	**4.5100e-003**	**4.3100e-003**	**236.4680**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
General Heavy Industry	1.8211	0.0196	0.1785	0.1500	1.0700e-003		0.0136	0.0136		0.0136	0.0136		214.2466	214.2466	4.1100e-003	3.9300e-003	215.5197
General Office Building	0.177008	1.9100e-003	0.0174	0.0146	1.0000e-004		1.3200e-003	1.3200e-003		1.3200e-003	1.3200e-003		20.8245	20.8245	4.0000e-004	3.8000e-004	20.9483
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0216**	**0.1959**	**0.1646**	**1.1700e-003**		**0.0149**	**0.0149**		**0.0149**	**0.0149**		**235.0711**	**235.0711**	**4.5100e-003**	**4.3100e-003**	**236.4680**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.4894	6.0000e-005	6.3100e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		0.0134	0.0134	4.0000e-005		0.0143

Unmitigated	1.4894	6.0000e-005	6.3100e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		0.0134	0.0134	4.0000e-005		0.0143

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.1792					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.3096					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.9000e-004	6.0000e-005	6.3100e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		0.0134	0.0134	4.0000e-005		0.0143
Total	**1.4894**	**6.0000e-005**	**6.3100e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**		**0.0134**	**0.0134**	**4.0000e-005**		**0.0143**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.1792					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.3096					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.9000e-004	6.0000e-005	6.3100e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		0.0134	0.0134	4.0000e-005		0.0143
Total	**1.4894**	**6.0000e-005**	**6.3100e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**		**0.0134**	**0.0134**	**4.0000e-005**		**0.0143**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Compostable Materials

Anaerobic Digestion Program Environmental Impact Report

To assist in the siting and permitting of AD facilities in California, CalRecycle sponsored the development of a Program EIR to assess the environmental effects of anaerobic digestion facilities in California. The Program EIR also provides background on technologies, potential impacts, and mitigation measures. If you require assistance in obtaining access to these documents, call the Public Affairs Office at (916) 341-6300 or Ken Decio at (916) 341-6313.

- Final Program EIR. The Final Program EIR was certified on June 22, 2011 after a June 21 public meeting. Documents related to certification of the Final Program EIR include:
    - Guidance Document for CEQA Review of Municipal Organic Waste Anaerobic Digester Facilities in California
    - Staff Recommendations on CEQA Findings
    - Mitigation Monitoring and Reporting Plan
    - Anaerobic Digestion Initiative
    - Request for Certification of the Anaerobic Digestion Final Program EIR and Approve Anaerobic Digestion Initiative
    - Notice of Determination
    - Department of Fish and Game CEQA Filing Fee No Effect Determination
- Draft Program EIR was available for public comment through April 4, 2011. Comments were also accepted at the CalRecycle Monthly Public Meeting on March 15, 2011 in Sacramento and at a special public meeting for Southern California jurisdictions on March 30, 2011 in Lakewood.
- Notice of Preparation, April 30, 2010.

STATEWIDE ANAEROBIC DIGESTER FACILITIES FOR THE TREATMENT OF MUNICIPAL ORGANIC SOLID WASTE

Final Program Environmental Impact Report
SCH No. 2010042100

Prepared for the
California Department of Resources
Recycling and Recovery (CalRecycle)

June 2011

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STATEWIDE ANAEROBIC DIGESTER FACILITIES FOR THE TREATMENT OF MUNICIPAL ORGANIC SOLID WASTE

Final Program Environmental Impact Report

SCH No. 2010042100

Prepared for the
California Department of Resources
Recycling and Recovery (CalRecycle)

June 2011

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To: Interested Agencies and Individuals

Subject: Final Program Environmental Impact Report for Statewide Anaerobic Digester Facilities for the Treatment of Municipal Organic Solid Waste

The California Department of Resources Recycling and Recovery (CalRecycle) has prepared the Final Program Environmental Impact Report (Final Program EIR) for Statewide Anaerobic Digester Facilities for the Treatment of Municipal Organic Solid Waste. This Final Program EIR is comprised of the revised Draft Program EIR (Chapters 1-15 and Appendices) and the Comments and Responses Document (following revised Draft Program EIR). Revisions to the Draft Program EIR are shown in underline for additions and ~~strikethrough~~ for deletions. Revisions to the Draft Program EIR are the result of the comments on the Draft Program EIR and minor staff initiated text changes. For the convenience and clarity of future users of the document, the executive summary table (Table 1-1) and all figures are shown as clean copies (without mark-ups) and noted as revised in the title. All changes to the impact statements or mitigation measures in Table 1-1 are shown in underline and ~~strikethrough~~ in the respective chapters of the revised Draft Program EIR (Chapters 5-11).

The Final Program EIR will also be available on the CalRecycle web site: (http://www.calrecycle.ca.gov/SWFacilities/Compostables/AnaerobicDig/).

If you have any questions regarding the Final Program EIR, please contact Ken Decio at (916) 341-6313 or Ken.Decio@CalRecycle.ca.gov.

Ken Decio, Senior Integrated Waste Management Specialist June 10, 2011

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Revised Draft Program EIR

CHAPTER 1
Executive Summary

1.1 Introduction

CalRecycle has prepared this Draft Program Environmental Impact Report (EIR) to assess the potential environmental effects that may result from the adoption of an Anaerobic Digestion (AD) Initiative, a comprehensive program to foster the development of AD facilities to process the organic fraction of municipal solid waste and other organic wastes throughout the State of California. Throughout the document, the adoption of the AD Initiative and subsequent development of AD facilities in California will be referred to as the “project”.

This Draft Program EIR will inform future policy considerations related to AD facilities and assist state and local agencies in preparing site-specific environmental documentation that may be required for AD facility applications and/or permits submitted to CalRecycle, regulatory agencies and local jurisdictions. In the event CalRecycle or other public agencies adopt regulations or ordinances relating to regulating or permitting AD facilities, the Draft Program EIR provides useful information and can serve as the basis for analyzing the environmental effects of individual projects.

By preparing this Program EIR, CalRecycle is providing additional focus in California on the potential development of AD facilities. While there has been considerable discussion and interest in AD facilities in California, to date there has not been a broad review of the potential environmental impacts of developing AD facilities. This Program EIR responds to the need for such environmental review. Some members of the Technical Advisory Group (TAG) have a concern that, by preparing the Program EIR, CalRecycle is indicating a preference for AD technologies over other technologies, or that it will appear that way to the public. CalRecycle emphasizes that the intent of this document is not to identify AD facilities as preferred to alternative waste management options, or to identify preferred AD facility systems or vendors. CalRecycle has previously provided RMDZ loans, permitting guidance, and technical assistance for projects using a range of technologies including biochemical and thermochemical conversion technologies. This effort should best be understood as an effort by CalRecycle to use its very limited funding to analyze the potential environmental impacts of AD facilities, which is but one of the conversion technologies available to reduce the level of organics going to landfills in California. The Program EIR is a starting point for the environmental review of AD facilities proposed in local jurisdictions. By tapping into the considerable California specific knowledge and experience of CalRecycle staff and the TAG, this effort provides a technical outreach and overview that would not otherwise be available to local jurisdictions considering a specific AD facility proposal.

1.2 Anaerobic Digestion Initiative

Under its Strategic Directive 6.1, CalRecycle seeks to reduce by 50 percent the amount of organic waste disposed in the state's landfills by 2020. In addition to helping conserve limited landfill capacity, this CalRecycle policy recognizes that organic wastes are a resource, not just solid wastes that must be disposed. Organic wastes have an energy value that can be captured and utilized and are also a necessary component of compost, soil amendments, and other useful products. Directive 6.1 also encompasses one of CalRecycle's actions to help California significantly reduce its generation of greenhouse gases. Under the State's *Climate Change Scoping Plan* (CARB, 2008), CalRecycle is responsible for taking actions to reduce the emission of methane, a potent greenhouse gas, from landfills. AD facilities utilize organic wastes as a feedstock from which to produce biogas (which is captured and contains a high percentage of methane). Typically the methane gas produced by the anaerobic digestion process is converted to liquefied natural gas (LNG), compressed natural gas (CNG), or electricity (using internal combustion engines or fuel cells) for on-site energy needs and export to the energy grid (CARB, 2008). The development of AD facilities is one of CalRecycle's charges under the AB 32 Climate Change Scoping Plan. The AB 32 Climate Change Scoping Plan estimates that AD facilities in California could avoid methane emissions from landfills at a level of 2 million metric tons of carbon dioxide equivalents (CO_2e) per year by the year 2020 (CARB, 2008). Anaerobic digestion also can contribute to meeting the State's Renewable Portfolio Standard and Low Carbon Fuel Standard. To assist in achieving those objectives, CalRecycle intends to adopt the AD Initiative, a comprehensive program to foster the development of AD facilities to convert organic solid wastes into sources of energy, valuable compost feedstocks, soil amendments, and other products.

The AD Initiative consists of CalRecycle's adoption of a policy and a series of discrete actions to implement the policy, together with additional actions that will be developed and implemented in the future:

- It is the policy of CalRecycle to encourage the development of AD facilities in California as an alternative to the landfill disposal of organic solid waste. Specifically, as an initial measure, CalRecycle will encourage the establishment of in-vessel digesters located at existing or new solid waste facilities and in areas zoned for industrial or solid waste handling activities.
- CalRecycle shall, not later than January 1, 2012, establish programs to implement the above policy, including without limitation:
    - Provide research grants, loans, and contracts (dependent on funding availability) to develop AD facilities and for activities that advance the state of knowledge about anaerobic digestion and its applications and the uses of products and by-products, including anaerobic digestion demonstration projects that use the organic fraction of municipal solid waste as a feedstock.
    - Develop guidance publications to assist operators who seek to establish AD facilities.
    - Develop guidance publications to assist LEAs and other local and regional government agencies that permit and regulate AD facilities, specifically guidance for co-location at solid waste facilities.

  - Draft revised regulations for aspects of specific design, operation and permitting of AD facilities within the authority and responsibility of CalRecycle.
  - Promote anaerobic digestion through CalRecycle's participation with the California Energy Commission in implementing AB 118 (Alternative and Renewable Fuel and Vehicle Technology Program), the Bioenergy Interagency Working Group, and with the Air Resources Board in implementing the Anaerobic Digestion and Low Carbon Fuel Standard measures in the AB 32 Climate Change Scoping Plan.
  - Work with the California Pollution Control Financing Authority and California Alternative Energy and Advanced Transportation Financing Authority to help anaerobic digestion project proposals obtain funding.
  - Participate on technical workgroups convened by the Climate Action Reserve to develop or modify protocols, such as the Organic Waste Digestion Project Protocol, for projects that divert and anaerobically digest organic waste that otherwise would have gone to solid waste landfills.

1.3 Project Objectives

The project has several objectives including the following:

- Assist in meeting CalRecycle Strategic Directive 6.1: Reduce the amount of organics in the waste stream by 50 percent by 2020.
- Support Assembly Bill 32 (AB 32), the California Global Warming Solutions Act of 2006, greenhouse gas reduction measures related to the use of anaerobic digestion:
  - Measures E-3. Achieve a 33 percent renewable energy mix by 2020. (AD facilities produce biogas which is a renewable energy source.)
  - RW-3. High Recycling/Zero Waste. (Anaerobic digestion is one of five subcategories listed under this measure.)
- Assist local governments and state agencies (both lead and responsible agencies) by providing program-level analyses that will identify potential environmental effects of AD facilities and discuss mitigation measures or best management practices that can reduce or eliminate the environmental effects.

1.4 Proposed Facilities

The scope of proposed facility types has been focused by the objective of reducing the organic content of the solid wastes that are disposed in municipal solid waste landfills and to generate or recover energy from the solid wastes.

AD Facilities included in the scope: In-vessel AD facilities which are located at existing or new permitted solid waste facilities or stand-alone AD facilities in areas zoned for industrial or solid waste handling activities.

AD Facilities not included in the scope: Dairy manure digesters, dairy manure co-digesters and wastewater treatment plant digesters. In-ground digester cell technology (for example the landfill-based anaerobic digester-compost pilot project developed at the Yolo County Central Landfill), though not included in the project, is discussed and evaluated as an alternative in **Chapter 13**.

There are several variations of in-vessel digester technologies. This Draft Program EIR allows for flexibility in technology choices at the local level. Different in-vessel technologies have the same general processes which are discussed in the siting, construction and operational sections, below.

1.5 Feedstocks

The scope of this Draft Program EIR is focused on reducing organic portions of the municipal solid waste stream and feedstocks which enhance the efficiency of the AD process.

Feedstock materials included in the scope: Food waste, green material and mixed solid waste. The food and green material categories are intended to be inclusive and not limited by current regulatory definitions or collection methods – "food" includes cannery waste, meat, poultry, fish, cheese waste, food processing waste, fats, oils and greases (FOG), etc., and "green material" includes urban, agricultural, crop residues, contaminated green materials (containing inorganic material), etc. Use of manure will be considered as nitrogen nutrient amendment material for the purpose of increasing the growth of microorganisms and digester efficiency, but not as a primary waste stream to be evaluated. Unprocessed mammalian tissue (i.e., dead cows, carcasses, etc.) is also not included in the scope of this Program EIR.

Feedstock materials not included in the scope: Biosolids, untreated septage, waste co-digested with biosolids at wastewater treatment plants or dairy manure co-digesters, and hazardous waste.

1.6 Summary of Significant Impacts and Mitigation Measures

Potential environmental impacts of the project are summarized in **Table 1-1**, below. As indicated in the table, all the impacts could be mitigated to a less-than-significant level with implementation of the mitigation measures. Please refer to Chapters 5 through Chapter 11 in this Draft Program EIR for a complete discussion of each impact. As discussed in Chapter 2, a Mitigation Monitoring or Reporting Program (MMRP) will be prepared at the time of the Final Program EIR for this project.

Notably, the development of AD facilities would have substantial benefits in regards to diverting organic material from landfills and reducing greenhouse gas (GHG) emissions in comparison to existing practices.

1.7 Areas of Controversy and Other CEQA Considerations

For the most part, comments received from members of the Technical Advisory Group (TAG) (see the list of members in Chapter 14) and in response to the EIR Notice of Preparation (NOP) have been supportive of the goals of the Program EIR. There was general support from the TAG members that the Program EIR move forward quickly to provide information that can help AD facility projects that are in the early phases of planning and/or permitting. Also there was considerable support from the TAG for regulations to specifically address the permitting of AD facilities.

The inclusion of the Landfill In-Ground Digester Cell Alternative was a topic that raised some controversy in the TAG meetings. Some members (on one NOP comment letter) indicated that it should be included as part of the project. Other TAG members wanted it discussed as an alternative or not at all in the Program EIR. Ultimately the in-ground digester cell was considered as an alternative to the project (in the Program EIR) because, while it has similar target feedstocks, it is unique in comparison to the in-vessel systems considered in the Program EIR.

Some TAG members indicated that the Thermal Conversion Alternative is not an appropriate project alternative, because thermal conversion technologies have different target feedstock materials than AD facilities. Because of the differences in target feedstock materials, the Thermal Conversion Alternative was described in some detail in Chapter 13, but it was not directly compared as an alternative to the project.

1.8 Alternatives

The purpose of the alternatives analysis in an EIR is to describe a range of reasonable alternatives to the project that could feasibly attain the objectives of the project, and to evaluate the comparative merits of the alternatives (CEQA Guidelines §15126.6(a)). Additionally, CEQA Guidelines §15126.6(b) requires consideration of alternatives that could avoid or substantially lessen any significant adverse environmental effects of the proposed project, including alternatives that may be more costly or could otherwise impede the project’s objectives. The range of alternatives considered must include those that offer substantial environmental advantages over the proposed project and may be feasibly accomplished in a successful manner considering economic, environmental, social, technological, and legal factors.

The following alternatives are fully analyzed and evaluated in Chapter 13, Alternatives:

- No Project Alternative. Under the No Project Alternative, CalRecycle would not undertake the AD Initiative. This would maintain the status quo for AD facilities with respect to CEQA and permitting. AD facilities would be required to comply with current CEQA and other regulatory requirements without the benefit of the project. Development of AD facilities would continue in its current form and would be regulated by CalRecycle, by other permits from responsible agencies (i.e., County Use Permits, air and water quality permits, etc.), and by local and regional governments through local ordinances and regulations. The potential for reducing disposal of organics at California landfills would be reduced.
- Co-Digestion at Wastewater Treatment Plants (WWTPs) Alternative. Under the Co-Digestion at WWTPs Alternative, the AD Initiative would apply to the construction and operation of co-digestion facilities at existing AD facilities at WWTPs for the diversion of organic materials from landfills and the production of biogas from organics in the waste stream.
- Co-Digestion at Dairy Manure Digesters Alternative. Under the Co-Digestion at Dairy Manure Digesters Alternative, the AD Initiative would apply to the construction and operation of co-digestion facilities at dairy manure digesters for the diversion of organic materials (as co-digestion feedstocks) from California landfills and the production of biogas from organics in the waste stream.
- Increased Aerobic Composting Alternative. Under the Increased Aerobic Composting Alternative, the AD Initiative would apply to the construction and/or operation

changes needed at existing or new compost facilities to divert more organic materials from California landfills.

- Landfill In-Ground Digester Cell Alternative. Under the Landfill In-Ground “Digester Cell” Alternative, the AD Initiative would apply to the construction and operation of in-ground digesters at a landfill that are limited to organic materials and which would utilize liquid injection and recirculation.

The analysis of the alternatives found that only the Increased Aerobic Composting Alternative and the Co-Digestion at Existing WWTPs Alternative are promising for being able to substantially assist in reducing the amount of organics in the waste stream by 2020, a key project objective. Between the two alternatives that could substantially reduce organics, the Increased Aerobic Composting Alternative would appear to have more flexibility in expanding existing facilities or adding new facilities to handle the increased organic materials. While WWTPs could use any current excess capacity they have to digest the additional organics, once that capacity is maximized, it would be a major step for a WWTP to add a new AD facility to their facility for the purpose of digesting municipal organic solid wastes, which is not the primary role of WWTPs. Therefore, compared to the alternatives analyzed in this chapter, the Aerobic Composting Alternative is the environmentally superior alternative because it is most likely to result in substantial reductions in organics in the waste stream by 2020. However, it should be noted that the proposed project (the AD Initiative) could substantially achieve all the project objectives and could be implemented with mitigation measures that would reduce ~~most of~~ the project impacts to a level that would be less than significant. None of the alternatives considered are environmentally superior to the proposed project in that they do not meet project objectives.

TABLE 1-1 (REVISED)
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance	
		Before Mitigation	After Mitigation
5. Air Quality and Greenhouse Gas			
Impact 5.1: Construction and operations of AD facilities within California would result in emissions of criteria air pollutants at levels that could substantially contribute to a potential violation of applicable air quality standards or to nonattainment conditions.	**Measure 5.1a:** Applicants shall prepare and submit an Air Quality Technical Report as part of the environmental assessments for the development of future AD facilities on a specific project-by-project basis. The technical report shall include an analysis of potential air quality impacts for all steps of the project (including a screening level analysis to determine if construction and operation [for all on-site processes, including any end-use and disposal methods] related criteria air pollutant emissions would exceed applicable air district thresholds, as well as greenhouse gas (GHG) emissions and any health risk associated with toxic air contaminants (TACs) from all AD facility sources) and reduction measures. Preparation of the technical report should be coordinated with the appropriate air district and shall identify compliance with all applicable New Source Review and Best Available Control Technology (BACT) requirements. The technical report shall identify all project emissions from permitted (stationary) and non-permitted (mobile and area) sources and mitigation measures (as appropriate) designed to reduce significant emissions to below the applicable air district thresholds of significance, and if these thresholds cannot be met with mitigation, then the individual AD facility project could require additional CEQA review or additional mitigation measures. **Measure 5.1b:** Applicants shall require construction contractors and system operators to implement the following Best Management Practices (BMPs) as applicable during construction and operations: • Facilities shall be required to comply with the rules and regulations from the applicable Air Quality Management District (AQMD) or Air Pollution Control District (APCD). • Facilities shall require substrate unloading and pre-processing activities to occur indoors within enclosed, negative pressure buildings. Collected foul air (including volatile organic compounds (VOCs) off-gassed from undigested substrates) should be treated via biofilter or air scrubbing system. • Use equipment meeting, at a minimum, Tier II emission standards. • Minimize idling time either by shutting equipment off when not in use or reducing the time of idling to 5 minutes (as required by the state airborne toxics control measure [Title 13, §2485 of the California Code of Regulations]). Provide clear signage that posts this requirement for workers at the entrances to the site. • Maintain all equipment in proper working condition according to manufacturer's specifications. • Use electric equipment when possible. For projects that are unable to use internal combustion engines due to air district regulations (i.e., NOx emission limits), other options for generating renewable energy from biogas should be considered. Other options that should be evaluated for using biogas or biomethane as an energy source include: use as a transportation fuel (compressed biomethane), use in fuel cells to generate clean electricity, use for on-site heating, or injection of biomethane into the utility gas pipeline system. If there are other lower NOx alternative technologies available at the time of AD facility development, these should be considered as well during the facility design process.	S	LSM

LS – Less than Significant LSM – Less than Significant with Mitigation NI – No Impact S – Significant

TABLE 1-1 (REVISED)
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance Before Mitigation	Impact Significance After Mitigation
Impact 5.2: Operation of AD facilities in California could create objectionable odors affecting a substantial number of people.	**Measure 5.2a:** Applicants for the development of AD facilities shall comply with appropriate local land use plans, policies, and regulations, including applicable setbacks and buffer areas from sensitive land uses for potentially odoriferous processes. **Measure 5.2b:** If an AD facility handles compostable material and is classified as a compostable material handling facility, the facility must develop an Odor Impact Minimization Plan (OIMP) pursuant to 14 CCR 17863.4. Otherwise, applicants shall develop and implement an Odor Management Plan (OMP) that incorporates equivalent odor reduction controls for digester operations and is consistent with local air district odor management requirements. These plans shall identify and describe potential odor sources, as well as identify the potential, intensity, and frequency of odor from these likely sources. In addition, the plans will specify odor control technologies and management practices that if implemented, would mitigate odors associated with the majority of facilities to less than significant. However, less or more control measures may be required for individual projects. Odor control strategies and management practices that can be incorporated into these plans include, but are not limited to, the following: - Require substrate haulage to the AD facility within covered, liquid leak-proof containers. - Establish time limit for on-site retention of undigested substrates (i.e., feedstocks should be processed and placed into the portion of the system where liquid discharge and air emissions can be controlled within 24 or 48 hours of receipt). - Provide enclosed, negative pressure buildings for indoor receiving and pre-processing. Treat collected foul air in a biofilter or air scrubbing system. - Establish contingency plans for operating downtime (e.g., equipment malfunction, power outage). - Manage delivery schedule to facilitate prompt handling of odorous substrates. - Handle fresh unstable digestate within enclosed building, or mix with green waste and incorporate into a composting operation within the same business day, and/or directly pump to covered, liquid leak-proof containers for transportation. - Protocol for monitoring and recording odor events. - Protocol for reporting and responding to odor events.	S	LSM
Impact 5.3: Construction and operation of AD facilities in California could lead to increases in chronic exposure of sensitive receptors in the vicinity to certain toxic air contaminants from stationary and mobile sources.	**Measure 5.3a:** Implement Mitigation Measures 5.1a and 5.1b. **Measure 5.3b:** Based on the Air Quality Technical Report (specified in Measure 5.1a), if the health risk is determined to be significant on a project-by-project basis with diesel particulate matter (DPM) as a major contributor, then the applicants shall implement control measures such that the AD facility health risk would be below the applicable air district threshold, which may include implementation of one or more of the following requirements, where feasible and appropriate: • Use either new diesel engines that are designed to minimize DPM emissions (usually through the use of catalyzed particulate filters in the exhaust) or retrofit older engines with catalyzed	S	LSM

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Impact	Mitigation Measure	Impact Significance	
		Before Mitigation	After Mitigation
	particulate filters (which will reduce DPM emissions by 85%); • Use electric equipment to be powered from the grid, which would eliminate local combustion emissions; • Use alternative fuels, such as compressed natural gas (CNG) or liquefied natural gas (LNG). **Measure 5.3c:** Hydrogen sulfide (H2S) contained in the biogas shall be scrubbed (i.e., via iron sponge or other technology) before emission to air can occur.		
Impact 5.4: Development of AD facilities in California could increase GHG emissions.	**Measure 5.4:** Implement Mitigation Measure 5.1a.	NI	NI
Impact 5.5: Development of AD facilities in California, together with anticipated cumulative development in the area, would contribute to regional criteria pollutants.	**Measure 5.5:** Implement Mitigation Measures 5.1a and 5.1b.	S	LSM
6. Hydrology			
Impact 6.1: Construction of AD Facilities could generate loose, erodible soils and other water quality pollutants that may impair water quality.	None required.	LS	LS
Impact 6.2: The operation of AD facilities could adversely affect surface and groundwater quality.	**Measure 6.2a:** During pre-processing, all water that contacts digester feedstock, including stormwater from feedstock handling and storage facilities and water from equipment washdown and feedstock wetting, shall be contained until appropriately disposed or utilized. Best Management Practices (BMPs) may be used to reduce loading of sediment, nutrients, trash, organic matter, and other pollutants. These BMPs may include, but are not limited to, trash grates and filters, oil-water separators, mechanical filters such as sand filters, vegetated swales, engineered wastewater treatment wetlands, settling ponds, and other facilities to reduce the potential loading of pollutants into surface waters or groundwater. All discharges of stormwater are prohibited unless covered under the General Industrial Stormwater Permit, other National Pollutant Discharge Elimination System (NPDES) permit, or are exempted from NPDES permitting requirements. The NPDES permits will generally require implementation of management measures to achieve a performance standard of best available technology economically achievable (BAT) and best conventional pollutant control technology (BCT), as appropriate. The General Industrial Stormwater Permit also requires the development of a storm water pollution prevention plan (SWPPP) and a monitoring plan, in compliance with permit requirements.[1] Other liquid and solid wastes may only be discharged pursuant to an NPDES permit or waste discharge requirement (WDR) order. **Measure 6.2b**: In order to minimize the amount of fugitive trash or feedstock released to surface waters, the following measures shall be implemented. When feasible, the project proponent shall preferentially select feedstocks that contain minimal amounts of trash that could become entrained in surface water, either via direct contact with stormwater flows or via other accidental release, such as due to wind. Processing of such feedstocks may, however, be unavoidable, such as in support of an AD facility that processes MSW. Therefore, the project applicant shall ensure that (1) drainage from all feedstock loading, unloading,	S	LSM

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[1] For more information, please refer to: http://www.swrcb.ca.gov/water_issues/programs/stormwater/industrial.shtml

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		Before Mitigation	After Mitigation
	and storage areas is contained onsite or treated to remove trash and stray feedstock, and sediment prior to release as permitted; (2) in all feedstock loading and unloading areas, and all areas where feedstock is moved by front loaders or other uncovered or uncontained transport machinery, the applicant shall ensure that mechanical sweeping and/or equivalent trash control operational procedures are performed at least daily, during operations; and (3) the facility operator shall train all employees involved in feedstock handling so as to discourage, avoid, and minimize the release of feedstock or trash during operations. **Measure 6.2c**: In order to minimize water quality degradation associated with accidental spills at AD facilities, the applicant for individual projects that would be implemented under the Program EIR shall require project proponents to complete and adhere to the requirements of a Spill Prevention, Control, and Countermeasure (SPCC) Plan, which is based on the federal SPCC rule. Notification of the SPCC Plan shall be provided to the local Certified Unified Program Agency (CUPA). The SPCC Plan shall contain measures to prevent, contain, and otherwise minimize potential spills of pollutants during facility operation, in accordance with U.S. EPA requirements. For individual projects that would utilize wet digestion systems, in which processing and holding tanks would contain the (aqueous) digestion reaction and liquid digestate containing fats and oils, the SPCC Plan shall provide for installation and monitoring of secondary containment and/or leak detection systems to ensure that AD liquids are not accidentally discharged to navigable waters or adjoining shorelines. Monitoring of these systems shall be in accordance with SPCC Plan requirements. **Measure 6.2d:** Any proposed discharge to a pond for an individual project would require the project applicant to acquire WDRs from the appropriate regional board. The project applicant shall ensure that all ponds and discharges to such ponds adhere to all requirements under applicable WDRs. The need for pond liners in order to protect groundwater quality would be assessed during the regional board's review of the project, and requirements for pond liners would be included in the WDRs, as warranted. If appropriate, the WDRs would impose requirements for Class II surface impoundments as presented in Title 27 of the California Code of Regulations. Requirements include, but are not limited to, groundwater monitoring, double liner systems with leachate collection, water balance, a preliminary closure plan for clean closure, seismic analysis, and financial assurances. Compliance with WDRs may require the installation of facilities such as tanks and containers to store and process the digestate, the use of filter presses, and implementation of other water quality protection practices. **Measure 6.2e**: This measure would reduce potential for the movement of nutrients and other pollutants to groundwater and surface water for individual projects that would employ land application for liquid digestate or residual solids. The operators of individual projects implemented under this Program EIR shall ensure that land application of liquid digestate and/or residual solids adheres to all requirements of applicable WDRs. WDR requirements include but are not limited to, groundwater monitoring, completion of an anti-degradation analysis, and in some cases best practicable treatment and control to achieve salinity reduction in materials prior to discharge to land. WDRs would be issued by the appropriate regional board, and would consider site-specific conditions and waste characteristics, in order to determine applicable control measures and procedures that protect water quality.		

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Impact	Mitigation Measure	Impact Significance Before Mitigation	Impact Significance After Mitigation
	Measure 6.2f: This measure would reduce the potential for water quality degradation from projects that include discharge of liquid digestate to surface waters. The applicant for individual projects implemented under this Program EIR shall ensure that the discharge of liquid digestate to surface waters adheres to all NPDES permitting recommendations and requirements, as established by the appropriate regional board. Specific measures may include, but are not limited to, limitations on discharge volumes, seasonal discharge restrictions, limitations on loading rates and/or concentrations of specific constituents, and other facility-specific water quality control measures designed to protect receiving water quality and preserve beneficial uses identified in Basin Plans.		
Impact 6.3: AD facilities could be exposed to flooding hazards.	**Measure 6.3:** Individual applicants seeking coverage under this Program EIR shall ensure that, for their proposed AD facilities including pre-processing areas, feedstock storage areas, and digestate handling facilities, are protected from FEMA-defined 100-year flood events. Design measures may include, but are not limited to: facility siting, access placement, grading, elevated foundations, and site protection such as installation of levees or other protective features.	S	LSM
Impact 6.4: Construction of AD facilities could change drainage and flooding patterns	**Measure 6.4:** In order to ensure that the AD facilities would not result in detrimental increases in stormwater flow or flooding on site or downstream, the Applicant for each AD facility project shall prepare a comprehensive drainage plan (prior to construction) and implement the plan during construction. The comprehensive drainage plan shall include engineered stormwater retention facility designs, such as retention basins, flood control channels, storm drainage facilities, and other features as needed to ensure that, at a minimum, no net increase in stormwater discharge would occur during a 10-year, 24-hour storm event, as a result of project implementation. Project related increases in stormwater flows shall be assessed based on proposed changes in impervious surface coverage on site, as well as proposed grading and related changes in site topography.	S	LSM
Impact 6.5: AD facilities could require additional water supplies resulting in depletion of available water supplies.	None required.	LS	LS
Impact 6.6: AD facilities could become inundated as a result of seiche, tsunami, or mudflow.	**Measure 6.6:** To ensure that proposed AD facilities would not incur impacts associated with seiche, tsunami, or mudflow, the applicant for each individual project shall ensure that all facilities are located outside of potential risk areas for seiche, tsunami, and mudflow. In the event that a proposed facility would be sited within a potential risk area for one of these hazards, the facility shall be raised above projected maximum base inundation elevations, or shall be protected from inundation by the installation of berms, levees, or other protective facilities.	S	LSM
Impact 6.7: AD facilities could contribute to cumulative impacts to water quality.	**Measure 6.7:** Implement Mitigation Measures 6.2 (a-f) and 6.3.	S	LSM

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		Before Mitigation	After Mitigation
7. Noise			
Impact 7.1: Construction of AD facilities could temporarily increase noise levels at nearby sensitive receptor locations or result in noise levels in excess of standards in local general plans, noise ordinances, or other applicable standards.	**Measure 7.1a:** Construction activities shall be limited to the hours between 7 a.m. and 7 p.m., Monday through Saturday, or an alternative schedule established by the local jurisdiction, or other limits to construction hours normally enforced by the local jurisdiction (see Measure 7.1d below). **Measure 7.1b:** Construction equipment noise shall be minimized by muffling and shielding intakes and exhaust on construction equipment to a level no less effective than the manufacture's specifications, and by shrouding or shielding impact tools. **Measure 7.1c:** Construction contractors within 750 feet of sensitive receptors shall locate fixed construction equipment, such as compressors and generators, and construction staging areas as far as possible from nearby sensitive receptors. **Measure 7.1d**: Construction contractors shall comply with all local noise ordinances and regulations and other measures deemed necessary by the Lead Agency.	S	LSM
Impact 7.2: Noise from operation of AD facilities could substantially increase ambient noise levels at nearby land uses or result in noise levels in excess of standards in local general plans, local noise ordinances, or other applicable standards.	**Measure 7.2:** AD facilities located within 2,000 feet of a sensitive receptor shall conduct a site specific noise study. If operational sound levels would exceed local regulations, or 45 dBA at a sensitive receptor (if no regulations are available), additional sound-proofing such as enclosures, muffling, shielding, or other attenuation measures shall be installed to meet the required sound level.	S	LSM
Impact 7.3: AD facility operational activities associated with transportation would not increase ambient noise levels at nearby land uses.	None required.	LS	LS
Impact 7.4: Development of AD facilities could result in a cumulative increase in noise levels.	**Measure 7.4:** Implement Mitigation Measures 7.1a through 7.1d and Measure 7.2.	S	LSM
8. Public Services and Utilities			
Impact 8.1: The project could substantially increase demands on fire protection services.	**Measure 8.1:** Implement Mitigation Measures 10.1b, 10.3c, and 11.4a.	S	LSM
Impact 8.2: The project could potentially exceed wastewater treatment requirements of the Regional Water Quality Control Board (RWQCB).	**Measure 8.2a:** Implement Mitigation Measure 8.3b if the operator does not have an existing agreement, such as for co-located facilities. **Measure 8.2b:** In addition to an agreement for service, coordination with the wastewater treatment provider would be needed to determine if pre-treatment would be required to meet the RWQCB requirements for the existing wastewater treatment facility.	S	LSM

LS – Less than Significant LSM – Less than Significant with Mitigation NI – No Impact S – Significant

TABLE 1-1 (REVISED)
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance Before Mitigation	Impact Significance After Mitigation
Impact 8.3: The project could result in significant environmental effects from the construction and operation of new water and wastewater treatment facilities or expansion of existing facilities.	**Measure 8.3a:** If the project proposes to obtain water from a water supplier (municipal system or other public water entity), the developer would enter into an agreement for service with the supplier. **Measure 8.3b**: If the project proposes to obtain wastewater service from a wastewater treatment provider (municipal or other public entity), the developer would enter into an agreement for service with the provider. **Measure 8.3c:** Alternate water sources, such as non-potable and recycled water, shall be used during the pre-processing and AD process phases where needed and as available.	S	LSM
Impact 8.4: The project would not result in significant environmental effects from the construction of new stormwater treatment facilities or expansion of existing facilities.	None required.	LS	LS
Impact 8.5: The project would not require significant levels of new or expanded water supply resources or entitlements.	None required.	LS	LS
Impact 8.6: The project could result in exceeding the capacity of a wastewater treatment provider.	**Measure 8.6:** If the project proposes to obtain wastewater service from a wastewater treatment provider (municipal or other public entity), implement Mitigation Measure 8.3b.	S	LSM
Impact 8.7: The project could result in the construction of new energy supplies and could require additional energy infrastructure.	**Measure 8.7:** Projects requiring off-site energy infrastructure must complete CEQA review for the proposed energy improvements as a separate project. Infrastructure improvements may qualify as a categorical exemption pursuant to CEQA.	S	LSM
Impact 8.8: Development of AD facilities would not contribute to cumulative impacts to public services and utilities.	None required.	LS	LS
9. Transportation			
Impact 9.1: Construction of AD facilities would intermittently and temporarily increase traffic congestion due to vehicle trips generated by construction workers and construction vehicles on area roadways.	**Measure 9.1:** The contractor(s) will obtain any necessary road encroachment permits prior to installation of pipelines within the existing roadway right-of-way. As part of the road encroachment permit process, the contractor(s) will submit a traffic safety / traffic management plan (for work in the public right-of-way) to the agencies having jurisdiction over the affected roads. Elements of the plan will likely include, but are not necessarily limited to, the following: • Develop circulation and detour plans to minimize impacts to local street circulation. Use haul routes minimizing truck traffic on local roadways to the extent possible. Use flaggers and/or signage to guide vehicles through and/or around the construction zone. • To the extent feasible, and as needed to avoid adverse impacts on traffic flow, schedule truck trips outside of peak morning and evening commute hours. • Limit lane closures during peak traffic hours to the extent possible. Restore roads and streets to normal operation by covering trenches with steel plates outside of allowed working hours or when work is not in progress. • Limit, where possible, the pipeline construction work zone to a width that, at a minimum, maintains alternate one-way traffic flow past the construction zone. • Install traffic control devices as specified in Caltrans' Manual of Traffic Controls for Construction and Maintenance Work Zones where needed to maintain safe driving conditions. Use flaggers	S	LSM

LS – Less than Significant　　LSM – Less than Significant with Mitigation　　NI – No Impact　　S – Significant

TABLE 1-1 (REVISED)
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance	
		Before Mitigation	After Mitigation
	and/or signage to safely direct traffic through construction work zones. • Coordinate with facility owners or administrators of sensitive land uses such as police and fire stations, hospitals, and schools. Provide advance notification to the facility owner or operator of the timing, location, and duration of construction activities. • Coordinate with the local public transit providers so that bus routes or bus stops in work zones can be temporarily relocated as the service provider deems necessary.		
Impact 9.2: AD facility operations would not substantially increase on-going (operational) traffic volumes on roadways serving the facilities.	**Measure 9.2:** Measures will be imposed by applicable local agencies, as needed, to address site-specific significant traffic impacts identified during subsequent facility-specific analyses, implementation of which would reduce those impacts to a less-than-significant level.	S	LSM
Impact 9.3: AD facilities could potentially cause traffic safety hazards for vehicles, bicyclists, and pedestrians on public roadways, and could increase traffic hazards due to possible road wear or to accidental spills of digestate (liquids and solids).	**Measure 9.3a:** Implement Measure 9.1, which stipulates actions required of the contractor(s) to reduce potential traffic safety impacts to a less-than-significant level. **Measure 9.3b:** Prior to construction, the contractor(s), in cooperation with the agencies having jurisdiction over the affected roadways, will survey and describe the pre-construction roadway conditions on rural roadways and residential streets. Within 30 days after construction is completed, the affected agencies will survey these same roadways and residential streets in order to identify any damage that has occurred. Roads damaged by construction will be repaired to a structural condition equal to the condition that existed prior to construction activity. **Measure 9.3c:** Prior to initiation of project operations, the project sponsor(s) will submit a Spill Prevention Plan to the appropriate local agency. The Spill Prevention Plan will include, among other provisions, a requirement that each truck driver know how to carry out the emergency measures described in the Spill Prevention Plan (therefore reducing roadway hazards if an accidental spill were to occur).	S	LSM
Impact 9.4: AD facilities could intermittently and temporarily impede access to local streets or adjacent uses (including access for emergency vehicles), as well as disruption to bicycle/pedestrian access and circulation.	**Measure 9.4:** Implement Measure 9.1, which stipulates actions required of the contractor(s) to reduce potential access impacts to a less-than-significant level.	S	LSM
Impact 9.5: The project could contribute to cumulative impacts to traffic and transportation (traffic congestion, traffic safety, and emergency vehicle access).	**Measure 9.5a:** Prior to construction, the project sponsor will coordinate with the appropriate local government departments, Caltrans, and utility districts and agencies regarding the timing of construction projects that would occur near AD project sites. Specific measures to mitigate potential significant impacts will be determined as part of the interagency coordination, and could include measures such as employing flaggers during key construction periods, designating alternate haul routes, and providing more outreach and community noticing. **Measure 9.5b:** Implement Mitigation Measure 9.2. **Measure 9.5c:** Implement Mitigation Measures 9.1, 9.3b and 9.3c.	S	LSM

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TABLE 1-1 (REVISED)
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance	
		Before Mitigation	After Mitigation
10. Aesthetics			
Impact 10.1: AD facilities could have adverse effects on a scenic vista and/or scenic resources.	**Measure 10.1a:** Avoid siting AD facilities near scenic vistas and corridors designated within an applicable land use plan and the State Scenic Highway Program. **Measure 10.1b**: Landscaping and/or vegetated berms should be used to minimize views of facilities from sensitive views.	S	LSM
Impact 10.2: AD facilities could degrade the existing visual character/quality of the site and its surroundings.	**Measure 10.2a:** Implement Mitigation Measures 10.1a and 10.1b. **Measure 10.2b:** Facilities using truck tippers or other un-enclosed unloading should consider using litter fences to manage blowing litter. Facilities should educate haulers delivering materials to the AD facility through literature, web links, or provide training on the acceptance of waste at the facilities to minimize litter. Facility operators should develop a protocol to identify feedstocks that are severely contaminated with potential litter and reject unacceptable loads. **Measure 10.2c:** Clean-up crews can be used as necessary to control litter. **Measure 10.2d:** Feedstocks and digestate byproducts should be stored in enclosed facilities or processed in a timely manner to prevent visibly deteriorated site conditions. **Measure 10.2e:** Project operators should consider enclosure of pre-processing operations if it provides an aesthetic and/or noise attenuating benefit.	S	LSM
Impact 10.3: AD facilities could create a new source of light or glare with adverse affects to daytime and/or nighttime views.	**Measure 10.3a:** Implement 10.1b. **Measure 10.3b:** Any lighting (portable or permanent) should be hooded and directed onto the project site. This would reduce effects to nighttime skies from uplighting, reduce glare, and prevent light from spilling onto adjoining properties and roads. **Measure 10.3c:** Flares may be enclosed to reduce the visibility of flames during operation.	S	LSM
Impact 10.4: The project could result in cumulative impacts to visual resources.	**Measure 10.4:** Implement Mitigation Measures 10.1a, 10.1b, 10.2a, 10.2b, 10.2c, 10.2d, 10.2e, 10.3a, 10.3b, and 10.3c.	S	LSM
11. Hazards and Hazardous Materials			
Impact 11.1: Construction of AD facilities could result in the potential exposure of construction workers, the public and the environment to preexisting soil and/or groundwater contamination.	**Mitigation Measure 11.1:** Prior to final project design and any earth disturbing activities, the applicant or agency(ies) responsible shall conduct a Phase I Environmental Site Assessment (ESA). The Phase I ESA shall be prepared by a Registered Environmental Assessor (REA) or other qualified professional to assess the potential for contaminated soil or groundwater conditions at the project site; specifically in the area proposed for construction of AD facilities. The Phase I ESA shall include a review of appropriate federal, State and local hazardous materials databases to identify hazardous waste sites at on-site and off-site locations within a one quarter mile radius of the project location. This Phase I ESA shall also include a review of existing and past land uses through aerial photographs, historical records, interviews of owners and/or operators of the property, observations during a reconnaissance site visit, and review of other relevant existing information that could identify the potential existence of contaminated soil or groundwater. If no contaminated soil or groundwater is identified or if the Phase I ESA does not recommend any further investigation then the project applicant or agency(ies) responsible shall proceed with final project design and	S	LSM

LS – Less than Significant LSM – Less than Significant with Mitigation NI – No Impact S – Significant

TABLE 1-1 (REVISED)
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance	
		Before Mitigation	After Mitigation
	construction. OR If existing soil or groundwater contamination is identified, and if the Phase I ESA recommends further review, the applicant or agency(ies) responsible shall retain a REA to conduct follow-up sampling to characterize the contamination and to identify any required remediation that shall be conducted consistent with applicable regulations prior to any earth disturbing activities. The environmental professional shall prepare a report that includes, but is not limited to, activities performed for the assessment, summary of anticipated contaminants and contaminant concentrations at the proposed construction site, and recommendations for appropriate handling of any contaminated materials during construction.		
Impact 11.2: Transportation, use, disposal or accidental spill of hazardous materials during construction of AD facilities would not result in the potential exposure of construction workers, the public and the environment to hazardous materials.	None required.	LS	LS
Impact 11.3: Transportation, use, disposal or accidental spill of hazardous materials during the operation and maintenance of AD facilities would not result in potential harmful exposures of the public or the environment to hazardous materials.	**Mitigation Measure 11.3:** Implement Mitigation Measures 5.1a and 6.2a-f.	S	LSM
Impact 11.4: Operation of AD facilities could increase the risk of fire hazards due to the potential release of biogas.	**Mitigation Measure 11.4a:** Prior to project approval, AD facility operators shall prepare and implement a Fire Safety Plan that outlines fire hazards, describes facility operations procedures to prevent ignition of fires, requires regular inspection of fire suppression systems, and provides for worker training in safety procedures as well as protocols for responding to fire incidents. The Fire Safety Plan shall be reviewed and approved by the local fire enforcement agency. **Mitigation Measure 11.4b**: Implement Mitigation Measure 11.5.	S	LSM
Impact 11.5: AD facilities could be located within one quarter mile of a school resulting in potential hazards associated with accidental release of hazardous materials, including biogas.	**Mitigation Measure 11.5:** AD facilities shall be sited at least one quarter mile from existing or proposed schools, daycare facilities, hospitals and other sensitive land uses.	LS	LS
Impact 11.6: AD facility operations could generate vectors (flies, mosquitoes, rodents, etc.) exceeding regulatory agency thresholds for the presence of vectors.	None required.	LS	LS
Impact 11.7: AD facilities could be located within five miles of a public airport or private airstrip and create an aviation hazard.	**Mitigation Measure 11.7:** For any AD facility proposed within 5 statute miles of an airport's air operations area, the operator will notify the Federal Aviation Administration (FAA) Regional Airports Division office and the airport operator of the proposed facility as early in the process as possible. AD facilities with any open air (outdoor) activities must receive an FAA Determination of No Hazard prior to project approval.	S	LSM
Impact 11.8: Development of AD facilities could contribute to cumulative impacts related to hazardous materials.	**Mitigation Measure 11.8:** Implement Mitigation Measures 11.1, 11.4, 11.5, and 11.7.	LS	LS

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CHAPTER 2
Introduction

2.1 Purpose and Use of this Draft Program EIR

The California Department of Resources Recycling and Recovery (CalRecycle) intends to adopt the Anaerobic Digestion Initiative, a comprehensive program to foster the development of anaerobic digester facilities (AD facilities) that could assist in reducing the amount of organics in the waste stream, convert organic solid wastes into sources of renewable energy, and produce valuable compost feedstocks, soil amendments and other products. CalRecycle has prepared this Draft Program EIR to provide information concerning the potential environmental effects that may result from the development of AD facilities in California. This document has been prepared pursuant to the California Environmental Quality Act (CEQA) of 1970 (as amended), and the CEQA Guidelines (California Code of Regulations, Title 14). CEQA requires that state and local government agencies consider the environmental consequences of projects over which they have discretionary authority.

CalRecycle emphasizes that the intent of this document is not to identify AD facilities as preferred to alternative waste management options, or to identify preferred AD facility systems or vendors. CalRecycle has previously provided RMDZ loans, permitting guidance, and technical assistance for projects using a range of technologies including biochemical and thermochemical conversion technologies. This effort should best be understood as an effort by CalRecycle to use its very limited funding to analyze the potential environmental impacts of AD facilities, which is but one of the conversion technologies available to reduce the level of organics going to landfills in California.

An EIR is a public informational document for use by governmental agencies and the public to identify and evaluate potential environmental effects of a proposed project, to recommend mitigation measures to lessen or eliminate adverse impacts, and to examine feasible alternatives to the project. The Program EIR may be used by public agencies when considering approval of future individual site-specific projects for AD facilities within their jurisdictions.

2.2 Project Background

Compostable organic materials comprise approximately 25 percent or 10 million tons per year of the solid waste stream for California landfills (CalRecycle, 2009). Currently there are no commercial-scale stand-alone AD facilities or AD digesters co-located at solid waste facilities that process municipal organic solid waste in California. However, interest in developing such AD facilities is growing, and CalRecycle anticipates that AD facilities will be developed across the state to meet the increasing need to divert organic waste from landfills and to develop renewable energy technologies. The following summaries highlight some of the recent activity to develop or expand AD facilities in California.

> A pilot-scale AD facility has been in operation since 2006 at the University of California (UC) Davis and is currently going through a process of commercialization and scale-up of operations.
>
> CR&R Incorporated is in the funding and permitting stage of developing an anaerobic digestion project at their MRF and Transfer Station in Perris, CA. Utilizing the ArrowBio technology, the project will process post-recycled residual municipal solid waste and convert it into biogas for injection into the gas utility pipeline or upgrade the biogas into a transportation fuel. The Los Angeles County Board of Supervisors selected this project in 2010 as a demonstration facility for the Southern California Conversion Technology Program. This facility was also selected by the City of Los Angeles for the emerging class of alternative landfill technology Request for Proposals (RFP).
>
> CalRecycle recently approved a Recycling Market Development Zone (RMDZ) loan to Environ Strategy Consultants, Inc. (Environ) that will be used for equipment for an anaerobic digestion project that will process food waste derived from commercial and industrial sources to produce biomethane gas. The project will rebuild and expand the AD facilities owned by the Inland Empire Utilities Agency (IEUA) in Chino, California. Environ anticipates starting production by October 2011.
>
> In January 2011, the Humboldt County Waste Management Authority published a California Environmental Quality Act (CEQA) Initial Study and Mitigated Negative Declaration (MND) for a proposed regional food waste diversion program to serve Humboldt County. The proposed program would divert food waste (which is currently hauled an average of 190 miles and landfilled) to a local, anaerobic food waste digester facility (HWMA, 2011).
>
> The Port of San Diego is planning a food waste AD facility that could divert organics from landfills in San Diego County.
>
> Based on Green Vision goals of diversion and renewable energy production, the City of San Jose has pursued anaerobic digestion as a key infrastructure strategy since 2008. On February 4, 2011, after a two year procurement process, the City staff released a notice of intent to award the processing of all commercial organic waste (up to 60,000 tons/year) to Zero Waste Energy Development Company who has proposed the Kompoferm high solids dry fermentation system for implementation in 2012. The initial study for this project is expected to be released in Spring 2011.

Several other AD facility projects are in the early planning stages. Although co-digestion at wastewater treatment plants (WWTPs) is not covered by this Program EIR (except as an alternative to the project), the following summaries highlight current activities at WWTPs.

> Food waste is currently co-digested with primary and secondary municipal wastewater solids and other high-strength wastes at East Bay Municipal Utilities District’s (EBMUD) Main Wastewater Treatment Plant (MWWTP) in Oakland.

Central Marin Sanitation Agency (CMSA) is planning a food waste to energy program that would generate renewable energy and maximize unused AD capacity at CMSA (Kennedy/Jenks, 2009). The Digester Improvement/FOG and Food-to-Energy Facility project's final design documents were approved February 8, 2011 and CMSA plans to award the construction contract in April 2011 (CalRecycle, 2011).

2.3 CEQA EIR Process

2.3.1 Type of EIR

A Program EIR is an EIR prepared on a related set of actions, in this case the development of expanded or new AD facilities throughout the State of California. This Draft Program EIR provides a broad analysis of environmental impacts and through the CEQA tiering process will expedite future site-specific environmental review by lead agencies with discretion to approve AD facilities, pursuant to CEQA. To comply with CEQA, lead agencies considering individual AD facility projects in the future will prepare a Negative Declaration or Mitigated Negative Declaration or site-specific EIR to address local impacts, but may utilize the information and analysis in this Program EIR. The process is expedited for site-specific projects as this Draft Program EIR reduces the need for duplicative review of general environmental impacts, cumulative impacts and broad alternatives. This Draft Program EIR also should assist in achieving consistent mitigation between individual projects. Program EIR and tiering regulations can be found in California Public Resources Code §21093 and §21094, and CEQA Guidelines §15152 and §15168. A few notable excerpts include CEQA Guidelines §15152(d), which states: "Where an EIR has been prepared and certified for a program, plan, policy, or ordinance consistent with the requirements of this section, any lead agency for a later project pursuant to or consistent with the program, plan, policy, or ordinance should limit the EIR or negative declaration on the later project to effects which (1) Were not examined as significant effects on the environment in the prior EIR; or (2) Are susceptible to substantial reduction or avoidance by the choice of specific revisions in the project, by the imposition of conditions, or other means." Also, the advantages of using a program EIR are listed in the CEQA Guidelines §15168(b), which states that a program EIR can "(1) Provide an occasion for a more exhaustive consideration of effects and alternatives than would be practical in an EIR on an individual action, (2) Ensure consideration of cumulative impacts that might be slighted in a case-by-case analysis, (3) Avoid duplicative reconsideration of basic policy considerations, (4) Allow the Lead Agency to consider broad policy alternatives and programwide mitigation measures at an early time when the agency has greater flexibility to deal with basic problems or cumulative impacts, and (5) Allow reduction in paperwork."

2.3.2 Notice of Preparation and Scoping

In accordance with Section 15082(a) of the CEQA Guidelines, CalRecycle circulated a Notice of Preparation (NOP) for the project on April 30, 2010, which is included in **Appendix A**. The NOP was circulated to state and local agencies to solicit comments on the project as well as published on CalRecycle's website[1]. Recipients were given at least 30 days from receipt of the notice to respond. Six comment letters were received. Comments received on the NOP were used in consideration of the scope and content of this Draft Program EIR, including comments regarding the need for a more clearly defined project, which resulted in the development of the AD Initiative (described in detail in Chapter 3).

CalRecycle also formed a Technical Advisory Group (TAG) prior to the NOP to discuss the project description and environmental issues to be considered in this Draft Program EIR. The TAG includes state and regional regulatory agencies, solid waste industry representatives, AD facility developer representatives, and local jurisdictions. The project description incorporated input from the TAG regarding facilities and feedstocks that should be considered in this Draft Program EIR, and alternatives to be considered in the Program EIR.

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[1] http://www.calrecycle.ca.gov/SWFacilities/

2.3.3 Draft Program EIR

This document constitutes the Draft Program EIR which contains a description of the project, a description of the environmental setting, applicable regulatory requirements, discussions of project impacts, discussions of measures to be implemented to mitigate impacts found to be significant, as well as an analysis of project alternatives. As required by CEQA, this Draft Program EIR focuses on significant or potentially significant environmental effects (CEQA Guidelines §15143) as summarized in the NOP.

2.3.4 Public Review

This Draft Program EIR for the project is being distributed by the State Clearinghouse to state agencies and CalRecycle will also notify numerous other agencies, organizations, and interested groups and persons (including the members of the TAG) about the availability of the Draft Program EIR and encourage their comments during the 45-day public review period for this Draft Program EIR. For the duration of the comment period, the Draft Program EIR will be available at the Cal EPA library at the following location during regular business hours:

California Environmental Protection Agency
1001 I Street
P.O. Box 2815
Sacramento, CA
95812-2815

The Draft Program EIR will be available on the CalRecycle website at:

http://www.calrecycle.ca.gov/SWFacilities/Compostables/AnaerobicDig/

2.3.5 Final Program EIR and Certification

Written and oral comments received in response to the Draft Program EIR will be addressed in a response to comments document, which, together with the Draft Program EIR, will constitute the Final Program EIR. CalRecycle will receive public comments and consider the certification of the Final Program EIR and approval or denial of the project.

If the Final Program EIR includes impacts that cannot be mitigated to a less-than-significant level, the lead agency must state in writing the reasons for its actions. A statement of overriding considerations must be included in the record of the project approval and mentioned in the notice of determination (CEQA Guidelines, §15093(c)).

2.3.6 Mitigation Monitoring and Reporting

California Public Resources Code §21081.6(a)(1) requires public agencies, as part of the certification of an EIR, to prepare and approve a mitigation monitoring and reporting program. This program should be structured to ensure that changes to the project that the lead agency has adopted to mitigate or avoid significant environmental impacts are carried out during project implementation.

Throughout this Draft Program EIR, mitigation measures have been clearly identified and presented in language that will facilitate establishment of a mitigation monitoring and reporting program. Mitigation measures are listed in **Table 1-1** in the Executive Summary. A mitigation monitoring and reporting program will be prepared at the time of the Final Program EIR for this project and will identify the specific timing and roles and responsibilities for implementing mitigation measures.

2.4 Environmental Issues

This section discusses the environmental issue areas which are evaluated at a program level within this Program EIR. The following lists incorporate input from the TAG which reviewed a preliminary summary of potential environmental impacts.

This EIR analyzes the following environmental issues areas for which the project may have potentially significant impacts at the program level:

- Aesthetics
- Air Quality and Greenhouse Gas Emissions
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Noise
- Public Services and Utilities
- Transportation and Traffic
- Cumulative Impacts

The following environmental issue areas are discussed in much less detail as they are not anticipated to have potentially significant impacts at the program level, although they could require evaluation for individual projects due to the potential for local effects:

- Agricultural and Forest Resources
- Biological Resources
- Cultural Resources
- Geology, Soils and Seismicity
- Land Use and Land Use Planning
- Mineral Resources
- Population and Housing
- Recreation

2.5 References

California Integrated Waste Management Board, 2007. Guidance Document: How Conversion Technologies Fit Current Board Regulatory Structure (IWMB-2009-024). December 2007. Available online at: http://www.calrecycle.ca.gov/Publications/default.asp?pubid=1348. Accessed 08/12/2010.

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California Integrated Waste Management Board, 2009. Organics Policy Roadmap and Schedule. Available online at: http://www.ciwmb.ca.gov/Organics/RoadMap08/default.htm. Accessed 04/07/10.

CalRecycle, 2010. Landfill-Based Anaerobic Digester-Compost Pilot Project at Yolo County Central Landfill (DRRR-2010-002). Produced under Contract by Yolo County Planning and Public Works. April 2010. Available online at: http://www.calrecycle.ca.gov/Publications/default.asp?pubid=1354. Accessed 08/10/10.

CalRecycle, 2011. Email to Jacques Franco at CalRecycle from Jason Dow at Central Marin Sanitary Agency. February 9, 2011.

Humboldt Waste Management Agency (HWMA), 2011. Humboldt Regional Food Waste Digester. Initial Study and Mitigated Negative Declaration. January, 2011. Available online at: http://www.hwma.net/index.php?a=foodwastet. Accessed 02/09/11.

Kennedy/Jenks Consultants, 2009. A Sustainable Solution: Food Waste to Renewable Energy, Methane Capture Feasibility Study Report Summary. February 2, 2009.

State of California, 2010a. State of California, *California Environmental Quality Act*, Public Resources Code, Division 13, Sections 21000 through 21177, as amended January 1, 2010.

State of California, 2010b. State of California, Guidelines for California Environmental Quality Act, California Code of Regulations, Title 14, Chapter 3, Sections 15000 through 15387, as amended January 1, 2010.

CHAPTER 3
Project Description

3.1 Introduction

CalRecycle has prepared this Draft Program Environmental Impact Report (EIR) to assess the potential environmental effects that may result from the adoption of an Anaerobic Digestion (AD) Initiative, a comprehensive program to foster the development of AD facilities to process the organic fraction of municipal solid waste and other organic wastes throughout the State of California. Throughout the document, the adoption of the AD Initiative and subsequent development of AD facilities in California will be referred to as the “project”.

This Draft Program EIR will inform future policy considerations related to AD facilities and assist state and local agencies in preparing site-specific environmental documentation that may be required for AD facility applications and/or permits submitted to CalRecycle, regulatory agencies and local jurisdictions. In the event CalRecycle or other public agencies adopt regulations or ordinances relating to regulating or permitting AD facilities, the Draft Program EIR provides useful information and can serve as the basis for analyzing the environmental effects of individual projects.

By preparing this Program EIR, CalRecycle is providing additional focus in California on the potential development of AD facilities. While there has been considerable discussion and interest in AD facilities in California, to date there has not been a broad review of the potential environmental impacts of developing AD facilities. This Program EIR responds to the need for such environmental review. Some members of the Technical Advisory Group (TAG) have a concern that, by preparing the Program EIR, CalRecycle is indicating a preference for AD technologies over other technologies, or that it will appear that way to the public. CalRecycle emphasizes that the intent of this document is not to identify AD facilities as preferred to alternative waste management options, or to identify preferred AD facility systems or vendors. CalRecycle has previously provided RMDZ loans, permitting guidance, and technical assistance for projects using a range of technologies including biochemical and thermochemical conversion technologies. This effort should best be understood as an effort by CalRecycle to use its very limited funding to analyze the potential environmental impacts of AD facilities, which is but one of the conversion technologies available to reduce the level of organics going to landfills in California. The Program EIR is a starting point for the environmental review of AD facilities proposed in local jurisdictions. By tapping into the considerable California specific knowledge and experience of CalRecycle staff and the TAG this effort provides a technical outreach and overview that would not otherwise be available to local jurisdictions considering a specific AD facility proposal.

3.2 Anaerobic Digestion Initiative

Under its Strategic Directive 6.1, CalRecycle seeks to reduce by 50 percent the amount of organic waste disposed in the state's landfills by 2020. In addition to helping conserve limited landfill capacity, this CalRecycle policy recognizes that organic wastes are a resource, not just solid wastes that must be disposed. Organic wastes have an energy value that can be captured and utilized and are also a necessary component of compost, soil amendments, and other useful products. Directive 6.1 also encompasses one of CalRecycle's actions to help California significantly reduce its generation of greenhouse gases. Under the State's *Climate Change Scoping Plan* (CARB, 2008), CalRecycle has committed to take ~~is responsible for taking~~ actions to reduce the emission of methane, a potent greenhouse gas, from landfills. AD facilities utilize organic wastes as a feedstock from which to produce biogas (which is captured and contains a high percentage of methane). Typically the methane gas produced by the anaerobic digestion process is converted to liquefied natural gas (LNG), compressed natural gas (CNG), or electricity (using internal combustion engines or fuel cells) for on-site energy needs and export to the energy grid (CARB, 2008). The development of AD facilities is one of CalRecycle's charges under the AB 32 Climate Change Scoping Plan. The AB 32 Climate Change Scoping Plan estimates that AD facilities in California could avoid methane emissions from landfills at a level of 2 million metric tons of carbon dioxide equivalents (CO_2e) per year by the year 2020 (CARB, 2008). Anaerobic digestion also can contribute to meeting the State's Renewable Portfolio Standard and Low Carbon Fuel Standard. To assist in achieving those objectives, CalRecycle intends to adopt the AD Initiative, a comprehensive program to foster the development of AD facilities to convert organic solid wastes into sources of energy, valuable compost feedstocks, soil amendments, and other products.

The AD Initiative consists of CalRecycle's adoption of a policy and a series of discrete actions to implement the policy, together with additional actions that will be developed and implemented in the future:

- It is the policy of CalRecycle to encourage the development of AD facilities in California as an alternative to the landfill disposal of organic solid waste. Specifically, as an initial measure, CalRecycle will encourage the establishment of in-vessel digesters located at existing or new solid waste facilities and in areas zoned for industrial or solid waste handling activities.
- CalRecycle shall, not later than January 1, 2012, establish programs to implement the above policy, including without limitation:
    - Provide research grants, loans, and contracts (dependent on funding availability) to develop AD facilities and for activities that advance the state of knowledge about anaerobic digestion and its applications and the uses of products and by-products, including anaerobic digestion demonstration projects that use the organic fraction of municipal solid waste as a feedstock.
    - Develop guidance publications to assist operators who seek to establish AD facilities.
    - Develop guidance publications to assist LEAs and other local and regional government agencies that permit and regulate AD facilities, specifically guidance for co-location at solid waste facilities.

  - Draft revised regulations for aspects of specific design, operation and permitting of AD facilities within the authority and responsibility of CalRecycle.
  - Promote anaerobic digestion through CalRecycle's participation with the California Energy Commission in implementing AB 118 (Alternative and Renewable Fuel and Vehicle Technology Program), the Bioenergy Interagency Working Group, and with the Air Resources Board in implementing the Anaerobic Digestion and Low Carbon Fuel Standard measures in the AB 32 Climate Change Scoping Plan.
  - Work with the California Pollution Control Financing Authority and California Alternative Energy and Advanced Transportation Financing Authority to help anaerobic digestion project proposals obtain funding.
  - Participate on technical workgroups convened by the Climate Action Reserve to develop or modify protocols, such as the Organic Waste Digestion Project Protocol, for projects that divert and anaerobically digest organic waste that otherwise would have gone to solid waste landfills.

3.3 Project Objectives

The project has several objectives including the following:

- Assist in meeting CalRecycle Strategic Directive 6.1: Reduce the amount of organics in the waste stream by 50 percent by 2020.
- Support Assembly Bill 32 (AB 32), the California Global Warming Solutions Act of 2006, greenhouse gas reduction measures related to the use of anaerobic digestion:
  - Measures E-3. Achieve a 33 percent renewable energy mix by 2020. (AD facilities produce biogas which is a renewable energy source.)
  - RW-3. High Recycling/Zero Waste. (Anaerobic digestion is one of five subcategories listed under this measure.)
- Assist local governments and state agencies (both lead and responsible agencies) by providing program-level analyses that will identify potential environmental effects of AD facilities and discuss mitigation measures or best management practices that can reduce or eliminate the environmental effects.

3.4 Background on Anaerobic Digestion

Anaerobic digestion is the biological decomposition of organic matter with little or no oxygen producing a biogas composed primarily of CO_2 and methane (though some systems can be operated to produce some hydrogen gas with less methane product). ~~The a~~ Anaerobic decomposition (not digestion) yielding methane ~~process~~ occurs naturally in marshes, ~~and~~ wetlands, landfills, ruminants, and certain insects. There are a variety of controlled systems where AD technology is currently utilized in the United States including wastewater treatment facilities and dairy manure digesters and co-digesters. In other countries (primarily in Europe), AD technology is utilized to process and treat the organic fraction of municipal solid waste to recover energy and to reduce the volume of solid waste that must be landfilled.

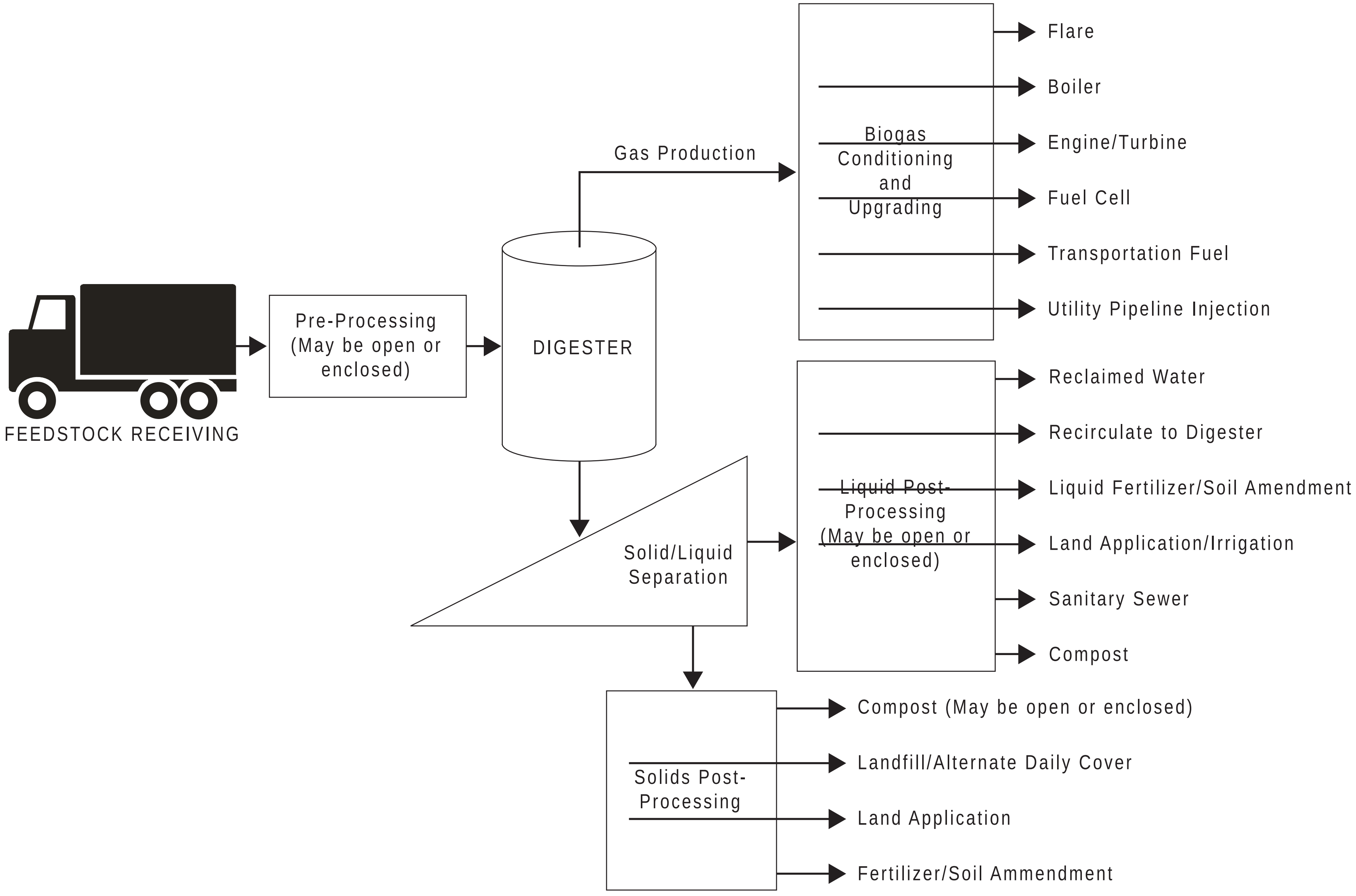
AD facilities for municipal organic waste would generally operate according to the process flow diagram shown in **Figure 3-1**. As with composting, organic materials are pre-processed prior to loading into the digester. Within the digester, decomposition occurs in four phases as shown in **Figure 3-2**: hydroloysis, acidogenesis, acetogenesis, and methanogeneis resulting in methane, carbon dioxide, water and digestate/residuals. Post-processing of gas, liquid and/or solids from the digester is always necessary. **Figure 3-3** shows the potential environmental effects during the three major operational phases (pre-processing, digestion and post-processing). These potential environmental effects, as well as regulations and mitigation measures to reduce potential impacts, are the focus of the Program EIR.

AD facilities that process solid waste produce biogas and digestate (liquids and solids). The biogas consists primarily of methane (CH_4), carbon dioxide (CO_2), with small amounts of hydrogen sulfide (H_2S), and ammonia (NH_3). Typically, biogas is saturated with water vapor and may have trace amounts of hydrogen (H_2), nitrogen (N_2), oxygen (O_2), dust and siloxanes (Greer, 2010). Digestate is the remaining solid and/or liquid residuals from the AD process.

Benefits of AD include a reduction in the mass of organic waste in landfills, reduced fugitive methane emissions from landfills, generation of liquid and/or solid soil amendments, reduction in odor, generation of renewable energy from biogas, and stabilization of organic material prior to disposal which reduces environmental impacts to air and water quality. One of the primary goals of this project is to divert organic waste from landfill disposal. There is a high diversity of organic waste in California, and it is often concentrated in areas with limited organic processing options that make it difficult to manage due to economic and environmental constraints. This geographic distribution directly affects the feasibility of organics diversion; and given the high costs of transportation; the economic feasibility of organics diversion is often determined primarily by geographic considerations. The diversity of organics also plays a significant role in identifying an appropriate technology.

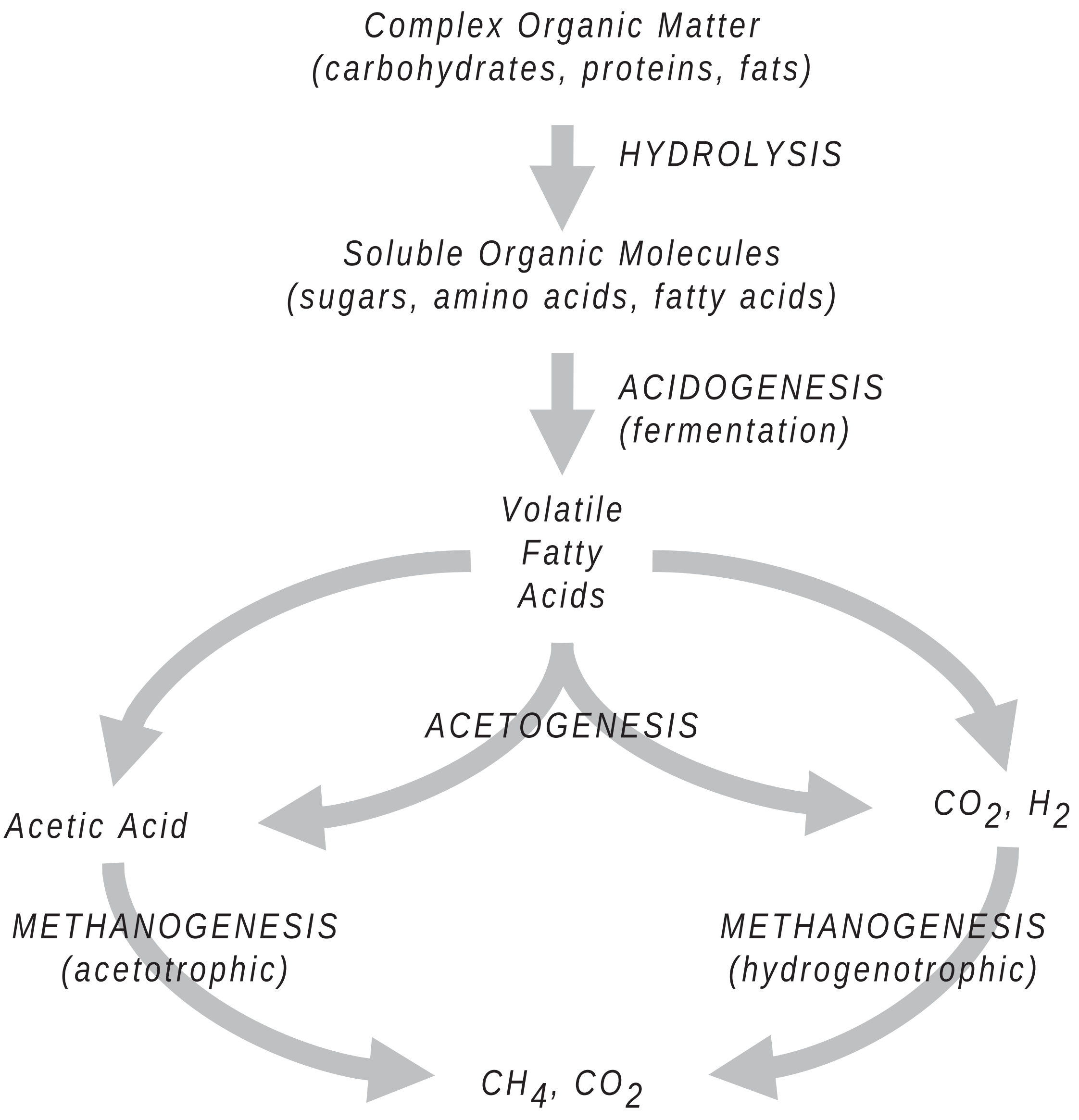
This is a program level EIR analyzing statewide impacts of anaerobic digestion (AD) facilities, but organics management decisions are often made at the local and regional level. There is no single best, most feasible or most environmentally benign organics management option suitable to all regions. Ultimately, each region must analyze its own organic waste streams and determine which management options are best based on the availability of technologically and economically feasible options.

AB 32 directed ARB to prepare a Scoping Plan that identifies how best to reach the 2020 GHG emissions limit. As part of this effort, and in consultation with CalRecycle, ARB proposed the Mandatory Commercial Recycling Measure. This measure requires development of regulations requiring recycling of commercial waste by the State’s businesses. This regulation is expected to result in diversion of an additional 2 million tons of compostable organic materials annually once fully implemented. These regulations will assist CalRecycle in achieving Strategic Directive 6.1, which calls for a reduction in the amount of organics in the waste stream of 50 percent by 2020.



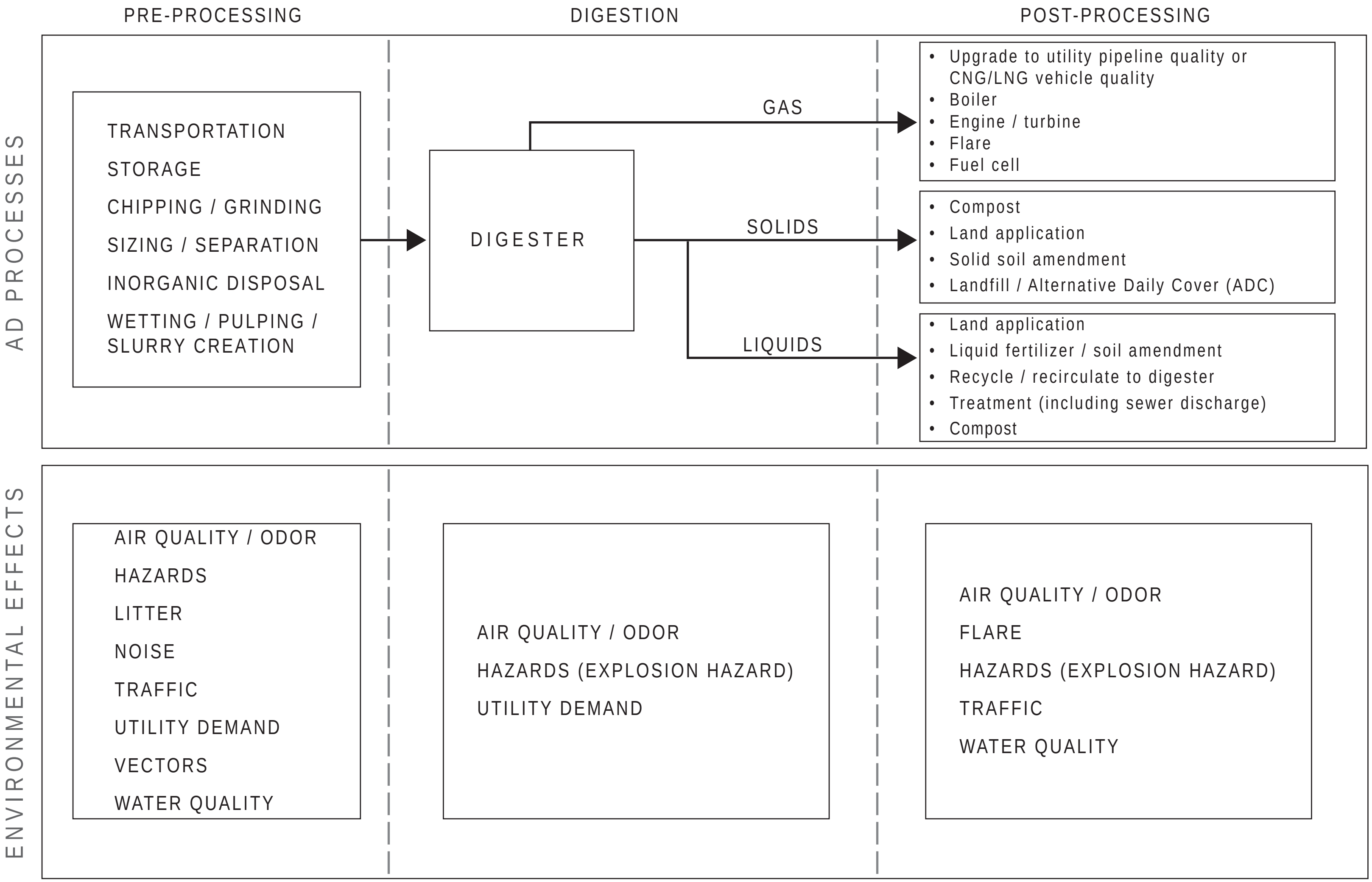
SOURCE: ESA, 2011

Figure 3-1 (Revised)
Anaerobic Digestion of Municipal Organic Solid Waste



SOURCE: CIWMB, 2009; and ESA, 2010

Figure 3-2
Anaerobic Digestion Phases



SOURCE: ESA, 2010

Figure 3-3 (Revised)
Anaerobic Digestion Processes and Potential Environmental Effects from Operational Phases

3.5 Proposed Facilities

The scope of proposed facility types has been focused by the objective of reducing the organic content of the solid wastes that are disposed in municipal solid waste landfills and to generate or recover energy from the solid wastes.

AD Facilities included in the scope: In-vessel AD facilities which are located at existing or new permitted solid waste facilities or stand-alone AD facilities in areas zoned for industrial or solid waste handling activities.

AD Facilities not included in the scope: Dairy manure digesters, dairy manure co-digesters and wastewater treatment plant digesters. In-ground digester cell technology (for example the landfill-based anaerobic digester-compost pilot project developed at the Yolo County Central Landfill), though not included in the project, is discussed and evaluated as an alternative in **Chapter 13**.

There are several variations of in-vessel digester technologies. This Draft Program EIR allows for flexibility in technology choices at the local level. Different in-vessel technologies have the same general processes which are discussed in the siting, construction and operational sections, below.

3.6 Feedstocks

The scope of this Draft Program EIR is focused on reducing organic portions of the municipal solid waste stream and feedstocks which enhance the efficiency of the AD process.

Feedstock materials included in the scope: Food waste, green material and mixed solid waste. The food and green material categories are intended to be inclusive and not limited by current regulatory definitions or collection methods – "food" includes cannery waste, meat, poultry, fish, cheese waste, food processing waste, fats, oils and greases (FOG), etc., and "green material" includes urban, agricultural, crop residues, contaminated green materials (containing inorganic material), etc. Use of manure will be considered as nitrogen nutrient amendment material for the purpose of increasing the growth of microorganisms and digester efficiency, but not as a primary waste stream to be evaluated. Unprocessed mammalian tissue (i.e., dead cows, carcasses, etc.) is also not included in the scope of this Program EIR.

Feedstock materials not included in the scope: Biosolids, untreated septage, waste co-digested with biosolids at wastewater treatment plants or dairy manure co-digesters, and hazardous waste.

3.7 Operation

The main operational phases for AD facilities are pre-processing, digestion and post-processing. Some photos of anaerobic digestion facilities are provided in **Appendix B** of this Program EIR, **Figure B-1** (photos of low-solids/ wet systems), **Figure B-2** (photos of high-solids/ dry systems) and **Figure B-3** (photos of pre-processing feedstocks and equipment). These photographs in **Appendix B** are provided only to show the industrial nature of the AD facilities, they are in no way an endorsement of specific AD technologies, vendors or service providers.

3.7.1 Pre-Processing

Pre-processing involves the activities necessary to prepare the feedstocks for delivery into the AD vessel. Pre-processing activities include feedstock receiving, storage of feedstock, all processing steps required to prepare the feedstock for the digester (such as sorting, screening, grinding and wetting), and the process of feedstock delivery into the digester. Some pre-processing activities (such as source-separation of the organic fraction and pre-screening) can occur prior to delivery to the AD facility. The amount of pre-processing equipment and contaminants ~~residual waste~~ (or waste that must be removed prior to digestion) would depend on the type of feedstock and digester technology. Wetting to adjust liquid percentage results in the need to manage liquid digestate and thus may require additional storage facilities. Some anaerobic digestion technologies are designed to remove inert solids in the pre-processing stage, while others are designed to remove inert solids after digestion during post-processing. Digester systems that are designed to remove inert solids during pre-processing use different techniques depending on the needs of the digester and the extent of contamination. For example, systems that require pre-pulping of wastes with water may use density separation technologies, while systems that minimize water inputs may use size separation techniques. Furthermore, source-separated organic loads that contain fewer inorganic solids than mixed solid wastes may require less pre-processing time and/or equipment, with fewer residual wastes to handle at the digestion facility.

3.7.2 Digestion

Various technologies are available for AD facilities. While new digestion technologies are regularly being developed, and existing technologies continuously improved, a good description of the range of these technologies is included in the March 2008 California Integrated Waste Management Board (now CalRecycle) report, *Current Anaerobic Digestion Technologies Used for Treatment of Municipal Organic Solid Waste* (CIWMB, 2008).

The anaerobic digestion systems developed for commercial applications differ based on the digester configurations and material handling systems. Digesters can be designed in single or two-stage configurations. Single-stage digester configurations may include multiple reactors, but each operates under the same conditions (i.e. initial solids content, loading rate, and temperature) and is loaded in parallel. Single-stage systems may incorporate pre-processing reactors (i.e. equalization tanks, hydropulpers, or tunnel sorting drums) in which some biological activity takes place, blurring the distinction between one and two-stage systems. However, pre-processing reactors are typically designed to optimize sorting and preparation of the waste materials for anaerobic digestion and are loaded in series with the digester. Two-stage systems typically include a hydrolysis stage optimized for acidification and fermentation of organic materials to acetate followed by a methanification stage optimized for methane production. The hydrolysis reactor is typically loaded first and the products are transferred to the methanification reactor. However, systems may also be designed to re-circulate digestate between reactors.

The reactors used for both single and two-stage systems may be designed to operate at different initial solids concentrations, loading rates, and temperatures. Typically, organic wastes contain 20 - 40% solids on a mass basis as received, although the initial solids concentration of the waste stream depends heavily on its composition (e.g. green and paper wastes tend to have higher initial solids concentrations than food wastes). Some systems dilute the waste with water to facilitate sorting, pumping and microbial contact within the reactor. Other systems minimize the addition of water and use heavy-duty pumps, conveyors, and/or front-end loaders to transfer incoming waste to the digester.

Plant operators often attempt to control the loading rate in order to allow sufficient time for degradation and to develop steady-state gas production. Over-loading the reactors can lead to acidification and inhibition of microbial decomposition, which may require re-inoculation or complete re-start of the system. Some digesters are loaded in batches (e.g. every one to five days a new batch is loaded). This may simplify the loading equipment and system operation, but the kinetics of degradation in batch-loaded reactors is different from continuous-loaded reactors. Typically, batch loading results in slower degradation and uneven gas production and methane content. Therefore, batch systems may have lower material throughput per given process area than continuous systems. In order to alleviate these problems, many batch-loaded digester systems incorporate multiple reactors with phased loading and/or continuous second-stage reactors.

Whether loaded continuously or in batches, the majority of commercial anaerobic digesters treating organic solid wastes are temperature controlled for enhanced degradation stability and rate. The microbes that degrade organic materials have evolved to thrive optimally at two different temperature ranges. Mesophilic microorganisms prefer temperatures of 30 to 40 degrees Celsius, while thermophilic microorganisms prefer temperatures of 45 to 55 degrees Celsius. ~~Studies have revealed microorganisms capable of degrading organic materials~~ Anaerobic digesters operating at higher and lower temperatures~~,~~ ~~but hyperthermophilic and psychrophilic digesters~~ have yet to enter the marketplace. Therefore, such systems will not be considered at present. Differences in operational temperature may impact gas production rates and methane contents, organic loading rates, pathogen destruction, digestate quality, and the type of permits required. Thermophilic microorganisms tend to degrade some materials at a higher rate than mesophilic microorganisms. This can reduce the size of the reactors required, but it increases the energy input requirement.

The final reactor design may incorporate different combinations of the above design considerations into a completed system. For example, commercial digesters include single-stage systems with waste diluted to less than 10% solids-mass fraction; single-stage systems that process undiluted wastes; two-stage systems in which diluted wastes are loaded into the first stage; and two-stage systems with undiluted waste (i.e., high solids AD facilities) loaded in batches into the first-stage reactors and leachate loaded continuously into the second-stage reactor. The potential exists for other configurations to be utilized as well. For example, pre- and/or post-treatment ~~some~~ reactors can be added which may also be aerated to pre-hydrolyze solids or to oxidize ammonia in the effluent, solids may be separated and re-circulated, and other design innovations could be envisioned.

As noted above, there are many final reactor designs available, some that were reviewed in preparing this Program EIR can be found in the References at the end of this Chapter. These references are provided in the interest of making this Program EIR a better informational document to help the reader in understanding more about the operation of AD facilities. These include Waasa (SMUD, 2005), BTA (BTA, 2010), BIMA (Entec, 2010), Dranco (De Baere, 2010), Kompogas (Evergreen

Energy Corporation, 2007), Valorga (Valorga International, 2010), Schwarting-Uhde (STOWA, 2006), , Biopercolat (Wherle Werk Ag, 2010), Biocel (CIWMB, 2008), SEBAC (Teixeira, 2004), APS (CIWMB, 2008), Bioferm (BIOFirm, 2009), and Kompoferm (Eggersmann, 2010). References to these systems are in no way an endorsement of specific AD technologies, vendors or service providers.

3.7.3 Post-Processing

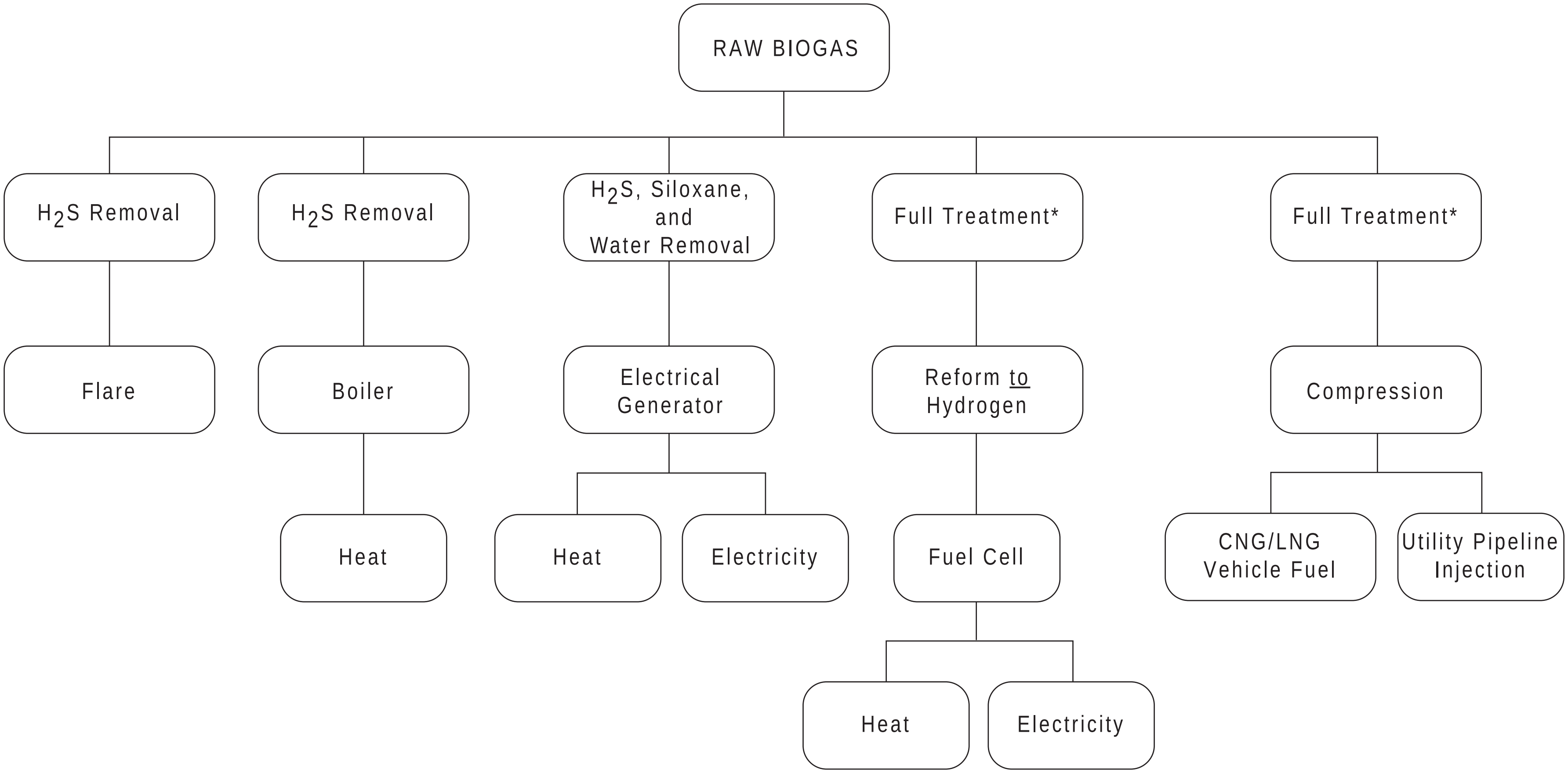
The products of the AD process are digestate and biogas. The digestate is further processed or dewatered resulting in separate liquid and solid products.

Biogas

Biogas generated through the AD process is captured and can be combusted in a flare, used directly in boilers or in reciprocating or gas turbine engines to produce electricity and heat, or the biogas can be upgraded to biomethane through the removal of hydrogen sulfide, carbon dioxide (CO_2), and moisture. Biomethane is a product almost equivalent to natural gas, which typically contains more than 95 percent methane (CH_4). Biomethane can be used in place of natural gas for various processes, and can be used onsite, piped to neighboring facilities, or by utility companies. Biomethane can be upgraded to utility standards and injected ~~pumped~~ into a natural gas supply pipeline, as well as for electrical generation, heating, cooling, and for natural gas-fueled vehicles. For each biogas optional use specific gas conditioning measures would be required. Although there are methodological variations in how the biogas can be conditioned, **Figure 3-4** below depicts the general processes considered in this Draft Program EIR. Some projects in California have injected or have rights to inject biomethane into utility pipeline systems (typically into high pressure lines), these systems require substantial additional design and require continuous monitoring to assure the quality of the injected biomethane.

Digestate

Through the AD process, biomass in the waste stream is reduced through conversion to biogas and the nutrients are concentrated in the remaining effluent. The effluent from the AD process consists of liquids, remaining biomass, and inorganic solids. The post-treatment options to separate the liquids from the solids in the effluent include screening and presses. The liquid can be recirculated in wet digesters (to a point), discharged to surface waters, percolation ponds, sanitary sewers, or beneficially used as irrigation water for agricultural crops or recycled for use in composting processes. Efforts are underway to convert the liquid digestate into value added liquid fertilizer. However, the chemical composition of the liquid effluent may restrict discharge options. ~~Some post-digestion aeration and/or filtration~~ Digestate may need to be treated ~~may be required prior to discharge~~ to reduce the solids content, oxygen demand, ammonia concentration, and/or salt concentration as prescribed by required permits. The solid (or remaining digestate) can be aerobically composted, disposed of in landfills or beneficially used as a soil amendment for agricultural crops. Use of the solid as alternative daily cover could potentially be approved on a site-specific basis.



*Full treatment includes removal of H_2S, water, siloxane, and CO_2

SOURCE: Extension, 2010; and ESA, 2010

Figure 3-4 (Revised)
Alternative Biogas Utilization and Required Cleanup

3.8 Construction

Construction of AD facilities would require site preparation and earthwork, consisting of stripping the area of vegetation (or demolition of structures if the site were previously developed) and either removing or storing the materials for later use in the finished grading phase. Rough earthwork would consist of cutting or filling the site to produce overall site gradients as specified by each project. In general, surfaces would be graded to drain to on-site retention/detention facilities. Excavation may occur for on-site utility infrastructure. Road paving may be required for entrance and on-site access roads.

If biogas at an AD facility is delivered by pipeline offsite, project construction activities could include surface preparation, excavation, trench shoring, pipeline installation, trench backfilling, and surface restoration, which may include paving if the pipelines are constructed within roadway rights-of-way.

3.9 Structures

Digester structures would vary depending on the type of AD facility, feedstocks, and use of end products (biogas and digestate). Co-located facilities may share structures with existing operations. Structures could include:

- Administrative buildings, which would be typical for industrial operations and would likely be prefabricated metal buildings.
- Digester tanks and potentially an operating control room.
- Storage tanks or storage areas or buildings for materials in the pre-processing phase, prior to entering the digester.
- Storage tanks or areas for liquid or solid or biogas end products.
- Structures may be needed to house the biogas post-processing equipment used to generate electricity from the biogas.

3.10 Infrastructure

Development of AD facilities could require the construction of various supporting infrastructure including, but not limited to, pipelines for transporting effluent, stormwater treatment and disposal facilities, water and wastewater infrastructure and on-site access roads.

3.11 Off-Site Improvements

In addition to the on-site improvements, some off-site improvements could also be needed such as signage, utility or traffic improvements, biogas processing equipment or additional wastewater processing infrastructure.

3.12 Governmental Agency Approvals

Approvals and permits that may be required from agencies for the development of site-specific AD projects are identified in **Table 3-1**. This is not an exhaustive list but represents the most likely permits and approvals which may be needed for project construction and operation.

TABLE 3-1
APPROVALS POTENTIALLY NEEDED FOR ANAEROBIC DIGESTER FACILITIES

Approvals	Authority	Potentially Affected Resources
Federal		
*Clean Water Act Section 404/ Rivers and Harbor Act Section 10 Dredge and Fill Permit (Clean Water Act, 33 USC 1344)	U.S. Army Corps of Engineers	Project facilities involving the discharge of dredge for fill material into waters of the U.S, including wetlands, or construction in navigable waters or activities within a floodplain.
*Federal Endangered Species Act compliance (Sections 7 and 9, 16 USC 1536)	U.S. Fish and Wildlife Service	Project facilities affecting species listed as endangered and threatened
*Federal Endangered Species Act compliance (Sections 7 and 9, 16 USC 1536)	National Marine Fisheries Service	Project facilities affecting designated special-status Anadromous fish species and critical habitat
*Magnuson Stevens Fisheries Conservation and Management Act Compliance	National Marine Fisheries Service	Project facilities affecting Essential Fish Habitat
State		
CalRecycle Discretionary Action Compostable Material Handling Permit or, Transfer/Processing Permit, Grants, Loans	CalRecycle	General protection of Public Health, Safety and the Environment Based on incoming feedstocks and operations
*California Endangered Species Act compliance (California Fish and Game Code, Section 2081 and 2090)	California Department of Fish and Game	Portions of project facilities affecting state designated special-status species
*Section 1601 *et seq.* Streambed Alteration Agreement (California Fish and Game Code, Sections 1600-1616)	California Department of Fish and Game	Portions of project facilities include activities affecting bed, bank, or channel of surface waters and adjacent riparian habitat.
*Williamson Act contract	Department of Conservation	Agricultural land when portions of project facilities require public acquisition of land under a Williamson Act contract
*Encroachment Permit	California Department of Transportation	Portions of project facilities (pipelines, etc.) within rights-of-way or easements managed by Caltrans
* Water Quality Certification (Clean Water Act, Section 401, 33 USC 1341)	Regional Water Board	Water quality certification for projects that affect wetlands and waters of the U.S.
NPDES Construction Stormwater Permit (Clean Water Act, Section 402, 33 USC 1342)	Regional Water Board	Water quality permit when portions of project activities or facilities may result in discharges to waters of the U.S.
Stormwater Pollution Prevention Plan (SWPPP)	Regional Water Board	Water quality plan required to receive NPDES permit coverage for construction site stormwater discharges.
*General Order for Dewatering and Other Low Threat Discharge to Surface Waters	Regional Water Board	Water quality permit when portions of project construction may require local groundwater dewatering, resulting in discharges to surface waters
Waste Discharge Requirements (WDRs)	Regional Water Board	Water quality permit when portions of project activities or facilities may result in discharges of residual solids and/or liquids to land.

TABLE 3-1
APPROVALS POTENTIALLY NEEDED FOR ANAEROBIC DIGESTER FACILITIES

Approvals	Authority	Potentially Affected Resources
National Pollution Elimination Discharge Permits (NPDES)	Regional Water Board	NPDES permits for General Industrial Storm Water and for industrial sites that discharge storm water or treated digestate offsite or to waters of the State.
*National Historic Preservation Act Section 106 Compliance	State Historic Preservation Office	For activities in portions of project that could affect cultural and historic resources considered eligible for inclusion in the National Register of Historic Places
Local		
CalRecycle Discretionary Action Compostable Material Handling Permit or, Transfer/ Processing Permit	Local Enforcement Agency	General protection of Public Health, Safety and the Environment Based on incoming feedstocks and operations
Authority to Construct	Air District with jurisdiction	Air quality ATC, in compliance with the local air district rules and regulations.
Permit To Operate	Air District with jurisdiction	Air quality PTO, upon completion of facility construction in compliance with the local air district rules and regulations.
*Rezoning, conditional use permit or similar land use approval	Counties and cities	Facilities or activities modifying land uses regulated under county or city land use codes
*Site plan review and approval	Counties and cities	Facilities or activities affecting land regulated under county or city site planning regulations
Wastewater Discharge Permit	Counties and cities	Facilities or activities that would result in wastewater discharge to the sewerage system
Local grading and erosion control Permit	Counties and cities	Earthmoving conducted as part of project
Building Permit	Counties and cities	Building(s) constructed as part of project
*Encroachment Permit	Counties or cities or other local jurisdictions such as special districts	Pipelines or other facilities in portions of project area on or affecting rights-of-way or easements

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* - Permit or approval may be applicable based upon location of site-specific activities and facilities.

3.13 CalRecycle Permitting/Regulatory Framework

The proposed AD facilities shall ~~could~~ be regulated under CalRecycle's existing composting or~~and~~ transfer/processing regulations, as contained in the CCR, Title 14, Chapter 3, which sets minimum standards for solid waste handling and disposal. ~~The application of permitting requirements must be applied on a case-by-case basis.~~ The determination ~~as to the type~~ of facility type under the existing regulations would be based on the nature of the feedstock and the temperature of on-site processes. If the feedstock reach a temperature of at least 50 degrees Celsius/122 degrees Fahrenheit (50°C/122°F) on site, then the facility shall ~~could~~ be regulated as a compostable material handling facility under the Title 14 composting requirements (sections 17850-17870). If the feedstock does not reach the temperature of 50°C/122°F on site, then the facility shall ~~could~~ be regulated as a transfer/processing facility. Transfer and processing operations and facilities are regulated under Chapter 3, Article 6.0 of Title 14 (sections 17400-17405.0). Both sets of regulations include exemptions and exclusions. This permitting discussion does not address potential on-site disposal of solid byproducts from AD facilities.

3.13.1 Compostable Materials Handling Facility

Composting is defined broadly as “the controlled or uncontrolled biological decomposition of organic wastes” (California Public Resources Code [PRC] Section 40116.1). Anaerobic digestion fits within this statutory definition. Thus, AD facilities ~~could~~ shall be regulated under CalRecycle’s compostable material handling regulations, located at Title 14 California Code of Regulations (CCR) Section 17850 et seq., if the feedstocks and processes meet the definitions within the implementing regulations. The relevant definitions from the Compostable Materials Handling Requirements include the following from Title 14 CCR Section 17852:

> "Active Compost" means compost feedstock that is in the process of being rapidly decomposed and is unstable. Active compost is generating temperatures of at least 50 degrees Celsius (122 degrees Fahrenheit) during decomposition; or is releasing carbon dioxide at a rate of at least 15 milligrams per gram of compost per day, or the equivalent of oxygen uptake.
>
> "Compostable Material" means any organic material that when accumulated will become active compost as defined in section 17852(a)(1).
>
> "Compostable Material Handling Operation" or "Facility" means an operation or facility that processes, transfers, or stores compostable material. Handling of compostable materials results in controlled biological decomposition. Handling includes composting, screening, chipping and grinding, and storage activities related to the production of compost, compost feedstocks, and chipped and ground materials.
>
> "Feedstock" means any compostable material used in the production of compost or chipped and ground material including, but not limited to, agricultural material, green material, food material, biosolids, and mixed solid waste. Feedstocks shall not be considered as either additives or amendments.

The determination of whether or not feedstocks meet the definition of compostable materials would be based on project operation and the Title 14 requirements. ~~made on a case-by-case basis.~~ ~~Additionally~~ ~~i~~If feedstocks do not reach a temperature of 50°C/122°F on site, then they are precluded from becoming active compost and the compostable material handling regulations do ~~would~~ not apply. The temperature could be reached during pre-processing, within the digester, or if aerobic composting of digestate occurs during post-processing on site.

~~Thus it is foreseeable that a~~An AD facility ~~could~~ shall be regulated as a compostable materials handling facility if feedstocks are organic wastes and the feedstock reaches a temperature of 50°C/122°F on site (pre-processing, in the digester, or during post-processing)[1]. If the AD facility does not meet these two requirements, then it ~~could~~ shall be regulated as a transfer/processing facility as discussed below. The determination of whether the facility requires a permit, EA notification, or is excluded would be made by the LEA; the tier regulatory placement is shown in **Table 3-2**.

TABLE 3-2
COMPOSTABLE MATERIAL HANDLING OPERATIONS AND FACILITIES - LEVEL OF PERMITTING OR AUTHORIZATION REQUIRED

Determination made by Local Enforcement Agency (LEA)	Compostable Material Handling Facilities
Full Permit	All compostable handling operations which do not meet the requirements for EA notification and are not excluded require a full permit (14 CCR Section 17854).
Registration Permit	N/A
EA Notification	EA Notification applies to the following operations and facilities: Agricultural Material Composting Operations pursuant to 14 CCR Section 17856 Green Material Composting Operations and Facilities pursuant to 14 CCR Section 17857.1 Research Composting Operations pursuant to 14 CCR Section 17862
Exclusion from regulatory requirements	Excluded activities are listed at 14 CCR 17855. Within-vessel composting (less than 50 cubic yards) Feedstock does not reach 50° C/122° F

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[1] It should also be noted that if the digestate fails the standards set for metals or pathogens set in Title 14 CCR Sections 17868.2 and 17868.3, the end product would require additional processing or disposal.

3.13.2 Transfer Processing Operations and Facilities

~~It is anticipated that~~ AD projects which do not qualify as compostable materials handling facilities ~~could~~ shall be regulated as transfer processing operations and facilities. Transfer or processing stations are defined as "those facilities utilized to receive solid wastes, temporarily store, separate, convert, or otherwise process the materials in the solid wastes, or to transfer the solid wastes directly from smaller to larger vehicles for transport, and those facilities utilized for transformation" (California PRC Section 40200). The determination of whether the facility requires a permit, qualifies under a notification tier or is excluded from regulations would be made by the LEA; the tier regulatory placement is shown in **Table 3-3**. Additionally, it is anticipated that proposed facilities would not meet the three-part test at 14 CCR Section 17402.5 because of the putrescible nature of the anticipated feedstocks.

TABLE 3-3
TRANSFER PROCESSING OPERATIONS AND FACILITIES - LEVEL OF PERMITTING OR AUTHORIZATION REQUIRED

Determination made by Local Enforcement Agency (LEA)	Transfer/Processing Operations and Facilities
Full Permit	If project receives 100 tons per day or more of solid waste it would be considered a Large Volume Transfer/Processing Facility and requires a full permit (14 CCR Section 17403.7).
Registration Permit	If project receives 15 tons per day or more of solid waste but less than 100 tons per day, it would be considered a Medium Volume Transfer/Processing Facility and requires a registration permit (14 CCR Section 17403.6).
EA Notification	If a project receives less than 15 tons per day of solid waste, it would be considered a Limited Volume Transfer Operation and requires an EA Notification (14 CCR Section 17403.3).
Exclusion from regulatory requirements	Excluded activities are listed at 14 CCR Section 17403.1 None are anticipated to apply to the proposed project. Facilities which meet the three-part test at 14 CCR Section 17402.5 are not subject to regulation; however, AD facilities as described within this Draft Program EIR would not meet the three-part test.

3.14 References

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CHAPTER 4
Approach to Environmental Analysis

4.1 Introduction

This chapter presents the general approach to analysis that was used in this Draft Program EIR to evaluate the impacts of the project.

Developing the approach to the environmental analysis involves:

- Identifying the types of facilities that the program would cover and thereby facilitate development, and
- Projecting the extent of digester facilities development that may occur as a result of the program,

This chapter expands upon each of these items.

4.2 Anaerobic Digester (AD) Facilities

In the United States, AD facilities have been used to digest or decompose agricultural waste (such as animal feeding operations and dairies) and in wastewater treatment operations. However, no commercial-scale municipal solid waste (MSW) digesters are in operation. The groundbreaking of the first commercial-scale dry fermentation AD facility in the U.S. was held September 15, 2010 at the University of Wisconsin Oshkosh, and is scheduled to begin operations in April 2011. This facility will process up to 8,000 tons of organic waste per year and will generate renewable heat and power for the campus (University of Wisconsin Oshkosh, 2010).

The adoption of the CalRecycle AD Initiative will foster the development of AD facilities to process the organic fraction of MSW and other organic wastes in California. Therefore, this Draft Program EIR evaluates the effects of the development and operation of these facilities in California.

For the purpose of this Program EIR, AD facility development is expected to consist of in-vessel digesters to be located at permitted solid waste facilities and within industrially zoned areas. Under CEQA, a Program EIR may evaluate “individual activities carried out under the same authorizing statutory or regulatory authority and having generally similar environmental effects which can be mitigated in similar ways” (CEQA Guidelines §15168(a)(4)). Because these actions would be directly facilitated by the proposed project, this document programmatically evaluates the environmental impacts of the development of AD facilities as actions that could result from program implementation.

As identified in Chapter 3, Project Description, the following types of commercial-scale AD facilities could be developed under the program: one-stage continuous, two-stage continuous and batch systems with wet or dry processes. This Program EIR evaluates the physical effects to the environment from construction and operation of these commercial-scale AD facilities. Each of the resource chapters in the Program EIR considers the various phases of digester projects (construction, pre-processing, the digestion phase, and post-processing uses of the gases, liquids and solids) and analyzes those phases that could affect the physical environment. Because of the programmatic review, specific equipment brands or vendors are not analyzed and the analysis is more general.

This Program EIR does not evaluate the impacts of solid waste or industrial facilities which are already permitted, independent of the AD facility. On a site-specific project level, the CEQA analysis would need to include an assessment of changes to other existing facilities by development of the AD facility (such as residuals being sent to the digester rather than an existing co-located landfill).

4.3 Impacts and Mitigation Measures

Types of Impacts

The environmental setting is the physical environmental conditions in the vicinity of the project, as they exist at the time the Notice of Preparation (NOP) was published, April 30, 2010 (CEQA Guidelines §15125(a)).

This Program EIR evaluates the potential adverse environmental effects of CalRecycle's adoption and implementation of the project. The environmental resources analyzed in this Program EIR (see Chapters 5 – 11) are those identified as being potentially affected by AD facility projects. Each resource chapter includes a discussion of existing environmental setting and regulatory requirements. The analysis first determines the extent to which each of the studied resources could be affected if AD facilities are developed. The analysis then applies a set of specific significance criteria (Thresholds of Significance) to categorize the severity of the potential environmental effects. These standards of significance are defined at the beginning of each impact analysis in Chapters 5 - 11, following a discussion of environmental and regulatory settings. Once the potential environmental changes are identified in this analysis, they are compared to the standards of significance for each impact area in Chapters 5-11. The impacts are then divided into the following categories:

- **Less-Than-Significant Impact.** A project impact is considered less-than-significant when it does not reach the standard of significance and would therefore cause no substantial change in the environmental. No mitigation is required for less-than-significant impacts.
- **Significant Impact.** Significant impacts are identified by the evaluation of project effects against the significance criteria identified in the Program EIR. A project impact is considered significant if it reaches or could potentially reach the level of significance identified in the Program EIR. Mitigation measures are identified to reduce these effects to the environment.
- **No Impact.** There are not impacts because the project is not anticipated to create change or the project would result in a beneficial impact.

- **Cumulative Significant Impact.** A cumulative impact can result when a change in the environment results from the incremental impact of a project when added to other related past, present or reasonably foreseeable future projects. Significant cumulative impacts may result from individually minor but collectively significant projects.

For all ***significant*** impacts, the Program EIR is required to include a description of feasible measures that could be implemented to avoid or substantially lessen the adverse change in any of the physical conditions within the area affected by the proposed project or to mitigate (reduce in magnitude) the impacts to a level that is below the defined standard of significance. Where available, mitigation measures are presented for all impacts determined to be significant. Where implementation of the mitigation measures would reduce the magnitude of the impact to below the defined standard of significance, the impact is determined to be less than significant after mitigation. Where implementation of the mitigation measures would not reduce the magnitude of the impact below the defined standard of significance, the impact is determined to be ***significant and unavoidable***.

Mitigation Measures

Where significant adverse impacts are identified, the Program EIR must “describe feasible measures which could minimize” those impacts to a less-than-significant level (CEQA Guidelines §15126.4). For each significant impact, mitigation measures are identified. In some cases, the Program EIR includes a list of alternative mitigation measures, which could reduce the impact to a less-than-significant level, or contribute to doing so, any of which may be selected by CalRecycle or a Lead Agency tiering from this Program EIR. Where multiple measures are required to reduce an impact to a less-than-significant level, the discussion clearly identifies which combination or permutation of measures would be necessary to achieve the appropriate level of mitigation.

Where measures are available that can reduce the magnitude of an impact, but not to a less-than-significant level, these are also identified. The Program EIR strives not to include measures that are clearly infeasible. Under CEQA, “feasible means capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors” (CEQA Guidelines §15364).

If, even with imposition of mitigation measures, the project will generate unavoidable significant effects, CalRecycle can only approve the project if it makes a written statement of overriding considerations and finds that the benefits of the project outweigh the occurrence of those unavoidable effects (CEQA Guidelines §15092 and §15093).

For any mitigation measures imposed by CalRecycle, CEQA requires that CalRecycle adopt a Mitigation Monitoring and Reporting Program (MMRP) specifying how it will ensure compliance with the mitigation measures. The MMRP would be developed prior to action on the project (Public Resources Code §21081.6(a)(1)).

4.4 Environmental Setting and Baseline

The environmental setting is the physical environmental conditions in the vicinity of the project, as they exist at the time the NOP was published, April 30, 2010 (CEQA Guidelines §15125). As with any Program EIR, the existing environmental setting for certain topics will include a reasonable amount of historical data in order to accurately and meaningfully portray existing conditions. This environmental setting will normally constitute the baseline physical conditions by which a Lead Agency determines whether an impact is significant. The description of the environmental setting needs to be no longer than is necessary to understand the significant effects of the project and its alternatives (CEQA Guidelines §15125).

The environmental baseline is that condition against which the future "with-project" condition is compared to determine the amount of impact. Normally, the environmental baseline is the same as existing conditions, as is the case for this Program EIR. **Figure 4-1** and **Table 4-1** show the most recent data on the ~~existing~~ composition of the disposed waste stream in California (the 2008 waste stream).

TABLE 4-1
COMPOSITION OF CALIFORNIA'S OVERALL DISPOSED WASTE STREAM

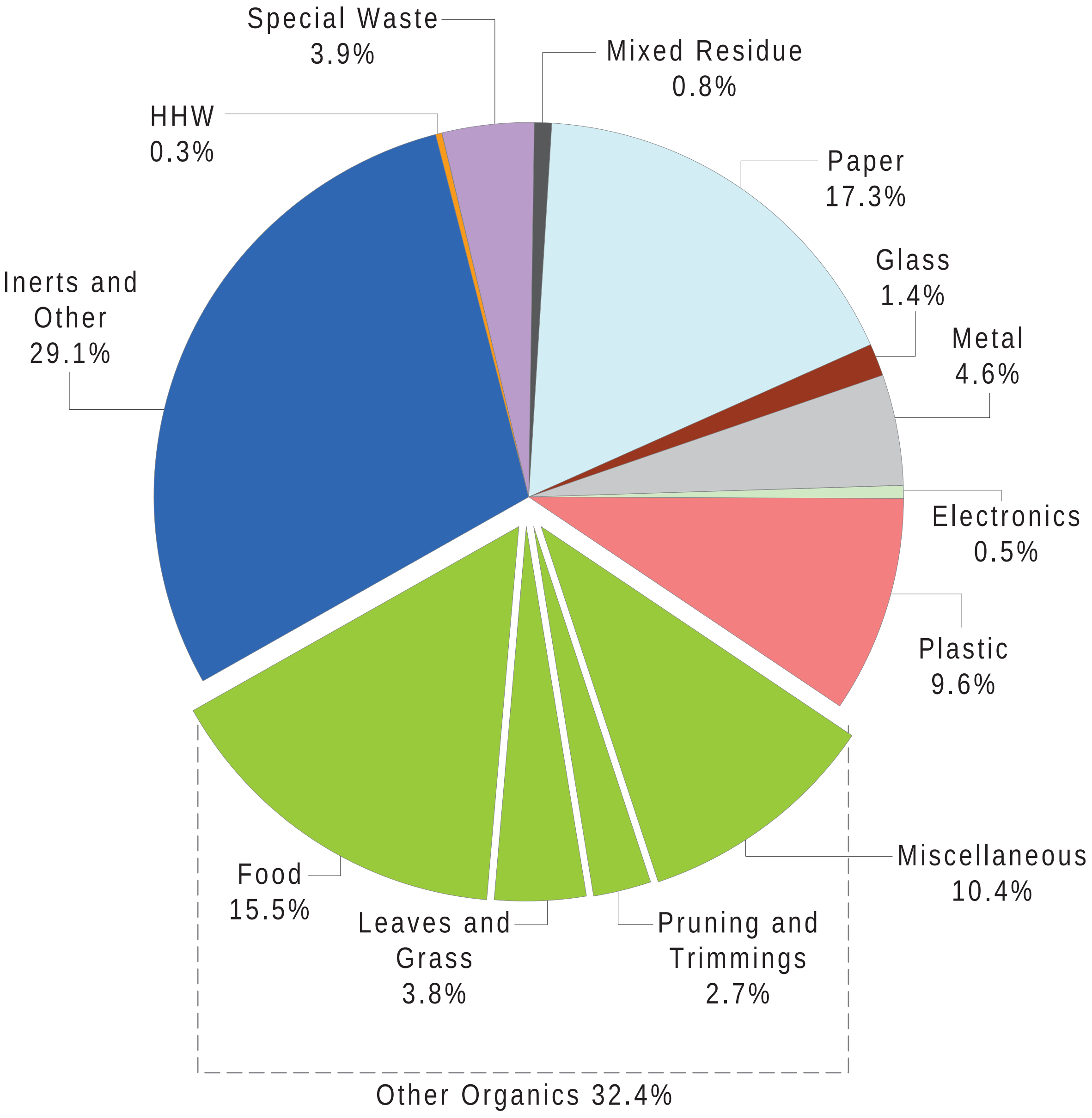
Material	Est. Percent	+ / -	Est. Tons
Paper	17.3%		6,859,121
Uncoated Corrugated Cardboard	4.8%	0.9%	1,905,897
Paper Bags	0.4%	0.1%	155,848
Newspaper	1.3%	0.3%	499,960
White Ledger Paper	0.7%	0.3%	259,151
Other Office Paper	1.2%	0.6%	472,147
Magazines and Catalogs	0.7%	0.2%	283,069
Phone Books and Directories	0.1%	0%	24,149
Other Miscellaneous Paper	3.0%	0.4%	1,202,354
Remainder/Composite Paper	5.2%	0.7%	2,056,546
Glass	1.4%		565,844
Clear Glass Bottles and Containers	0.5%	0.1%	196,093
Green Glass Bottles and Containers	0.2%	0.1%	79,491
Brown Glass Bottles and Containers	0.3%	0.1%	108,953
Other Colored Glass Bottles and Containers	0.1%	0%	40,570
Flat Glass	0.1%	0.1%	33,899
Remainder/Composite Glass	0.3%	0.1%	106,838
Metal	4.6%		1,809,684
Tin/Steel Cans	0.6%	0.1%	236,405
Major Appliances	0%	0.1%	17,120
Used Oil Filters	0%	0%	3,610
Other Ferrous	2.0%	0.4%	801,704
Aluminum Cans	0.1%	0%	47,829
Other Non-Ferrous	0.2%	0.1%	84,268
Remainder/Composite Metal	1.6%	0.5%	618,747
Electronics	0.5%		216,297
Brown Goods	0.2%	0.1%	76,725
Computer-related Electronics	0.1%	0.1%	32,932
Other Small Consumer Electronics	0.1%	0%	34,588
Video Display Devices	0.2%	0.1%	72,053

TABLE 4-1
COMPOSITION OF CALIFORNIA'S OVERALL DISPOSED WASTE STREAM

Material	Est. Percent	+ / -	Est. Tons
Plastic	9.6%		3,807,952
PETE Containers	0.5%	0.1%	199,644
HDPE Containers	0.4%	0.1%	157,779
Miscellaneous Plastic Containers	0.4%	0.1%	163,008
Plastic Trash Bags	0.9%	0.1%	361,997
Plastic Grocery and Other Merchandise Bags	0.3%	0%	123,405
Non-Bag Commercial and Industrial Packaging Film	0.5%	0.2%	194,863
Film Products	0.3%	0.2%	113,566
Other Film	1.4%	0.3%	554,002
Durable Plastic Items	2.1%	0.4%	834,970
Remainder/composite Plastic	2.8%	0.7%	1,104,719
Other Organic	32.4%		12,888,039
Food	15.5%	1.9%	6,158,120
Leaves and Grass	3.8%	0.7%	1,512,832
Pruning and Trimmings	2.7%	1.5%	1,058,854
Branches and Stumps	0.6%	0.4%	245,830
Manures	0.1%	0.1%	20,373
Textiles	2.2%	0.3%	886,814
Carpet	3.2%	2.0%	1,285,473
Remainder/Composite Organic	4.3%	0.5%	1,719,743
Inerts and Other	29.1%		11,577,768
Concrete	1.2%	0.4%	483,367
Asphalt Paving	0.3%	0.4%	129,834
Asphalt Roofing	2.8%	1.5%	1,121,945
Lumber	14.5%	2.2%	5,765,482
Gypsum Board	1.6%	0.7%	642,511
Rock, Soil and Fines	3.2%	1.1%	1,259,308
Remainder/Composite Inerts and Other	5.5%	1.3%	2,175,322
Household Hazardous Waste (HHW)	0.3%		120,752
Paint	0.1%	0.1%	48,025
Vehicle and Equipment Fluids	0%	0%	6,424
Used Oil	0%	0%	3,348
Batteries	0%	0%	19,082
Remainder/Composite Household Hazardous	0.1%	0.1%	43,873
Special Waste	3.9%		1,546,470
Ash	0.1%	0.1%	40,736
Treated Medical Waste	0%	0%	0
Bulky Items	3.5%	1.2%	1,393,091
Tires	0.2%	0.1%	60,180
Remainder/Composite Special Waste	0.1%	0.1%	52,463
Mixed Residue	0.8%		330,891
Mixed Residue	0.8%	0.2%	330,891
Totals	100%		39,722,818
Sample Count	751		

Notes: Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.

SOURCE: CalRecycle, 2009. *California 2008 Statewide Waste Characterization Study.* August 2009.



NOTE: Numbers may not total exactly due to rounding.

SOURCE: CalRecycle, 2009; and ESA, 2010

Figure 4-1
Overview of California’s Overall Disposed Waste Stream

4.5 Cumulative Impacts

Cumulative impacts are defined in the State CEQA Guidelines (§15355) as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts." A cumulative impact is "the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor, but collectively significant, projects taking place over a period of time." In a manner consistent with state CEQA Guidelines §15130[a], the discussion of cumulative impacts in this Draft Program EIR focuses on potentially significant cumulative impacts.

Cumulative impacts associated with each of the environmental resources (e.g., Air Quality, Traffic, Noise, etc.) are discussed within their respective chapters. The appropriate geographic scope for cumulative impacts analysis associated with resource areas ranges from site-specific to statewide.

The project does not directly propose the construction of any new AD facilities, but the Program EIR does analyze the impacts from these facilities because the Program EIR and the project will help facilitate AD facility CEQA reviews and permits; thus directly facilitating their development. While the Program EIR resource sections analyze the impacts of AD facility development located at permitted solid waste facilities and within industrially zoned areas, the cumulative analysis also considers the impacts from other closely related past, present, and reasonably foreseeable probable future projects throughout California.

Probable Future AD Facility Projects

Forecasting future development involves estimating and projection. Invariably projecting a precise level of future development for AD facilities in California under the AD Initiative is extremely challenging. Notwithstanding, the Program EIR must provide information about physical environmental effects that could occur as a result of implementing the CalRecycle AD Initiative project. To ensure that potential errors that are part of any projection do not downplay or minimize the potential for environmental impacts, this Program EIR has made assumptions that lead to projections of a high level of AD facility development so that the cumulative impact analysis does not understate the development of AD facilities (and potential impacts) that could occur.

As mentioned above, there are no existing commercial-scale AD facilities to process MSW in the U.S. Thus, for the purpose of projecting potential AD facility development, a primary consideration is Strategic Directive 6.1, whereby CalRecycle seeks to reduce the amount of organic waste disposed in California landfills by 50 percent by 2020, as well as information contained in technical articles, primarily *Life-Cycle Analysis of Energy and Greenhouse Gas Emissions from Anaerobic Biodegradation of Municipal Solid Waste* (DiStefano and Belenky, 2009) , with a data check against results in *Assessing the Environmental Burdens of Anaerobic Digestion in Comparison to Alternative Options for Managing the Biodegradable Fraction of Municipal Solid Waste* (Haight, 2005). The DiStefano and Belenky article assumed an average AD facility size of 50,000 tons MSW to be processed per year. This facility size was based on MSW throughput capacity of dry digesters in

Western Europe (DiStefano and Belenky, 2009). For the cumulative analysis in this Program EIR, it was assumed that 70 AD facilities (each assumed to process 50,000 tons of MSW) could be developed statewide by 2020 based on the 28 million tons of biodegradable MSW landfilled in California in 2007, half (about 14 million tons) of which is goal-set to be reduced as part of Strategic Directive 6.1. The diverted material would be processed by a suite of alternative technologies. These technologies could include composting, source reduction, waste to energy conversion, and AD facilities. Based on the proportion of organics in the disposed waste stream (shown in **Table 4-1**) that would be usable substrate for AD facilities, which would primarily be the "Food" fraction, it was assumed that aggressive programs could result in up to 3.5 million tons of organics per year diverted to AD facilities. This estimate would represent about 25 percent of the total 14 million ton diversion goal of Strategic Directive 6.1 and would result in the development of 70 AD facilities, assuming each would process 50,000 tons of biodegradable MSW per year. Notably, these AD diversion and facility projections are conservative, based on the assumption that AD technologies are very successful.

It is acknowledged that currently, AD facility development in California faces difficult economic conditions; capital requirements are high and the financial return from the systems may not justify the cost. Several factors would need to be necessary to develop up to 70 AD facilities in California. Key factors could include:

- Mandatory food waste collection programs;
- Restriction on organic material disposal at landfills;
- Increased tipping fees at landfills and compost facilities;
- Increased demand for new energy sources;
- Increased demand for local renewable energy sources;
- Increased efforts in California (AB 32) to reduce greenhouse gases (GHGs);
- Improvements in AD technologies; and
- Public financial support or the development of profitable business models.

There have been a variety of factors that have caused the price of fossil-fuels to spike over the past 50 years and there are no sources of energy that can be developed without environmental consequences. Changes in public opinion could dramatically change the types of energy projects that are supported or required in the future. AD facilities could benefit from increased incentives for local, renewable energy sources. Using factors from the DiStefano and Belenky study (2009), the assumed 70 AD facilities in California could generate approximately 200 million cubic meters of methane, which would correspond to about 500 million ~~mega~~kilowatt-hours of annual electrical capacity.

For the purpose of cumulative impact analyses in the various resource chapters in this Program EIR, development of the digesters can be assumed to be concentrated geographically near major population centers (within reasonable limits), to the extent that such assumptions will help to identify potentially significant cumulative impacts.

Operating Parameters of Future AD Facilities

It is understood that the 70 AD facilities statewide could use biogas for electricity or co-generation, or upgrade biogas to biomethane quality through the removal of hydrogen sulfide, CO_2, and moisture. Biomethane can be used in place of natural gas for various processes, including use by utility companies if the biomethane is upgraded to utility standards and pumped into a natural gas supply pipeline, as well as for electrical generation, heating, and for natural gas-fueled vehicles.

Several of the environmental resource chapters analyze vehicles trips directly (Chapter 9, Transportation and Traffic) or indirectly (Chapter 5, Air Quality and GHG Emissions, and Chapter 7, Noise). In regards to truck trips, the analyses in this Program EIR have relied upon estimates detailed in recent information incorporated in the DiStefano and Belenky study (2009), which assumed 100 miles round trip per 18-ton haul truck per facility, or about 275,000 miles traveled annually per AD facility.

4.6 References

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CHAPTER 5
Air Quality and Greenhouse Gas

5.1 Environmental Setting

The environmental setting first identifies the air quality pollutants of concern in California; including criteria air pollutants, toxic air contaminants (TACs), odors, and greenhouse gases (GHGs) that could be emitted during the construction and operation of anaerobic digester (AD) facilities. This discussion also explains California's climate and meteorology and their effect on air quality.

Air Quality Pollutants of Concern

Criteria Air Pollutants

Ozone. Short-term exposure to ozone can irritate the eyes and cause constriction of the airways. Besides causing shortness of breath, ozone can aggravate existing respiratory diseases such as asthma, bronchitis, and emphysema. Ozone is not emitted directly into the atmosphere, but is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving reactive organic gases (ROG) (also termed volatile organic compounds or VOCs) and nitrogen oxides (NOx). ROG and NOx are known as precursor compounds for ozone. Significant ozone production generally requires ozone precursors to be present in a stable atmosphere with strong sunlight for approximately three hours. Ozone is a regional air pollutant because it is not emitted directly by sources, but is formed downwind of sources of ROG and NOx under the influence of wind and sunlight. Ozone concentrations tend to be higher in the late spring, summer, and fall, when the long sunny days combine with regional subsidence inversions to create conditions conducive to the formation and accumulation of secondary photochemical compounds, like ozone. Ground level ozone in conjunction with suspended particulate matter in the atmosphere leads to hazy conditions generally termed as "smog."

Notably, some hydrocarbons are less ozone-forming than other hydrocarbons, so the United States Environmental Protection Agency (USEPA) has officially excluded them from the definition of regulated hydrocarbons under the VOC classification. This definition excludes methane, ethane, and compounds not commonly found in large quantities in engine exhaust from consideration as VOCs.

Carbon Monoxide (CO). Ambient CO concentrations normally are considered a local effect and typically correspond closely to the spatial and temporal distributions of vehicular traffic. Wind speed and atmospheric mixing also influence carbon monoxide concentrations. Under inversion conditions, CO concentrations may be distributed more uniformly over an area that may extend some distance from vehicular sources. When inhaled at high concentrations, CO combines with hemoglobin in the blood and reduces the oxygen-carrying capacity of the blood. This results in reduced oxygen reaching the brain, heart, and other body tissues. This condition is especially critical for people with cardiovascular diseases, chronic lung disease, or anemia, as well as for fetuses.

Carbon monoxide concentrations have declined dramatically in California due to existing controls and programs, and most areas of the state have no problem meeting the CO State and federal standards. CO measurements and modeling were important in the early 1980's when CO levels were regularly exceeded throughout California. In more recent years, CO measurements and modeling have not been a priority in most California air districts due to the retirement of older polluting vehicles, less emissions from new vehicles and improvements in fuels. The clear success in reducing CO levels is evident in the first paragraph of the executive summary of the California Air Resources Board *2004 Revision to the California State Implementation Plan for Carbon Monoxide Updated Maintenance Plan for Ten Federal Planning Areas* (CARB, 2004), shown below:

> "The dramatic reduction in carbon monoxide (CO) levels across California is one of the biggest success stories in air pollution control. Air Resources Board (CARB or Board) requirements for cleaner vehicles, equipment and fuels have cut peak CO levels in half since 1980, despite growth. All areas of the State designated as non-attainment for the federal 8-hour CO standard in 1991 now attain the standard, including the Los Angeles urbanized area. Even the Calexico area of Imperial County on the congested Mexican border had no violations of the federal CO standard in 2003. Only the South Coast and Calexico continue to violate the more protective State 8-hour CO standard, with declining levels beginning to approach that standard."

Respirable Particulate Matter (PM10 and PM2.5). PM10 and PM2.5 consist of particulate matter that is 10 microns or less in diameter and 2.5 microns or less in diameter, respectively. (A micron is one-millionth of a meter). PM10 and PM2.5 represent fractions of particulate matter that can be inhaled into the air passages and the lungs and can cause adverse health effects. Some sources of particulate matter, such as wood burning in fireplaces, demolition, and construction activities, are more local in nature, while others, such as vehicular traffic, have a more regional effect. Very small particles of certain substances (e.g., sulfates and nitrates) can cause lung damage directly, or can contain adsorbed gases (e.g., chlorides or ammonium) that may be injurious to health. Particulates also can damage materials and reduce visibility. Large dust particles (diameter greater than 10 microns) settle out rapidly and are easily filtered by human breathing passages. This large dust is of more concern as a soiling nuisance rather than a health hazard. The remaining fraction, PM10 and PM2.5, are a health concern particularly at levels above the federal and State ambient air quality standards. PM2.5 (including diesel exhaust particles) is thought to have greater effects on health, because these particles are so small and thus, are able to penetrate to the deepest parts of the lungs. Scientific studies have suggested links between fine particulate matter and numerous health problems including asthma, bronchitis, acute and chronic respiratory symptoms such as shortness of breath and painful breathing. Recent studies have shown an association between morbidity and mortality and daily concentrations of particulate matter in the air. Children are more susceptible to the health risks of PM10 and PM2.5 because their immune and respiratory systems are still developing.

Mortality studies since the 1990s have shown a statistically significant direct association between mortality (premature deaths) and daily concentrations of particulate matter in the air. Despite important gaps in scientific knowledge and continued reasons for some skepticism, a comprehensive evaluation of the research findings provides persuasive evidence that exposure to fine particulate air pollution has adverse effects on cardiopulmonary health (Dockery and Pope, 2006). The CARB has estimated that achieving the ambient air quality standards for PM10 could reduce premature mortality rates by 6,500 cases per year (CARB, 2002).

Nitrogen Dioxide (NO_2). NO_2 is a reddish brown gas that is a by-product of combustion processes. Automobiles and industrial operations are the main sources of NO_2. NO_2 may be visible as a coloring component of a brown cloud on high pollution days, especially in conjunction with high ozone levels.

NO_2 is an air quality concern because it acts as a respiratory irritant and is a precursor of ozone. NO_2 is a major component of the group of gaseous nitrogen compounds commonly referred to as nitrogen oxides (NOx). Nitrogen oxides are produced by fuel combustion in motor vehicles, industrial stationary sources (such as industrial activities), ships, aircraft, and rail transit. Typically, nitrogen oxides emitted from fuel combustion are in the form of nitric oxide (NO) and nitrogen dioxide (NO_2). NO is often converted to NO_2 when it reacts with ozone or undergoes photochemical reactions in the atmosphere. Therefore, emissions of NO_2 from combustion sources are typically evaluated based on the amount of NOx emitted from the source.

Sulfur dioxide (SO_2). SO_2 is a combustion product of sulfur or sulfur-containing fuels such as coal, diesel, and biogas. SO_2 is also a precursor to the formation of atmospheric sulfate and particulate matter and contributes to potential atmospheric sulfuric acid formation that could precipitate downwind as acid rain. SO_2 is a major component of the group of gaseous sulfurous compounds commonly referred to as sulfur oxides (SOx).

Hydrogen sulfide (H_2S). H_2S is generated by the anaerobic decomposition of organic material. It is emitted naturally in geothermal areas and is also associated with certain industrial processes. Exposure to low concentrations of H_2S may cause irritation to eyes, nose, or throat. Exposure to higher concentrations (typically at work settings) can cause olfactory fatigue, respiratory paralysis, and death. However, no health effects have been found in humans exposed to typical environmental concentrations.

Lead. Lead has a range of adverse neurotoxin health effects, and was formerly released into the atmosphere primarily via leaded gasoline products. The phase-out of leaded gasoline in California resulted in decreasing levels of atmospheric lead. AD facilities would not introduce any new sources of lead emissions; consequently, lead emissions are not required to be quantified and are not further evaluated in this analysis.

Toxic Air Contaminants (TACs)

TACs are airborne substances that are capable of causing short-term (acute) and/or long-term (chronic and/or carcinogenic) adverse human health effects (i.e., injury or illness). TACs are substances for which federal or State criteria air pollutant standards have not been adopted. Thus, for TACs, there

is no federal or State ambient air quality standard against which to measure a project's air quality impacts. For this reason, TACs are analyzed by performing a health risk assessment. TACs include both organic and inorganic chemical substances. They may be emitted from a variety of common sources including gasoline stations, automobiles, dry cleaners, industrial operations, and painting operations. The current California list of TACs includes approximately 200 compounds, including particulate emissions from diesel-fueled engines, which can be emitted through the construction and/or operation of AD facilities. In addition, operation of AD facilities could result in trace amounts of air toxics (primarily H_2S and ammonia) that may be released as fugitives from the digester or from the potential combustion or flaring of the biogas. Additional air toxics that could be generated by the combustion of biogas (either in an engine or flare) include benzene, formaldehyde, and other products of incomplete combustion.

Diesel Particulate Matter (DPM). Diesel particulate matter is a TAC and is the most complex of diesel emissions. Diesel particulates, as defined by most emission standards, are sampled from diluted and cooled exhaust gases. This definition includes both solids and liquid material that condenses during the dilution process. The basic fractions of DPM are elemental carbon and heavy hydrocarbons derived from fuel and lubricating oil. DPM contains a large portion of the polycyclic aromatic hydrocarbons (PAH) found in diesel exhaust. Diesel particulates include small nuclei mode particles of diameters below 0.04μm and their agglomerates of diameters up to 1μm. DPM is expected to be the TAC of greatest concern generated by the construction and operation of AD facilities since it would be emitted outside of the digester and thus not captured during the digestion process.

In 2001, CARB assessed the statewide health risks from exposure to DPM and to other TACs. Ambient exposures to diesel particulates in California are significant fractions of total TAC levels in the State. CARB subsequently developed the *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles* (CARB, 2000). According to this plan, the statewide cancer risk from exposure to diesel exhaust was about 540 per million (i.e., 540 cancers per million people) as compared to a total risk for exposure to all ambient air toxics of 760 per million as reported in 2000. This estimate of risk from diesel exhaust, which accounts for a substantial portion (about 70 percent) of the total risk from TACs, included both urban and rural areas in the State. It can be considered as an average worst-case for the State, since it assumes constant exposure to outdoor concentrations of diesel exhaust and does not account for expected lower concentrations indoors, where people spend most of their time.

Ammonia. Ammonia is a TAC and is considered a precursor to PM2.5. Ammonia is generated during AD of organic materials and is therefore of interest in evaluating the air quality impacts of the project. Ammonia gas (a base) is known to react with acids in the atmosphere (typically nitric or sulfuric acid) to form ammonium nitrates or sulfates, which are particulates. Although it is known that the release of ammonia gas is a participant in the formation of ammonium nitrate, it is difficult to forecast how much ammonium nitrate would be created by a release of a certain amount of ammonia. The reaction that forms ammonium nitrate or ammonium sulfate depends on the presence of other chemicals that are in turn part of a complex photochemical process occurring in the atmosphere (including NOx and SOx). At the same time, both ammonia and ammonium particulates are subject to removal processes that constantly remove the pollutants from the atmosphere. No health effects have been found in humans exposed to typical environmental (moderate) concentrations of ammonia. In high concentrations, it can severely irritate the eyes, nose, ears, and throat. Lung damage and death may occur after exposure to very high concentrations of ammonia. Individuals with asthma may be more sensitive to breathing ammonia than others.

Odorous Emissions

Anaerobic decomposition of organic materials can be a source of odor. Though odors rarely cause any physical harm, they still remain unpleasant and can lead to public distress generating complaints. The occurrence and severity of odor impacts depend on the nature, frequency and intensity of the source; wind speed and direction; and the sensitivity of receptors.

Greenhouse Gas Emissions

Global climate change refers to observed changes in weather features that occur across the Earth as a whole, such as temperature, wind patterns, precipitation, and storms, over a long period (CAT, 2006; CEC, 2006; CEC, 2008; IPCC, 2007). Global temperatures are modulated by naturally occurring atmospheric gases, such as water vapor, carbon dioxide, methane, and nitrous oxide. These gases allow sunlight into the Earth’s atmosphere, but prevent radiant heat from escaping into outer space, thus altering Earth’s energy balance in a phenomenon called the “greenhouse effect”. Some greenhouse gases are short lived, such as water vapor, while others, such as sulfur hexafluoride, have a long lifespan in the atmosphere.

Earth has a dynamic climate that is evidenced by repeated episodes of warming and cooling in the geologic record. Consistent with a general warming trend, global surface temperatures have increased by 0.74°C ± 0.18°C over the past 100 years (IPCC, 2007). The recent warming trend has been correlated with the global Industrial Revolution, which resulted in increased urban and agricultural centers at the expense of forests and reliance on fossil fuels (CAT, 2006). Eleven of the past twelve years are among the twelve warmest years recorded since 1850 (CEC, 2006). Although natural processes and sources of greenhouse gases contribute to warming periods, recent warming trends are attributed to human activities as well (CAT, 2006; CEC 2006). Potential global warming impacts may include, but are not limited to, loss in snow pack, sea level rise, more extreme heat days per year, more high ozone days, more large forest fires, and more drought years. Secondary effects are likely to include a global rise in sea level, impacts to agriculture, changes in disease vectors, and changes in habitat and biodiversity. While the possible outcomes and the feedback mechanisms involved are not fully understood, and much research remains to be done, the potential for substantial environmental, social, and economic consequences over the long term may be great.

GHGs include all of the following naturally-occurring and anthropogenic (man-made) gases: carbon dioxide (CO_2), methane, nitrous oxide (N_2O), sulfur hexafluoride, perfluorocarbons, hydrofluorocarbons, and nitrogen trifluoride (NF_3) (California Health and Safety Code §38505(g). In terms of Global Warming Potential (GWP), each of these gases varies substantially from one another. GWP is a measure of how much a given mass of GHG will contribute to global warming, comparing one GHG to the same mass of CO_2 on a relative scale (CAPCOA, 2009; CAT, 2006; IPCC, 2007). The GWP depends on the absorption of infrared radiation by a given species, the spectral location of its absorbing wavelengths, and the atmospheric lifetime of the species. GHG emissions are measured in units of pounds or tons of CO_2 equivalents (CO_2e). As an example, HFC-23 contributes 14,800 times as much as CO_2 to the GWP over 100 years. GWP values for key GHGs are summarized in **Table 5-1**. The following sections contain a general discussion of the natural and anthropogenic sources of each GHG.

TABLE 5-1
GLOBAL WARMING POTENTIAL OF GREENHOUSE GASES

Gas	Lifetime (years)	Global Warming Potential for 100-Year Time Horizon
Carbon Dioxide (CO_2)	50-200	1
Methane (CH_4)	12	25
Nitrous Oxide (NO_2)	114	298
Perfluorocarbons (PFC-14)	50,000	7,300
Hydrofluorocarbons (HFC-23)	270	14,800
Sulfur Hexafluoride (SF_6)	3,200	22,800

SOURCE: IPCC. 2007. Table 2.14, Chapter 2, Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the IPCC. Available at: http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-chapter2.pdf

Carbon Dioxide (CO_2). In the atmosphere, carbon generally exists in its oxidized form as CO_2. Natural sources of CO_2 include animal and plant respiration, ocean-atmospheric exchange and volcanic eruptions. Anthropogenic sources of CO_2 include the combustion of fossil fuels, such as coal, oil, and gas in power plants, automobiles, industrial facilities and other sources, and specialized industrial production processes and product uses (i.e., mineral production, metal production, and use of petroleum based products). The largest source of CO_2 emissions globally is the combustion of fossil fuels. Sinks of CO_2 include forests, wetlands and agriculture. When CO_2 sources exceed CO_2 sinks, the Earth's natural balance is no longer in equilibrium. Since the late 1800s, the concentration of CO_2 in the atmosphere has risen approximately 30% (CAT, 2006; CAPCOA, 2009).

Methane (CH_4). Methane in the atmosphere is eventually oxidized, yielding carbon dioxide and water. Natural sources of methane include, but are not limited to, anaerobic production, wetlands, termites, oceans, methane gas hydrates (clathrates), volcanoes and other geologic structures, wildfires, and animals. Anthropogenic sources of methane include, but are not limited to, landfills, natural gas systems, coal mining, manure management, forested lands, wastewater treatment, rice cultivation, composting, petrochemical production, and field burning of agricultural residues. In California, agricultural processes contribute significant sources of anthropogenic methane (CAT, 2006; CAPCOA, 2009).

Nitrous Oxide (N_2O). In the atmosphere, nitrous oxide reacts with ozone. Primary natural sources of nitrous oxide include bacterial breakdown of nitrogen in soils and oceans. Anthropogenic sources of nitrous oxide include fertilizer application, production of nitrogen fixing crops, nitric acid production, animal manure management, sewage treatment, combustion of fossil fuels, and nitric acid production (CAT, 2006; CAPCOA, 2009).

Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), and Sulfur Hexafluoride (SF_6). HFCs are man-made chemicals containing the element fluorine. Developed as alternatives to ozone-depleting substances for industrial, commercial and consumer products, they are used predominantly as refrigerants and aerosol propellants. PFCs are man-made as well, primarily used as replacements to ozone-damaging chlorofluorocarbons and hydrochlorofluorocarbons. Sources include aluminum production and semiconductor manufacturing. Man made, major releases of SF_6 come from leakage from electrical substations, magnesium smelters and some consumer goods, such as tennis balls and training shoes. Each of these GHGs possesses a relatively high GWP and long atmospheric lifetimes (CAT, 2006; CAPCOA, 2009).

California Climate and Meteorology

Air quality is affected by the rate, amount, and location of pollutant emissions and the associated meteorological conditions that influence pollutant movement and dispersal. Atmospheric conditions (for example, wind speed, wind direction, and air temperature) in combination with local surface topography (for example, geographic features such as mountains and valleys), determine how air pollutant emissions affect local air quality.

Because of the strong influence of the Pacific Ocean and mountains, variations in climate in California run in a general east-to-west direction. California's climate varies from Mediterranean (most of the State) to steppe (scattered foothill areas), to alpine (high Sierra), to desert (Colorado and Mojave Deserts).

The Sierra Nevada, Coast and Cascade Ranges act as barriers to the passage of air masses. During summer, California is protected from much of the hot, dry air masses that develop over the central United States. Because of these barriers, and California's western border of the Pacific Ocean, summer weather in portions of the State is generally milder than that in the rest of the country and is characterized by dry, sunny conditions with infrequent rain.

In winter, the same mountain ranges prevent cold, dry air masses from moving into California from the central areas of the United States. Consequently, winters in California are also milder than would be expected at these latitudes.

Regulatory Requirements

Federal

Clean Air Act

The Clean Air Act (CAA) is a federal law that regulates air emissions from stationary and mobile sources. Principal provisions include the authorization for the USEPA to establish National Ambient Air Quality Standards (NAAQS) to protect public health and public welfare and to regulate emissions of hazardous air pollutants. Six criteria pollutants include carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, particulate matter (equal to or less than PM10) and lead. **Table 5-2** shows current federal and State ambient air quality standards and provides a brief discussion of the related health effects and principal sources for each pollutant. The CAA was amended in 1977 and 1990, primarily to set new deadlines for achieving attainment of NAAQS because many areas of the country had failed to meet the deadlines.

TABLE 5-2
STATE AND NATIONAL CRITERIA AIR POLLUTANT STANDARDS, EFFECTS, AND SOURCES

Pollutant	Averaging Time	State Standard	National Standard	Pollutant Health and Atmospheric Effects	Major Pollutant Sources
Ozone	1 hour 8 hours	0.09 ppm 0.07 ppm	--- 0.075 ppm	High concentrations can directly affect lungs, causing irritation. Long-term exposure may cause damage to lung tissue.	Formed when reactive organic gases (ROG) and nitrogen oxides (NOx) react in the presence of sunlight. Major sources include on-road motor vehicles, solvent evaporation, and commercial / industrial mobile equipment.
Carbon Monoxide	1 hour 8 hours	20 ppm 9.0 ppm	35 ppm 9 ppm	Classified as a chemical asphyxiant, carbon monoxide interferes with the transfer of fresh oxygen to the blood and deprives sensitive tissues of oxygen.	Internal combustion engines, primarily gasoline-powered motor vehicles.
Nitrogen Dioxide	1 hour Annual Avg.	0.18 ppm 0.030 ppm	0.100 ppm 0.053 ppm	Irritating to eyes and respiratory tract. Colors atmosphere reddish-brown.	Motor vehicles, petroleum refining operations, industrial sources, aircraft, ships, and railroads.
Sulfur Dioxide	1 hour 3 hours 24 hours Annual Avg.	0.25 ppm --- 0.04 ppm ---	--- 0.5 ppm 0.14 ppm 0.03 ppm	Irritates upper respiratory tract; injurious to lung tissue. Can yellow the leaves of plants, destructive to marble, iron, and steel. Limits visibility and reduces sunlight.	Fuel combustion, chemical plants, sulfur recovery plants, and metal processing.
Respirable Particulate Matter (PM10)	24 hours Annual Avg.	50 μg/m3 20 μg/m3	150 μg/m3 ---	May irritate eyes and respiratory tract, decreases in lung capacity, cancer and increased mortality. Produces haze and limits visibility.	Dust and fume-producing industrial and agricultural operations, combustion, atmospheric photochemical reactions, and natural activities (e.g., wind-raised dust and ocean sprays).
Fine Particulate Matter (PM2.5)	24 hours Annual Avg.	--- 12 μg/m3	35 μg/m3 15 μg/m3	Increases respiratory disease, lung damage, cancer, and premature death. Reduces visibility and results in surface soiling.	Fuel combustion in motor vehicles, equipment, and industrial sources; residential and agricultural burning; Also, formed from photochemical reactions of other pollutants, including NOx, sulfur oxides, and organics.
Lead	Monthly Ave. Quarterly	1.5 μg/m3 ---	--- 1.5 μg/m3	Disturbs gastrointestinal system, and causes anemia, kidney disease, and neuromuscular and neurological dysfunction.	Present source: lead smelters, battery manufacturing & recycling facilities. Past source: combustion of leaded gasoline.
Hydrogen Sulfide	1 hour	0.03 ppm	No National Standard	Nuisance odor (rotten egg smell), headache and breathing difficulties (higher concentrations)	Geothermal Power Plants, Petroleum Production and refining
Sulfates	24 hour	25 μg/m3	No National Standard	Breathing difficulties, aggravates asthma, reduced visibility	Produced by the reaction in the air of SO2.
Visibility Reducing Particles	8 hour	Extinction coefficient of 0.23/km; visibility of 10 miles or more	No National Standard	Reduces visibility, reduced airport safety, lower real estate value, discourages tourism.	See PM2.5.

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ppm = parts per million; μg/m^3 = micrograms per cubic meter.

SOURCE: California Air Resources Board (CARB), 2010a. *Ambient Air Quality Standards,* available at http://www.arb.ca.gov/research/aaqs/aaqs2.pdf Standards last updated February 16, 2010. California Air Resources Board, 2009a. *ARB Fact Sheet: Air Pollution Sources, Effects and Control,* http://www.arb.ca.gov/research/health/fs/fs2/fs2.htm, page last reviewed December 2009.

Pursuant to the 1990 amendments to the CAA, the USEPA classifies air basins, or portions of air basins, as "attainment" or "nonattainment" for each criteria air pollutant, based on whether or not the NAAQS had been achieved. **Table 5-3** shows the current attainment statuses across the project area by air basin (shown in **Figure 5-1**) for the pollutants of highest concern (ozone and particulates).

TABLE 5-3
CRITERIA POLLUTANT ATTAINMENT STATUS BY CALIFORNIA AIR BASIN

Air Basin	State Ozone	Federal Ozone	State PM10	Federal PM10	State PM2.5	Federal PM2.5
Great Basin Valleys Air Basin	N	U	N	N	A	U
Lake County Air Basin	A	U	A	U	A	U
Lake Tahoe Air Basin	N	U	N	U	A	U
Mojave Desert Air Basin	N	N	N	N	N	U
Mountain Counties Air Basin	N	N	N	U	N	N
North Central Coast Air Basin	N	U	N	U	A	U
North Coast Air Basin	A	U	N	U	U	U
Northeast Plateau Air Basin	NT	U	N	U	U	U
Sacramento Valley Air Basin	N	N	N	N	N	N
Salton Sea Air Basin	N	N	N	N	U	N
San Diego Air Basin	N	N	N	U	N	U
San Francisco Bay Area Air Basin	N	N	N	U	N	N
San Joaquin Valley Air Basin	N	N	N	A	N	N
South Central Coast Air Basin	N	N	N	U	N	U
South Coast Air Basin	N	N	N	N	N	N

A Attainment. An area is designated attainment if the state or federal standard for the specified pollutant is met.
N Nonattainment. An area is designated nonattainment if the State or federal standard for the specified pollutant is not met.
NT Nonattainment – Transitional. An area is designated non-attainment – transitional to signify that the area is close to attaining the standard for that pollutant.
U Unclassified. An area is designated unclassified if the data are incomplete and do not support a designation of attainment or nonattainment.

Air basins classified as N or NT areas have at least one area within that basin that has shown a violation of the relevant ambient standard.

SOURCE: California Air Resources Board (CARB), 2010b. *Area Designation Maps,* http://www.arb.ca.gov/desig/adm/adm.htm, page updated July 26, 2010 and accessed July 29, 2010.

The 1990 amendments to the CAA requires each state to prepare an air quality control plan referred to as the State Implementation Plan (SIP). The amendments added requirements for states containing areas that violate the NAAQS to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIP is a living document that is periodically modified to reflect the latest emissions inventories, planning documents, and rules and regulations of air basins as reported by the agencies with jurisdiction over them. The USEPA has responsibility to review all state SIPs to determine if they conform to the mandates of the CAA and will achieve air quality goals when implemented. If the USEPA determines a SIP to be inadequate, it may prepare a Federal Implementation Plan (FIP) for the nonattainment area and may impose additional control measures. Failure to submit an approvable SIP or to implement the plan within mandated timeframes can result in sanctions being applied to transportation funding and stationary air pollution sources in the air basins.

Regulation of TACs, termed Hazardous Air Pollutants (HAPs) under federal regulations, is achieved through federal, State and local controls on individual sources. The 1977 amendments to the CAA required the USEPA to identify National Emission Standards for Hazardous Air Pollutants (NESHAPs) to protect public health and welfare. These substances include certain volatile organic chemicals, pesticides, herbicides, and radionuclides that present a tangible hazard, based on scientific studies of exposure to humans and other mammals. There is uncertainty in the precise degree of hazard.

SOURCE: CA Air Resources Board, 2008; and ESA, 2010

Figure 5-1
California Air Basins

Relevant to the CAA, GHGs and climate change, *Massachusetts v. Environmental Protection Agency* (549 U.S. 497) is the pivotal federal court case. In this case, twelve states and cities, including California, sued to force the USEPA to regulate GHGs as a pollutant pursuant to the CAA. This lawsuit was pursued in conjunction with several environmental organizations. The petitioners contended that the CAA gave the USEPA the necessary authority and the mandate to address GHGs in light of scientific evidence on global warming.

The USEPA was one of several respondents in the case. The USEPA contended that it did not have the authority under the CAA to regulate GHGs, and even if the USEPA did have such authority, it would decline to exercise it. Central to this case was the exact definition of an air pollutant as stipulated in the CAA. In April 2007, the United States Supreme Court ruled five to four that the plaintiffs had standing to sue, that the CAA gave the USEPA the authority to regulate GHGs, and that the USEPA's reasons for not regulating GHG were found to be inadequate. Since this ruling, the USEPA has been developing regulations for geologic carbon sequestration projects and will be issuing GHG permits for large sources.

State

The CARB manages air quality, regulates mobile emissions sources, and oversees the activities of county APCDs and regional AQMDs. CARB establishes state ambient air quality standards and vehicle emissions standards.

California has adopted ambient standards that are more stringent than the federal standards for the criteria air pollutants. These are shown in **Table 5-2**. Under the 1988 California Clean Air Act (CCAA) patterned after the CAA, areas have been designated as attainment or nonattainment with respect to the state standards. **Table 5-3** summarizes the attainment status with California standards of the Program area by air basin for the pollutants of highest concern (ozone and particulates).

Toxic Air Contaminants

The State Air Toxics Program was established in 1983 under Assembly Bill (AB) 1807 (Tanner). A total of 243 substances have been designated TACs under California law; they include the 189 (federal) hazardous air pollutants (HAPs) adopted in accordance with AB 2728. The Air Toxics "Hot Spots" Information and Assessment Act of 1987 (AB 2588) seeks to identify and evaluate risk from air toxics sources; however, AB 2588 does not regulate air toxics emissions. Toxic air contaminant emissions from individual facilities are quantified and prioritized. "High-priority" facilities are required to perform a health risk assessment and, if specific thresholds are violated, are required to communicate the results to the public in the form of notices and public meetings.

CARB developed the *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles* (CARB, 2000), which represents proposals to reduce diesel particulate emissions, with the goal of reducing emissions and associated health risks by 75 percent in 2010 and by 85 percent in 2020. The program aims to require the use of state-of-the-art catalyzed diesel particulate filters and ultra low sulfur diesel fuel on diesel-fueled engines.

CARB recently published the *Air Quality and Land Use Handbook: A Community Health Perspective* (CARB, 2005). The primary goal in developing the handbook was to provide information that will help keep California's children and other vulnerable populations out of harm's way with respect to nearby sources of TACs. The handbook highlights recent studies that have shown that public exposure to air pollution can be substantially elevated near freeways and certain other facilities. The health risk is greatly reduced with distance. For that reason, CARB provides some general recommendations aimed at keeping appropriate distances between sources of air pollution and sensitive land uses, such as residences.

Greenhouse Gases

Executive Order S-3-05

In 2005, in recognition of California's vulnerability to the effects of climate change, Governor Schwarzenegger established Executive Order S-3-05, which sets forth a series of target dates by which statewide emission of greenhouse gas would be progressively reduced, as follows:

- By 2010, reduce greenhouse gas emissions to 2000 levels;
- By 2020, reduce greenhouse gas emissions to 1990 levels; and
- By 2050, reduce greenhouse gas emissions to 80 percent below 1990 levels.

Assembly Bill 32 (AB 32)

In 2006, California passed the California Global Warming Solutions Act of 2006 (Assembly Bill No. 32; California Health and Safety Code Division 25.5, §s 38500, et seq., or AB 32), which requires the CARB to design and implement emission limits, regulations, and other measures, such that statewide greenhouse gas emissions will be reduced to 1990 levels by 2020.

In December 2007, CARB approved the 2020 emission limit of 427 million metric tons of CO_2 equivalents (CO_2e) of greenhouse gases. The 2020 target of 427 million metric tons of CO_2e requires the reduction of 169 million metric tons of CO_2e, or approximately 30 percent, from the state's projected 2020 emissions of 596 million metric tons of CO_2e (business-as-usual).

AB 32 required development of a mandatory reporting rule for major sources of GHGs. The CARB reporting rule (California Code of Regulations Title 17, Subchapter 10, Article 2, §95100 to 95133) became effective in January 2009. The rule requires reporting of GHG emissions for:

- Cement plants;
- Petroleum refineries ($\geq$ 25,000 metric tons of CO_2e in any calendar year);
- Hydrogen plants ($\geq$ 25,000 metric tons of CO_2e in any calendar year);
- Electric generating facilities and cogeneration facilities (> 1 MW capacity and > 2,500 metric tons of CO_2e in any year)
- Electricity retail providers and marketers
- Other facilities that emit >25,000 metric tons of CO_2e, for stationary combustion sources, in any calendar year.

Cement plants, oil refineries, fossil-fueled electric-generating facilities/providers, cogeneration facilities, and hydrogen plants and other stationary combustion sources that emit more than 25,000 metric tons/year CO_2e, make up 94 percent of the point source CO_2e emissions in California.

In June 2008, CARB published its *Climate Change Draft Scoping Plan* (CARB, 2008a) that was approved and adopted by the CARB Board on December 11, 2008 as the *Climate Change Scoping Plan* (CARB, 2008b). The *Climate Change Draft Scoping Plan* reported that CARB met the first milestones set by AB 32 in 2007: developing a list of early actions to begin sharply reducing GHG emissions; assembling an inventory of historic emissions; and establishing the 2020 emissions limit. Key elements of the *Climate Change Scoping Plan* include:

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standards;
- Achieving a statewide renewables energy mix of 33 percent;
- Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system;
- Establishing targets for transportation-related GHG emissions for regions throughout California, and pursuing policies and incentives to achieve those targets;
- Adopting and implementing measures pursuant to existing state laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard; and
- Creating targeted fees, including a public goods charge on water use, fees on high global warming potential gases, and a fee to fund the administrative costs of the state's long-term commitment to AB 32 implementation (CARB, 2008b).

CARB has not yet determined what amount of GHG emissions reductions it recommends from local government land use decisions; however, the *Climate Change Scoping Plan* does state that successful implementation of the plan relies on local governments' land use planning and urban growth decisions because local governments have primary authority to plan, zone, approve, and permit land development to accommodate population growth and the changing needs of their jurisdictions. CARB further acknowledges that decisions on how land is used will have large effects on the GHG emissions that will result from the transportation, housing, industry, forestry, water, agriculture, electricity, and natural gas emission sectors.

The *Climate Change Scoping Plan* also includes recommended measures that were developed to reduce GHG emissions from key sources and activities while improving public health, promoting a cleaner environment, preserving our natural resources, and ensuring that the impacts of the reductions are equitable and do not disproportionately impact low-income and minority communities. These measures, shown below in **Table 5-4** by sector, also put the state on a path to meet the long-term 2050 goal of reducing California's GHG emissions to 80 percent below 1990 levels.

The total reduction for the recommended measures is 174 million metric tons/year of CO_2e, slightly exceeding the 169 million metric tons/year of CO_2e reductions estimated to be needed in the *Climate Change Draft Scoping Plan*. The measures in the *Climate Change Scoping Plan* approved by the Board will be developed over the next two years and be in place by 2012.

TABLE 5-4
LIST OF RECOMMENDED ACTIONS BY SECTOR

Measure No.	Measure Description	GHG Reductions (Annual Million Metric Tons CO_2e)
Transportation		
T-1	Pavley I and II – Light Duty Vehicle Greenhouse Gas Standards	31.7
T-2	Low Carbon Fuel Standard (Discrete Early Action)	15
T-3[1]	Regional Transportation-Related Greenhouse Gas Targets	5
T-4	Vehicle Efficiency Measures	4.5
T-5	Ship Electrification at Ports (Discrete Early Action)	0.2
T-6	Goods Movement Efficiency Measures. • Ship Electrification at Ports • System-Wide Efficiency Improvements	3.5
T-7	Heavy-Duty Vehicle Greenhouse Gas Emission Reduction Measure – Aerodynamic Efficiency (Discrete Early Action)	0.93
T-8	Medium- and Heavy-Duty Vehicle Hybridization	0.5
T-9	High Speed Rail	1
Electricity and Natural Gas		
E-1	Energy Efficiency (32,000 GWh of Reduced Demand) • Increased Utility Energy Efficiency Programs • More Stringent Building & Appliance Standards Additional Efficiency and Conservation Programs	15.2
E-2	Increase Combined Heat and Power Use by 30,000 GWh (Net reductions include avoided transmission line loss)	6.7
E-3	Renewables Portfolio Standard (33% by 2020)	21.3
E-4	Million Solar Roofs (including California Solar Initiative, New Solar Homes Partnership and solar programs of publicly owned utilities) • Target of 3000 MW Total Installation by 2020	2.1
CR-1	Energy Efficiency (800 Million Therms Reduced Consumptions) • Utility Energy Efficiency Programs • Building and Appliance Standards • Additional Efficiency and Conservation Programs	4.3
CR-2	Solar Water Heating (AB 1470 goal)	0.1
Green Buildings		
GB-1	Green Buildings	26
Water		
W-1	Water Use Efficiency	1.4†
W-2	Water Recycling	0.3†
W-3	Water System Energy Efficiency	2.0†
W-4	Reuse Urban Runoff	0.2†
W-5	Increase Renewable Energy Production	0.9†
W-6	Public Goods Charge (Water)	TBD†
Industry		
I-1	Energy Efficiency and Co-Benefits Audits for Large Industrial Sources	TBD
I-2	Oil and Gas Extraction GHG Emission Reduction	0.2
I-3	GHG Leak Reduction from Oil and Gas Transmission	0.9
I-4	Refinery Flare Recovery Process Improvements	0.3
I-5	Removal of Methane Exemption from Existing Refinery Regulations	0.01
Recycling and Waste~~Water~~ Management		
RW-1	Landfill Methane Control (Discrete Early Action)	1
RW-2	Additional Reductions in Landfill Methane • Increase the Efficiency of Landfill Methane Capture	TBD†

TABLE 5-4
LIST OF RECOMMENDED ACTIONS BY SECTOR

Measure No.	Measure Description	GHG Reductions (Annual Million Metric Tons CO_2e)
RW-3	High Recycling/Zero Waste • Commercial Recycling • Increase Production and Markets for Organic Products • Anaerobic Digestion • Extended Producer Responsibility • Environmentally Preferable Purchasing	9†
Forests		
F-1	Sustainable Forest Target	5
High Global Warming Potential (GWP) Gases		
H-1	Motor Vehicle Air Conditioning Systems: Reduction of Refrigerant Emissions from Non-Professional Services (Discrete Early Action)	0.26
H-2	SF_6 Limits in Non-Utility and Non-Semiconductor Applications (Discrete Early Action)	0.3
H-3	Reduction of Perfluorocarbons in Semiconductor Manufacturing (Discrete Early Action)	0.15
H-4	Limit High GWP Use in Consumer Products Discrete Early Action (Adopted June 2008)	0.25
H-5	High GWP Reductions from Mobile Sources • Low GWP Refrigerants for New Motor Vehicle Air Conditioning Systems • Air Conditioner Refrigerant Leak Test During Vehicle Smog Check • Refrigerant Recovery from Decommissioned Refrigerated Shipping Containers • Enforcement of Federal Ban on Refrigerant Release during Servicing or Dismantling of Motor Vehicle Air Conditioning Systems	3.3
H-6	High GWP Reductions from Stationary Sources • High GWP Stationary Equipment Refrigerant Management Program: - Refrigerant Tracking/Reporting/Repair Deposit Program - Specifications for Commercial and Industrial Refrigeration Systems • Foam Recovery and Destruction Program • SF Leak Reduction and Recycling in Electrical Applications • Alternative Suppressants in Fire Protection Systems • Residential Refrigeration Early Retirement Program	10.9
H-7	Mitigation Fee on High GWP Gases	5
Agriculture		
A-1	Methane Capture at Large Dairies	1.0†

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1. This is not the SB 375 regional target. CARB will establish regional targets for each California's 18 Metropolitan Planning Organization (MPO's) regions following the input of the regional targets advisory committee and a consultation process with MPO's and other stakeholders per SB 375

† GHG emission reduction estimates are not included in calculating the total reductions needed to meet the 2020 target

Senate Bill 97 (SB 97)

SB 97, signed August 2007 (Chapter 185, Statutes of 2007; Public Resources Code §21083.05 and 21097), acknowledges that climate change is a prominent environmental issue that requires analysis under CEQA. This bill directed the Governor's Office of Planning and Research (OPR), which is part of the state Resources Agency, to prepare, develop, and transmit to CARB guidelines for the feasible mitigation of GHG emissions (or the effects of GHG emissions), as required by CEQA, by July 1, 2009. The Resources Agency was required to certify and adopt those guidelines by January 1, 2010. On December 31, 2009, the Natural Resources Agency delivered its rulemaking package to the Office of Administrative Law for their review pursuant to the Administrative Procedure Act. The adopted guidelines became effective on March 18, 2010.

California Air Pollution Control Officers Association (CAPCOA)

In January 2008, CAPCOA issued a “white paper” on evaluating and addressing GHGs under CEQA (CAPCOA, 2008). This resource guide was prepared to support local governments as they develop their programs and policies around climate change issues. The paper is not a guidance document. It is not intended to dictate or direct how any agency chooses to address GHG emissions. Rather, it is intended to provide a common platform of information about key elements of CEQA as they pertain to GHG, including an analysis of different approaches to setting significance thresholds.

The paper notes that for a variety of reasons, local agencies may decide not to have a CEQA threshold. Local agencies may also decide to assess projects on a case-by-case basis when the projects come forward. The paper also discusses a range of GHG emission thresholds that could be used. The range of thresholds discussed includes a GHG threshold of zero and several non-zero thresholds. Non-zero thresholds include percentage reductions for new projects that would allow the state to meet its goals for GHG emissions reductions by 2020 and perhaps 2050. These would be determined by a comparison of new emissions versus business as usual emissions and the reductions required would be approximately 30 percent to achieve 2020 goals and 90 percent (effectively immediately) to achieve the more aggressive 2050 goals. These goals could be varied to apply differently to a new project, by economic sector, or by region in the state.

Other non-zero thresholds are discussed in the paper, including:

- 900 metric tons/year CO_2e (a market capture approach);
- 10,000 metric tons/year CO_2e (potential CARB mandatory reporting level with Cap and Trade);
- 25,000 metric tons/year CO_2e (the CARB mandatory reporting level for the statewide emissions inventory);
- 40,000 to 50,000 metric tons/year CO_2e (regulated emissions inventory capture – using percentages equivalent to those used in air districts for criteria air pollutants),
- Projects of statewide importance (9,000 metric tons/year CO_2e for residential, 13,000 metric tons/year CO_2e for office project, and 41,000 metric tons/year CO_2e for retail projects), and
- Unit-based thresholds and efficiency-based thresholds that were not quantified in the report.

Local Jurisdictions

The CARB has delegated much of its air pollution control authority to local air pollution control districts (APCDs) and air quality management districts (AQMDs). California’s 15 air basins are identified in **Figure 5-1**. For some air basins covering more than one county, a unified air district has been formed to manage air quality issues throughout the basin. In other multicounty air basins, individual county air districts manage air quality in only their county. Individual air districts or groups of air districts prepare air quality management plans designed to bring an air basin into compliance for nonattainment criteria pollutants. Those plans are submitted to the CARB for approval and usually contain an emissions inventory and a list of rules proposed for adoption. The project would not preempt or supersede the authority of local agencies to prohibit, restrict, or control air pollutant sources subject to those agencies’ control.

5.2 Impacts and Mitigation Measures

Approach and Methods

Criteria Pollutants

Construction and operations of AD facilities would result in criteria pollutant emissions. Construction of AD facilities would produce emissions of PM10 and PM2.5 from fugitive dust primarily during earthmoving activities, as well as construction equipment and haul truck exhaust emissions of ROG, NOx, PM10, PM2.5, CO, and CO_2. Implementation of standard best management practices would reduce the potential for air quality violations from construction of digester facilities. In regards to criteria air pollutant emissions for the operation of anaerobic digesters, additional sources and emissions would include any diesel equipment on-site for pre-processing, increased traffic on the local and regional roadway network, and the post processing of the biogas. These impacts are discussed and mitigation measures are identified below in Impact 5.1. Finally, regional cumulative criteria pollutant impacts are discussed in Impact 5.5. Notably, due to the uncertainties associated with this programmatic assessment, such as potential size and locations of potential facilities, as well as pertinent jurisdictional AQMD or APCD thresholds of significance that would apply to the AD facilities, these impacts are discussed on a qualitative basis.

Odors

Due to the collection, transport, storage, and pre-processing activities of the potentially odiferous organic substrates for digestion and resultant digestates, the siting of these AD facilities could lead to objectionable odors at off-site receptors in the vicinity of an AD facility. This impact is discussed and mitigation measures are identified below in Impact 5.2.

Toxic Air Contaminants

Since accurate quantification of health risks requires detailed site specific information which is not available on a programmatic level, health risk impacts are discussed qualitatively below in Impact 5.3. This includes a description of general methodology, risk models, TAC sources, and potential mitigation measures.

Greenhouse Gases

The development of AD facilities could result in changes in temporary, short-term, and operation-related (long-term) emissions of GHGs. Similar to several other resource areas, there are no adopted quantitative statewide guidelines (significance thresholds) for GHG emission impacts. Lead agencies should develop methods to analyze the impact of GHG in CEQA review documents. This project would be considered to have a significant impact if it would be in conflict with the AB 32 State goals for reducing GHG emissions. It is assumed that AB 32 will be successful in reducing GHG emissions and reducing the cumulative GHG emissions statewide by 2020. Therefore, the project has been reviewed to determine whether it would conflict with the goals of AB 32. This impact is discussed below in Impact 5.4.

Thresholds of Significance

CEQA defines a significant effect on the environment as a substantial, or potentially substantial, adverse change in the physical conditions of the area affected by the project. According to Appendix G of the CEQA Guidelines, a project would have a significant effect on air quality or associated with GHG if it would:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- Result in a cumulatively considerable net increase of any non-attainment pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors);
- Expose sensitive receptors to substantial pollutant concentrations;
- Create objectionable odors affecting a substantial number of people;
- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; or
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHG.

The following discussion of environmental impacts is limited to those potential impacts that could result in some level of potentially significant environmental change, as defined by CEQA. However, consistent with the CEQA Guidelines for a program-level EIR (CEQA Guidelines §15168), as individual AD facilities are proposed, the lead agency will examine these individual projects to determine whether their construction and operational effects were fully analyzed in this Program EIR. Future review of individual AD facilities may require additional site-specific CEQA review, including site specific air quality studies that could include further modeling (e.g., AERMOD) or analysis of these particular air quality impacts on a project-by-project basis.

Impact Analysis

Impact 5.1: Construction and operations of AD facilities within California would result in emissions of criteria air pollutants at levels that could substantially contribute to a potential violation of applicable air quality standards or to nonattainment conditions. (Significant)

Construction

Construction related emissions for AD facilities would arise from a variety of activities, including: (1) grading, excavation, road building, and other earth moving activities; (2) travel by construction equipment and employee vehicles, especially on unpaved surfaces; (3) exhaust from construction equipment; (4) architectural coatings; and (5) asphalt paving.

Construction-related fugitive dust emissions would vary from day to day, depending on the level and type of activity, silt and clay content of the soil, and the weather. In the absence of mitigation, construction activities may result in significant quantities of dust, and as a result, local visibility and PM10 concentrations may be adversely affected on a temporary and intermittent basis during construction. In addition, the fugitive dust generated by construction would include not only PM10, but also larger particles, which would fall out of the atmosphere within several hundred feet of the site and could result in nuisance-type impacts.

Construction equipment and construction-worker commute vehicles would also generate criteria air pollutant emissions. Criteria pollutant emissions of ROG and NOx from these emissions sources would incrementally add to regional atmospheric loading of ozone precursors during the construction period.

Although construction activities would be short-term in duration, due to the uncertainties regarding size and locations of potential facilities, as well as pertinent jurisdictional AQMD or APCD thresholds of significance that would apply to the AD facilities, digester construction activities are considered potentially significant prior to mitigation. Mitigation measures have been incorporated below to determine if emissions would be significant on a project specific level and control strategies to reduce these emissions.

Operations

Emissions associated with digester operations would depend on several factors, such as the size and type of AD facility (e.g., one-stage or two-stage continuous systems, batch systems, wet or dry processes), any equipment needed for pre-processing, the increased traffic on the local and regional roadway network (including additional waste haul trucks and employees), and the post processing of the biogas (e.g., flaring of excess biogas, combusting for electricity, or cleaning up biogas for use as a transportation fuel or injection to utility transmission lines). Operational sources of fugitive dust would primarily be processing equipment and truck movement over paved and unpaved surfaces. In addition, non-methane VOCs released from pre-digested substrate materials during the receipt and pre-processing activities, as well as potential residual VOC release if the liquid digestate is reduced via evaporation pond for post-processing at AD facilities would not be a regional change but could result in increased localized emissions. Although there will be emissions associated with these sources at AD facilities, the operation of these facilities would divert organics out of landfills. By doing so, there would be less activity at the landfill, such as potentially fewer pieces of off-road equipment and a potential decrease in the vehicle miles traveled (VMT) for haul trucks. The AD facilities could also generate biogas to replace fossil fuels for electricity production or for vehicle transportation. However, quantification of operational emissions is too speculative on this statewide programmatic level since there are too many unknown localized variables and operational considerations. For instance, if AD facilities use biogas in internal combustion engines to generate electricity, the process also emits NOx, which is a precursor of ozone. As shown in Table 5-3, many air basins are non-attainment of the state and/or federal ozone ambient air quality standards, and the potential NOx emissions from these internal combustion engines could be a challenge for AD facilities in meeting local AQMD or APCD standards. Project-by-project analysis will be able to obtain specific information, such as landfill and AD facility distances to the applicable solid waste centroid (for VMT), operating information for the landfill that organics are being diverted from (i.e., equipment operations, methane capture rate and end use of the biogas), as well as individual AD facility operating characteristics (i.e., organics throughput, equipment, biogas usage), which will be evaluated to develop an informative emissions inventory.

Due to the uncertainties underlying this programmatic assessment regarding the variable criteria described above for AD facility operations, as well as pertinent jurisdictional AQMD or APCD thresholds of significance that would apply to the AD facilities, digester operations are considered potentially significant prior to mitigation. Mitigation measures have been incorporated below to determine if emissions would be significant on a project specific level and to identify control strategies to reduce these emissions.

Mitigation Measures

Measure 5.1a: Applicants shall prepare and submit an Air Quality Technical Report as part of the environmental assessments for the development of future AD facilities on a specific project-by-project basis. The technical report shall include an analysis of potential air quality impacts for all steps of the project (including a screening level analysis to determine if construction and operation [for all on-site processes, including any end-use and disposal methods] related criteria air pollutant emissions would exceed applicable air district thresholds, as well as greenhouse gas (GHG) emissions and any health risk associated with toxic air contaminants (TACs) from all AD facility sources) and reduction measures. Preparation of the technical report should be coordinated with the appropriate air district and shall identify compliance with all applicable New Source Review and Best Available Control Technology (BACT) requirements. The technical report shall identify all project emissions from permitted (stationary) and non-permitted (mobile and area) sources and mitigation measures (as appropriate) designed to reduce significant emissions to below the applicable air district thresholds of significance, and if these thresholds cannot be met with mitigation, then the individual AD facility project could require additional CEQA review or additional mitigation measures.

Measure 5.1b: Applicants shall require construction contractors and system operators to implement the following Best Management Practices (BMPs) as applicable during construction and operations:

- Facilities shall be required to comply with the rules and regulations from the applicable Air Quality Management District (AQMD) or Air Pollution Control District (APCD).
- Facilities shall require substrate unloading and pre-processing activities to occur indoors within enclosed, negative pressure buildings. Collected foul air (including volatile organic compounds (VOCs) off-gassed from undigested substrates) should be treated via biofilter or air scrubbing system.
- Use equipment meeting, at a minimum, Tier II emission standards.
- Minimize idling time either by shutting equipment off when not in use or reducing the time of idling to 5 minutes (as required by the state airborne toxics control measure [Title 13, §2485 of the California Code of Regulations]). Provide clear signage that posts this requirement for workers at the entrances to the site.
- Maintain all equipment in proper working condition according to manufacturer's specifications.
- Use electric equipment when possible.
- For projects that are unable to use internal combustion engines due to air district regulations (i.e., NOx emission limits), other options for generating

renewable energy from biogas should be considered. Other options that should be evaluated for using biogas or biomethane as an energy source include: ~~Where feasible as an alternative to internal combustion engines, which generate nitrogen oxides (NOx) emissions, use biogas from AD facilities~~ use as a transportation fuel (compressed biomethane), use in fuel cells to generate clean electricity, use for on-site heating, or injection of biomethane into the utility gas pipeline system. If there are other lower NOx alternative technologies available at the time of AD facility development, these should be considered as well during the facility design process.

Impact Significance After Mitigation: Less than Significant

Implementation of Mitigation Measures 5.1a and 5.1b would ensure that BMPs are followed during construction and operational activities and that emissions associated with AD facilities to be built under this Program EIR would be reduced to a less–than-significant level.

Impact 5.2: Operation of AD facilities in California could create objectionable odors affecting a substantial number of people. (Significant)

Factors that affect odor impacts include the proposed AD facility design, sensitive receptor proximity, and exposure duration. Anaerobic digestion is the biological decomposition of organic matter in the absence of molecular oxygen. As a result, odorous compounds, such as ammonia and H_2S, are generated and could be released into the environment. The anaerobic digestion process occurs naturally in marshes, wetlands and is the principal decomposition process in landfills. However, in the operation of AD facilities, the digestion process occurs in a closed system. Volatile organic compounds are broken down through the anaerobic digestion process, and exhaust is generally processed in a more controlled environment.

However, the collection transport, storage, and pre-processing activities of the potentially odiferous organic substrates for digestion and the resultant digestate could produce nuisance odors at AD facilities. In addition, the siting of these digester facilities could lead to objectionable odors at off-site receptors in the vicinity. Mitigation measures shall be implemented in order to ensure the potential nuisance impact associated with odors would not affect a substantial number of people.

Mitigation Measures

Measure 5.2a: Applicants for the development of AD facilities shall comply with appropriate local land use plans, policies, and regulations, including applicable setbacks and buffer areas from sensitive land uses for potentially odoriferous processes.

Measure 5.2b: If an AD facility handles compostable material and is classified as a compostable material handling facility, the facility must develop an Odor Impact Minimization Plan (OIMP) pursuant to 14 CCR 17863.4. Otherwise, applicants shall develop and implement an Odor Management Plan (OMP) that incorporates equivalent odor reduction controls for digester operations and is consistent with local air district odor management requirements. These plans shall identify and describe potential odor sources, as well as identify the potential, intensity, and frequency of odor from these likely sources. In addition, the plans will specify odor control technologies and management practices that if implemented, would mitigate odors associated with the majority of facilities to less than significant. However, less or more control measures may be required for individual projects. Odor control strategies and management practices that can be incorporated into these plans include, but are not limited to, the following:

- ~~A list of potential odor sources.~~

- ~~Identification and description of the most likely sources of odor.~~
- ~~Identification of potential, intensity, and frequency of odor from likely sources.~~
- ~~A list of odor control technologies and management practices that could be implemented to minimize odor releases. These management practices shall include the establishment of the following criteria:~~

- Require substrate haulage to the AD facility within covered, liquid leak-proof~~sealed~~ containers.
- Establish time limit for on-site retention of undigested substrates (i.e., feedstocks should be processed and placed into the portion of the system where liquid discharge and air emissions can be controlled within 24 or 48 hours~~substrates must be put into the digester within 24 hours~~ of receipt).
- Provide enclosed, negative pressure buildings for indoor receiving and pre-processing. Treat collected foul air in a biofilter or air scrubbing system.
- Establish contingency plans for operating downtime (e.g., equipment malfunction, power outage).
- Manage delivery schedule to facilitate prompt handling of odorous substrates.
- Handle fresh unstable digestate within enclosed building, or mix with greenwaste and incorporate into a composting operation within the same business day, -and/or directly pump to covered, liquid leak-proof~~sealed~~ containers for transportation.
- Protocol for monitoring and recording odor events.
- Protocol for reporting and responding to odor events.

Impact Significance After Mitigation: Less than Significant

Impact 5.3: Construction and operation of AD facilities in California could lead to increases in chronic exposure of sensitive receptors in the vicinity to certain toxic air contaminants from stationary and mobile sources. (Significant)

For construction impacts, emissions of toxics can occur from site preparation and construction activities that are required for AD facilities. Large construction projects may last many months and may result in significant levels of DPM emissions and possibly resulting in long-term significant health risks. The nearest sensitive receptors must be included in the modeling analysis to determine worst case impacts from construction activities.

The impacts from operation of a typical AD facility can be determined by comparing the facility's pre- and post-project emissions. For operations, air toxics emissions could include DPM from trucks that deliver substrate to the facility, or from trace amounts of air toxics (primarily H_2S and ammonia) that may be released as fugitives from the anaerobic digester or from the potential combustion or flaring of the biogas. Additional air toxics that could be generated by the combustion of biogas (either in an engine or flare) include benzene, formaldehyde, and other products of incomplete combustion.

Combustion of biogas containing H_2S generates sulfur dioxide, which can react with water to produce sulfuric acid. AD facilities typically include control technologies that convert the H_2S to sulfur, which is then removed from the gas stream in order to avoid corrosion of engine parts in the combustion chamber and in the exhaust system. In addition, ammonia may form in the anaerobic digestion process from nitrogen compounds contained in the organic substrates.

Health impacts from exposure to toxic emissions related to the AD facilities are dependent on the magnitude of concentrations that the public can be exposed to, as well as to the relative toxicities of the individual pollutants released from each type of facility. Exposure levels are determined by carrying out dispersion modeling of estimated toxics emissions from typical proposed facility sources (described above) by using a screening model, such as the EPA model SCREEN3 (USEPA, 1995). The SCREEN3 model predicts possible worst-case impacts, by using hypothetical worst-case meteorology. For calculating more accurate impacts at site-specific facilities, the EPA model AERMOD can be used (American Meteorological Society, 2006). AERMOD uses meteorological data that is representative of the site, as well as multiple toxic emission source types, such as point, area, or volume to represent the emission sources.

For a screening analysis, cancer and non-cancer health risks can be calculated by applying algorithms given in the document published by California Office of Environmental Health Hazard Assessment (OEHHA) to calculate health risks (OEHHA, 2003). For more accurate site specific risks, AERMOD can be run in conjunction with the CARB model "Hot Spots Analysis Reporting Program" (HARP) to estimate cancer and non-cancer health risks that the public can be exposed to (CARB, 2009b). HARP uses the same toxicity values as are given in the OEHHA Risk Assessment Guidelines and incorporates multi-pathway uptake factors for the various toxic species to calculate risks.

The estimated cancer risks from AD facility emissions are then compared to the applicable AQMD or APCD significance thresholds to determine if the impacts from the scenarios evaluated might result in significant impacts to the public. In addition, Hazard Quotients are estimated for non-carcinogens in HARP to determine if the modeled exposure levels exceed established health thresholds, called Reference Exposure Levels (RELs), to test for significance. The estimated risks for the various digester scenarios can then be used to estimate health risks, and for those scenarios with unacceptable risks, mitigation measures are applied to determine if the projects can achieve acceptable health risks to the public. Due to the unknown site specific exposure and information that is needed to quantify and evaluate health risk associated with AD facilities, this impact is considered potentially significant.

Mitigation Measures

Measure 5.3a: Implement Mitigation Measures 5.1a and 5.1b.

Measure 5.3b: Based on the Air Quality Technical Report (specified in Measure 5.1a), if the health risk is determined to be significant on a project-by-project basis with diesel particulate matter (DPM) as a major contributor, then the applicants shall implement control measures such that the AD facility health risk would be below the applicable air district threshold, which may include implementation of one or more of the following requirements, where feasible and appropriate:

- Use either new diesel engines that are designed to minimize DPM emissions (usually through the use of catalyzed particulate filters in the exhaust) or retrofit older engines with catalyzed particulate filters (which will reduce DPM emissions by 85%);
- Use electric equipment to be powered from the grid, which would eliminate local combustion emissions;
- Use alternative fuels, such as compressed natural gas (CNG) or liquefied natural gas (LNG).

Measure 5.3c: Hydrogen sulfide (H_2S) contained in the biogas shall be scrubbed (i.e., via iron sponge or other technology) before emission to air can occur.

Impact Significance After Mitigation: Less than Significant

Implementation of Mitigation Measures 5.3a, 5.3b, and 5.3c would ensure that BMPs are followed during construction and operations and that TAC emissions from digester operations to be built under this Program EIR would be reduced to a less-than-significant level.

Impact 5.4: Development of AD facilities in California ~~would reduce~~ could increase GHG emissions. (No Impact)

"The most common GHG that results from human activity is carbon dioxide, followed by methane and nitrous oxide" (OPR, 2008). State law defines GHG to also include hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride. These latter GHG compounds would not be expected to be emitted by AD facilities. GHG impacts are considered to be exclusively cumulative impacts; there are no non-cumulative GHG emission impacts from a climate change perspective (CAPCOA, 2008).

Four types of criterion are used to determine whether the project could conflict with the state goals for reducing GHG emissions. The analyses are as follows:

a. Any potential conflicts with the CARB's 39 recommended actions in the Climate Change Scoping Plan.
b. The relative size of the potential AD facilities. This criterion is typically applied on a project-by-project basis.
c. The general energy efficiency parameters of AD facilities to determine whether the design is inherently energy efficient.
d. Any potential conflicts with applicable City or County plans, policies, or regulations adopted for the purpose of reducing the emissions of GHGs.

With regard to Criterion A described above, the project does not pose any apparent conflict with the most recent list of the CARB early action strategies (see **Table 5-4**). In fact, an established goal of the project is the furthering of compliance with the GHG reduction measures contained in AB 32, specifically Measures E-3 (achieve a 33% renewables mix by 2020) and RW-3 (high recycling/zero waste). Anaerobic digestion produces biogas which is a renewable energy source (supports Measure E-3) and anaerobic digestion is one of the categories listed under measure RW-3.

In regards to Criterion B, GHG emissions associated with digester operations would depend on several factors, such as the size and type of AD facility, any equipment needed for pre-processing, the increased traffic on the local and regional roadway network, and the post processing of the biogas (e.g., flaring of excess biogas, combusting for electricity, or cleaning up biogas for use as a transportation fuel or injection into natural gas utility transmission lines). Although there will be emissions associated with these sources at AD facilities, the operation of these facilities would divert organics out of landfills. By doing so, there would be less activity at the landfill, such as potentially fewer pieces of off-road equipment and a potential decrease in the vehicle miles traveled (VMT) for haul trucks. The AD facilities could also generate biogas to replace fossil fuels for electricity production or for vehicle transportation. Notably, several studies have projected reductions in GHGs by the diversion of organics into AD facilities (DiStefano and Belenky, 2009; Haight, 2005). Results and potential applicability drawbacks of these studies are described below.

The emission estimates presented below are based on life-cycle analyses and depict potential CO_2 equivalents (CO_2e) reductions in comparison to landfill processes by the capture and combustion of methane in biogas and subsequent electricity displacement due to on-site generation. As presented in the *Life-Cycle Analysis of Energy and Greenhouse Gas Emissions from Anaerobic Biodegradation of Municipal Solid Waste* (DiStefano and Belenky, 2009), construction of each AD facility would result in approximately 10,750 metric tons of CO_2e. Key assumptions included in this article, which studied the energy requirements and GHG emissions associated with current landfilling of municipal solid waste (MSW) in comparison to potential MSW digestion in AD facilities for the whole United States, included an average AD facility size of 50,000 tons MSW to be processed per year. The analysis included emissions associated with the collection and transport of MSW to AD facilities, transport of rejected MSW and associated landfill operations, production of biogenic methane, transport of digestate to landfills, construction of AD facilities, and operation of AD facilities (assumed to be dry single-stage thermophilic reactors with electricity generation from the biogas). In summary, the article found that AD systems would result in an approximate 57,480 metric ton to 60,236 metric ton CO_2e reduction (depending on if the electricity displaced natural gas or coal, respectively) per AD facility versus landfilling of the MSW. In addition, the study *Assessing the Environmental Burdens of Anaerobic Digestion in Comparison to Alternative Options for Managing the Biodegradable Fraction of Municipal Solid Waste* (Haight, 2005), found that AD systems for processing 108,322 tons of organic MSW would result in a reduction of 121,908 metric tons CO_2e per year versus landfilling. The following California specific assumptions could impact the findings of these studies in terms of applicability to this programmatic assessment:

- Several California test facilities have described variable methane potential for organic substrates, which was not accounted for in the above studies;
- The above studies did not encapsulate the full spectrum of facility types that could be developed in California (i.e., wet systems, mesophilic systems, batch systems, etc.);
- The above studies did not analyze all potential uses of the solids portion of digestate that are covered in this programmatic assessment (i.e., aerobically composted, used as a soil amendment, alternative daily cover, etc.);
- The above studies did not analyze all potential uses of the biogas that are covered in this programmatic assessment (i.e., flaring of excess biogas, combusting for electricity, or cleaning up biogas for use as a transportation fuel or injection to utility transmission lines)
- California's energy grid mix differs from the assumptions in the above studies;
- CARB estimates a 75 percent landfill gas collection efficiency for California, which matches the DiStefano and Belenky study, but is greater than the assumption of 50 percent collection in the Haight study;
- The Haight study assumes all organics in the MSW are appropriate for AD. However, in California, about 50 percent of current disposal is organic waste and less than half of this is appropriate for AD;

- Landfill carbon sequestration is not considered an emission offset, which was not discussed in the above studies.

Due to the many unknown variables and operational considerations associated with quantification of GHGs on a statewide programmatic level, GHG emissions determination is too speculative at this juncture. Project-by-project analysis (as required in Mitigation Measure 5.1a) will be able to obtain specific information, such as landfill and AD facility distances to the applicable solid waste centroid (for VMT), operating information for the landfill (i.e., equipment operations, methane capture rate and usage) that organics are being diverted from, as well as individual AD facility operating characteristics (i.e., organics throughput, equipment, biogas usage), which will be evaluated to develop an informative GHG inventory.

With respect to GHG analysis Criterion C, biogas generated through the anaerobic digestion process is captured in the digester and can be combusted in a flare, used directly in internal combustion engines to produce electricity and heat, or the biogas can be upgraded to biomethane through the removal of hydrogen sulfide, CO_2, and moisture. Biomethane can be used in place of natural gas for various processes, including use by utility companies if the biomethane is upgraded to utility standards and pumped into a natural gas supply pipeline, as well as for electrical generation, heating, and for natural gas-fueled vehicles. Thus, development of AD facilities would result in an inherently efficient and renewable source of energy.

Finally, with regard to Criterion D, digester development and operations would be expected to comply with applicable City or County plans, policies, or regulations adopted for the purpose of reducing the emissions of GHGs. As described for Criterion A, the Program would directly support several GHG reduction measures contained in AB 32 (increased renewables mix and high recycling/zero waste), which would also be beneficial in meeting any local jurisdiction reduction goals.

Although not required, to further reduce the magnitude of this issue that has no impact, Mitigation Measure 5.4 recommends projects implement Mitigation Measure 5.1a, which includes a project level review of GHG emissions.

Mitigation Measures

Measure 5.4: Implement Mitigation Measure 5.1a.

Impact Significance After Mitigation: Less than Significant.

Based upon the analysis of Criteria A, B, C and D presented above, development of AD facilities would support the CARB early action strategies, may result in a net decrease in GHG emissions, would result in an inherently efficient and renewable source of energy, and would be expected to comply with any applicable City or County plans, policies, or ordinance/regulations to reduce GHG emissions. With implementation of Mitigation Measures 5.1a, which will assess GHG emissions on a project-by-project basis to ensure compliance with the applicable air district thresholds and/or guidance and incorporate further emission mitigation if required, the development of AD facilities would not result in a cumulatively considerable increase in GHG emissions and would not impair the State's ability to implement AB 32.

Impact 5.5: Development of AD facilities in California, together with anticipated cumulative development in the area, would contribute to regional criteria pollutants. (Significant)

CEQA requires that the EIR examine cumulative impacts. As discussed in CEQA Guidelines §15130(a)(1), a cumulative impact "consists of an impact which is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts." The analysis of cumulative impacts need not provide the level of detail required of the analysis of impacts from the project itself, but shall "reflect the severity of the impacts and their likelihood of occurrence" (CEQA Guidelines §15130(b)). A cumulative impact occurs when two or more individual effects, considered together, are considerable or would compound or increase other environmental impacts. Cumulative impacts can result from individually minor but collectively significant impacts, meaning that the project's incremental effects are considerable when viewed in connection with the effects of past, current, and probable future projects. Notably, any project that would individually have a significant air quality impact would also be considered to have a significant cumulative air quality impact.

Additional sources of criteria pollutant emissions associated with AD facility operations would include any additional diesel equipment on-site for pre-processing, increased traffic on the local roadway network (though for AD facilities co-located at a solid waste facility, there would usually be no substantial net increase in traffic as the organics would be transported there already), and the post processing of the biogas. Although AD facility operations would result in air pollutant emissions from these sources, AD facilities would also divert organics from landfills. By doing so, there would be less activity at the landfill, such as potentially fewer pieces of off-road equipment and a potential decrease in the VMT for haul trucks. The AD facilities could also generate biogas to replace fossil fuels for electricity production or for vehicle transportation. Other land development projects, industrial projects, and the increase in air quality emissions resulting from activities associated with population growth would also contribute to an increase in air quality emissions. Individual air districts classified as nonattainment areas for the state or federal ozone or federal PM10 ambient standards are required to prepare state implementation plans (SIPs) and air quality management plans (AQMPs) showing how they will come into compliance with the ambient standards. AQMPs include policies to reduce air emissions from industrial operations, auto and truck exhaust, increases in population, and other activities that could result in increased air emissions. This-cumulative impact is considered less than significant because AQMPs include policies aimed at reducing emissions and direct air quality impacts would be reduced to a less-than-significant level with implementation of mitigation.

Mitigation Measure

Measure 5.5: Implement Mitigation Measures 5.1a and 5.1b.

Impact Significance After Mitigation: Less than Significant

Implementation of Mitigation Measure 5.5 would ensure that BMPs are followed during operational activities at all AD facilities to be developed under this Program EIR. In addition, because the jurisdictionally appropriate SIPs and AQMPs describe the measures that would be used to reduce emissions (from vehicular and non-vehicular sources) and to attain the ambient standards, cumulative development under this Program would be considered less than significant.

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CHAPTER 6
Hydrology and Water Quality

6.1 Environmental Setting

The following text provides an overview of the environmental setting for the project, as relevant to surface and groundwater supply and quality.

Surface Water

California's surface water resources are diverse and varied, ranging from large and long-reaching perennial rivers in the north and central areas of the state, to primarily intermittent waterways along much of the southern coast, to desert washes and dry lakes in the inland east and south. Major waterways include the Trinity River system which drains the northern reaches of California's Coastal Range and the southern Cascades; the Sacramento-San Joaquin River system, which is the largest river system in the state and which drains the southern tip of the Cascade Range, the western Sierra Nevada, the eastern Coastal Range, and the Central Valley; and the Colorado River, which flows along California's eastern border and into Mexico. There are many smaller perennial and intermittent waterways that drain California's seaboard and the eastern slope of the Sierras.

Northern portions of the state generally receive substantially more precipitation than southern portions of the state. Snowpack in the Sierra Nevada and the southern Cascades serves as a significant reservoir for water storage. Snowpack accumulates over the winter and early spring months, and gradually melts in the late spring and summer, feeding surface flows, filling reservoirs, and recharging groundwater. Captured snowmelt, especially east and north of the Central Valley, is highly managed, and is released from reservoirs to supply regional agriculture and urban needs, and to provide water for export to other areas of the state.

Water from the Sacramento-San Joaquin Delta is pumped from Clifton Court into a network of aqueducts and reservoirs that supply water to Central and Southern California for agricultural and urban uses. Other state, federal, and local water projects provide water to specific cities or areas. Such projects include diversions from the Sierra Nevada to the San Francisco Bay Area, from the Owens Valley to Los Angeles, and from the Colorado River to the Imperial Valley and San Diego. Other water projects provide surface water supply to Santa Barbara, Blythe, San Luis Obispo, the northern San Francisco Bay Area, Vacaville, and other urban areas.

In recent decades, California's natural and engineered water systems have come under increasing demand pressure, in an attempt to meet urban, agricultural, industrial, and environmental water requirements. During dry years it is almost impossible to meet the needs of all water users, and recent droughts have resulted in reductions in water supplied for urban, environmental, and agricultural uses.

Groundwater

Groundwater is used extensively in many areas of the state to support urban, agricultural, and industrial users, especially in areas where surface water supplies are limited, or infrastructure for the delivery of surface water is lacking. Such areas include California's Central Valley, the southern portion of the San Francisco Bay Area, the greater Los Angeles area, and the inland desert areas of southern California.

California's major aquifers have been delineated by the California Department of Water Resources (DWR, 2003). Additional minor aquifers are scattered across the state; these minor aquifers are smaller in extent and contain less water than the aquifers delineated by DWR. However, these minor aquifers are frequently important localized sources of water, and are used for rural residential supply, grazing and farming, and, to a limited extent, for municipal water supply.

Groundwater overdraft has been a significant problem in California for many decades. In some portions of the southern half of the Central Valley, groundwater levels have been historically depleted on the order of 3 to 6 feet per year. Although state and local agencies are collaborating to reduce groundwater overdraft in many areas of the state, workable and realistic solutions are difficult to develop. As a result, groundwater overdraft is expected to continue for decades across the Central Valley, the Bay Area, southern desert areas, and several other areas. Over an extended period of time, extensive groundwater overdraft can result in irreversible land subsidence as depleted aquifers compact. Areas of significant land subsidence are characterized by reduced aquifer capacity and lowered land surfaces relative to historic conditions.

Water Quality

Surface water quality in California is highly variable, and ranges from very high quality lakes and streams in the Sierra Nevada and Cascade mountains and in remote or undeveloped areas, to highly-polluted drainage courses that carry municipal, agricultural, and industrial wastewater. The New River, the most polluted river in the United States, flows across the Mexico-United States border and into California, carrying with it municipal and industrial pollutants that include fecal bacteria, heavy metals, pesticides, and other toxic substances. Intermediate to these two extremes are waterways from which California's inhabitants, farmers, and industry get much of their water supply.

Groundwater quality is also highly variable both by geographical area and by depth within an area. High-quality groundwater exists in the Sierra Nevada, Cascades, and along the eastern side of the Central Valley, but is in aquifers of limited extent. High-quality groundwater also exists in other locations around the state that have limited agricultural and urban development. Groundwater across much of the Coastal Range and western flank of the southern Central Valley, and southern deserts often have high levels of naturally-occurring salts and metals that make the water unfit for many uses. In areas with extensive urban or agricultural activities, waste discharges have induced high levels of salts and other contaminants that make the groundwater unfit for consumption or other uses unless it is treated.

Surface water quality is affected by agricultural, urban, and industrial sources of pollution. Point sources, which are defined as specific outfalls discharging into natural waters, are easily identified and are regulated by California’s Regional Water Boards and the US EPA. Nonpoint sources, including polluted runoff from urban and agricultural sources, are more challenging to identify. Nonpoint sources generally drain into a river or waterway over an extended area, or via many individual inlets. In some instances, the waterways that receive polluted runoff and wastewater discharges serve as water supply sources for downstream water users.

Major sources of groundwater pollution include historic and ongoing waste discharges, leaking underground storage tanks, and infiltration of polluted runoff from agricultural and urban areas. Nitrogen fertilizers in particular are of concern, because increased nitrate levels in groundwater exceed drinking water standards in many areas of the state. Groundwater pollution can be extremely costly and difficult to remediate.

Common classes of water quality pollutants that are regulated under state and federal regulations include inorganics, pathogens, and pesticides and other organic compounds. Inorganics include nutrients (phosphorus and various forms of nitrogen including nitrate), salts, and metals (aluminum, antimony, arsenic, copper, cyanide, lead, mercury, nickel, etc.). Pathogens include total coliforms and fecal coliforms, as well as viruses, protozoa, and other microorganisms. Pesticides include herbicides and insecticides. Other organic compounds include volatile organic compounds (VOCs), and petroleum products (fuels, oils, greases, etc.). Water quality physical parameters such as dissolved oxygen are also regulated.

Both point sources and nonpoint sources of water pollution can degrade surface water and groundwater. Water pollution is a substantial issue in many areas, from the perspective of both environmental quality and human health. Water pollutant levels in California are regulated by state agencies including the Water Boards[1] and the California Department of Health Services. As discussed in the “Regulatory Setting” section below, these agencies implement federal water quality and drinking water quality requirements under the Clean Water Act, the Safe Drinking Water Act, and various state-level laws and regulations.

Regulatory Requirements

The Water Boards generally regulate point source waste discharges using National Pollutant Discharge Elimination System (NPDES) permits and Waste Discharge Requirement (WDR) orders. The Water Boards address nonpoint source discharges by mandating the use of best management practices (BMPs) and/or by establishing Total Maximum Daily Loads pursuant to the Clean Water Act. The relevant federal and state laws and regulations are discussed below.

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[1] The Water Boards consist of the State Water Resources Control Board (State Water Board) and nine Regional Water Quality Control Boards (regional boards)

Federal

Clean Water Act

The federal Clean Water Act (CWA) established the basic structure for regulating discharges of pollutants into "waters of the United States." The act specifies a variety of regulatory and non-regulatory tools to sharply reduce direct pollutant discharges into waterways, finance municipal wastewater treatment facilities, and manage polluted runoff. The CWA includes the following sections:

- Sections 303 and 304, which provide for water quality standards, criteria, and guidelines.
- Section 401, which requires every applicant for a federal permit or license for any activity that may result in a discharge to a water body to obtain a water quality certification that the proposed activity will comply with applicable water quality standards.
- Section 402, which regulates point- and nonpoint-source discharges to surface waters through the NPDES program. In California, the State Water Board oversees the NPDES program, which is administered by the regional boards. The NPDES program provides for both general permits (those that cover a number of similar or related activities) and individual permits. Anti-backsliding requirements provided for under CWA Sections 402(o)(2) and 303(d)(4) prohibit slackening of discharge requirements and regulations under revised NPDES permits. With isolated/limited exceptions, these regulations require effluent limitations in a reissued permit to be at least as stringent as those contained in the previous permit.
- Section 404, which establishes a program to regulate the discharge of dredged and fill material into waters of the U.S., including some wetlands. Activities in waters of the U.S. that are regulated under this program include fills for development, water resource projects (e.g., dams and levees), infrastructure development (e.g., highways and airports), and conversion of wetlands to uplands for farming and forestry.

Clean Water Act Section 303(d) Impaired Waters List

Under Section 303(d) of the CWA, states are required to develop lists of water bodies that would not attain water quality objectives after implementation of required levels of treatment by point-source dischargers (municipalities and industries). Section 303(d) requires that the state develop a TMDL for each of the listed pollutants. The TMDL is the amount of loading that the water body can receive and still be in compliance with water quality objectives. The TMDL can also act as a plan to reduce loading of a specific pollutant from various sources to achieve compliance with water quality objectives. The TMDL prepared by the state must include an allocation of allowable loadings to point and nonpoint sources, with consideration of background loadings and a margin of safety. The TMDL must also include an analysis that shows the linkage between loading reductions and the attainment of water quality objectives. EPA must either approve a TMDL prepared by the state or, if it disapproves the state's TMDL, issue its own. NPDES permit limits for listed pollutants must be consistent with the waste load allocation prescribed in the TMDL. After implementation of the TMDL, it is anticipated that the problems that led to placement of a given pollutant on the Section 303(d) list would be remediated. In California, preparation and management of the Section 303(d) list is administered by the regional boards.

Section 401 Water Quality Certification or Waiver

Under Section 401 of the CWA, an applicant for a Section 404 permit (to discharge dredged or fill material into waters of the United States) must first obtain a certificate from the appropriate state agency stating that the fill is consistent with the state's water quality standards and criteria. In California, the authority to either grant water quality certification or waive the requirement is delegated by the State Water Board to the nine regional boards.

National Pollutant Discharge Elimination System Permit Program

The NPDES permit program was established by the CWA to regulate municipal and industrial discharges to surface waters of the United States. Federal NPDES permit regulations have been established for broad categories of discharges, including point-source municipal waste discharges and nonpoint-source stormwater runoff. NPDES permits generally identify the following:

- effluent and receiving-water limits on allowable concentrations and/or mass emissions of pollutants contained in the discharge;
- prohibitions on discharges not specifically allowed under the permit; and
- provisions that describe required actions by the discharger, including industrial pretreatment, pollution prevention, self-monitoring, and other activities.

In November 1990, EPA published regulations establishing NPDES permit requirements for municipal and industrial stormwater discharges. Phase 1 of the permitting program applied to municipal discharges of stormwater in urban areas where the population exceeded 100,000 persons. Phase 1 also applied to stormwater discharges from a large variety of industrial activities, including general construction activity if the project would disturb more than 5 acres. Phase 2 of the NPDES stormwater permit regulations, which became effective in March 2003, required that NPDES permits be issued for construction activity for projects that disturb between 1 and 5 acres. Phase 2 of the municipal permit system (known as the "NPDES General Permit for Small MS4s") required small municipal areas of less than 100,000 persons to develop stormwater management programs.

In California, the USEPA has delegated its NPDES permitting functions to the State Water Board (state board) and the regional boards.

Executive Order 11988 and the Federal Emergency Management Agency

Under Executive Order 11988, the Federal Emergency Management Agency (FEMA) is responsible for management of floodplain areas. FEMA administers the National Flood Insurance Program (NFIP) to provide subsidized flood insurance to communities that comply with FEMA regulations limiting development in floodplains. FEMA also issues Flood Insurance Rate Maps (FIRMs) that identify which land areas are subject to flooding. These maps provide flood information and identify flood hazard zones in the community. The design standard for flood protection is established by FEMA, with the minimum level of flood protection for new development determined to be the 1-in-100 annual exceedance probability (AEP) (i.e., the 100-year flood event). Specifically, where levees provide flood protection, FEMA requires that the levee crown have 3 feet of freeboard above the 1-in-100 AEP water surface elevation, except in the vicinity of a structure such as a bridge, where the levee crown must have 4 feet of freeboard for a distance of 100 feet upstream and downstream of the structure.

Federal Antidegradation Policy

The federal antidegradation policy, established in 1968, is designed to protect existing uses and water quality and national water resources. The federal policy directs states to adopt a statewide policy that includes the following primary provisions:

- Existing in-stream uses and the water quality necessary to protect those uses shall be maintained and protected.
- Where existing water quality is better than necessary to support fishing and swimming conditions, that quality shall be maintained and protected unless the state finds that allowing lower water quality is necessary for important local economic or social development.
- Where high-quality waters constitute an outstanding national resource, such as waters of national and state parks, wildlife refuges, and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected.

National Toxics Rule

For 14 states, including California, the National Toxics Rule promulgates chemical-specific numeric criteria for priority toxic pollutants as needed to bring all states into compliance with the requirements of section 303(c)(2)(B) of the CWA. States determined by EPA to fully comply with section 303(c)(2)(B) requirements are not affected by this rule, however California is not in compliance.

The rule addresses two situations. For a few states, EPA is promulgating a limited number of criteria which were previously identified as necessary in disapproval letters to such states, and which the state has failed to address. For other states, Federal criteria are necessary for all priority toxic pollutants for which EPA has issued section 304(a) water quality criteria guidance and that are not the subject of approved state criteria. When these standards take effect, they will be the legally enforceable standards in the affected states for all purposes and programs under the CWA, including planning, monitoring, NPDES permitting, enforcement and compliance.

Safe Drinking Water Act

Under the Safe Drinking Water Act (SDWA) (Public Law 93-523), passed in 1974, the US EPA regulates contaminants of concern to domestic water supply. Contaminants of concern relevant to domestic water supply are defined as those that pose a public health threat or that alter the aesthetic acceptability of the water. These types of contaminants are regulated by EPA primary and secondary Maximum Contaminant Levels (MCLs) that are applicable to treated water supplies delivered to the distribution system. MCLs and the process for setting these standards are reviewed triennially. Amendments to the SDWA enacted in 1986 established an accelerated schedule for setting MCLs for drinking water. EPA has delegated to the California Department of Public Health (CDPH; formerly the Department of Health Services) the responsibility for administering California’s drinking-water program. CDPH is accountable to EPA for program implementation and for adopting standards and regulations that are at least as stringent as those developed by EPA. The applicable state primary and secondary MCLs are set forth in Title 22, Division 4, Chapter 15, Article 4 of the California Code of Regulations.

State

California State Nondegradation Policy

In 1968, as required under the federal antidegradation policy described above, the State Water Board adopted Resolution No. 68-16 a “Statement of Policy with Respect to Maintaining High Quality of Waters in California.” Resolution 68-16 states that the disposal of wastes into state waters shall be regulated to achieve the highest water quality consistent with maximum benefit to the people of the state and to promote the peace, health, safety, and welfare of the people of the state, and provides as follows:

1. “Whenever the existing quality of water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality will be maintained until it has been demonstrated to the State that any change will be consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial use of such water and will not result in water quality less than that prescribed in the policies.”
2. “Any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained.”

California Toxics Rule

In May 2000, the State Water Board adopted and EPA approved the California Toxics Rule, which establishes numeric water quality criteria for approximately 130 priority pollutant trace metals and organic compounds. The State Water Board subsequently adopted its State Implementation Policy of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries (SIP). The SIP outlines procedures for NPDES permitting for toxic-pollutant objectives that have been adopted in Basin Plans and in the California Toxics Rule.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act[2] (Division 7 of the California Water Code) established the State Water Board and divided the state into nine regions, each overseen by a regional board. The nine regional boards have the primary responsibility for the coordination and control of water quality within their respective jurisdictional boundaries. Pursuant to the Porter-Cologne Water Quality Control Act, the regional boards establish water quality objectives for the purpose of protecting beneficial uses. The Act recognizes that water quality may be changed to some degree without unreasonably affecting beneficial uses. Designated beneficial uses, together with the corresponding water quality objectives, constitute water quality standards under the federal CWA. Therefore, the

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[2] http://www.swrcb.ca.gov/laws_regulations/docs/portercologne.pdf

water quality objectives form the regulatory references for meeting state and federal requirements for water quality control.

Under authority of the Porter-Cologne Water Quality Control Act, the regional boards require persons who discharge or propose to discharge waste that could affect the quality of waters of the State to file a Report of Waste Discharge with the appropriate RWQCB. The regional board then issues or waives WDRs for the discharge or requires the discharger to enroll under a general NPDES Order or general WDR order.

State Water Resources Control Board

Created by the California State Legislature in 1967, the State Water Board holds authority over water resources allocation and water quality protection within the state. The five-member State Water Board allocates water rights, adjudicates water right disputes, develops statewide water protection plans, establishes water quality standards, and guides the nine regional water boards. The mission of State Water Board is to, "preserve, enhance, and restore the quality of California's water resources, and ensure their proper allocation and efficient use for the benefit of present and future generations."

Regional Water Boards

The nine regional water boards in California maintain jurisdiction over water quality within their regions. Each regional board is responsible for supporting the development of NPDES permits within their region, and for defining and enforcing water quality limitations for specific waters within their domain. Each of the regional boards has prepared water quality control plans (commonly referred to as Basin Plans) for relevant large scale watersheds or basins within its purview. These plans identify the existing and potential beneficial uses of waters of the State and establish water quality objectives to protect these uses. The basin plans also contain implementation, surveillance, and monitoring plans. Statewide and regional water quality control plans include enforceable prohibitions against certain types of discharges, including those that may pertain to nonpoint sources. Basin plans also establish beneficial uses and their corresponding water quality objectives, in order to meet state and federal regulatory criteria for water quality standards. As such, California's basin plans serve as regulatory references for meeting both State and federal requirements for water quality control (40 CFR Parts 130 and 131).

Waste Discharge Requirements (WDRs)

California's regional boards also oversee permitting as authorized under the Porter-Cologne Water Quality Control Act. If a project does not require federal permitting, it may still require a state permit. Found in Division 7 of the California Water Code, the Porter-Cologne Act requires persons who discharge waste that could affect the quality of waters of the State to file a Report of Waste Discharge with the appropriate regional board. Each regional board can adopt WDR General Orders (GOs) or individual WDR orders to regulate such discharges, and a given discharger will be subject to Waste Discharge Requirements (WDRs) either under a GO or a project specific state permit. WDRs usually include discharge prohibitions and discharge specifications including flow volumes and water quality constituent limitations to which a discharger must adhere. WDRs usually impose water quality monitoring requirements, and may require liner systems or other engineered features.

The limitations imposed by WDRs vary from region to region and from project to project, depending upon proposed discharge characteristics, and sensitivities of affected resources. In this manner, WDRs protect waters of the State from significant water quality degradation. Alternatively, if no degradation of water quality is anticipated from a proposed discharge, the regional board may issue a conditional waiver of WDRs.

Construction Stormwater NPDES Permit

The federal CWA prohibits discharges of stormwater from construction projects unless the discharge is in compliance with an NPDES permit. The State Water Board is the permitting authority in California and adopted a statewide General Permit for Stormwater Discharges Associated with Construction Activity (Order No. 99-08) for construction projects that disturb one or more acres of soil. Effective July 1, 2010 all dischargers are required to obtain coverage under the updated Construction General Permit Order 2009-0009-DWQ (the Construction General Permit), adopted on September 2, 2009. Construction activities include clearing, grading, excavation, stockpiling, and reconstruction of existing facilities (removal or replacement). For updated information see:

http://www.waterboards.ca.gov/water_issues/programs/stormwater/construction.shtml

In general, the Construction General Permit requires that the landowner and/or contractor submit a notice of intent (NOI) and develop and implement a storm water pollution prevention plan (SWPPP). It is the responsibility of the landowner to obtain coverage under the Construction General Permit prior to commencement of construction activities. To obtain coverage, the landowner must file an NOI with a vicinity map and the appropriate fee to the State Water Board. The NOI requirements of the Construction General Permit are intended to establish a mechanism which can be used to clearly identify the responsible parties, locations, and scope of operations of dischargers covered by the Construction General Permit and to document the discharger's knowledge of the requirements for a SWPPP.

The Construction General Permit requires a risk-based permitting approach, dependent upon the likely level of risk imparted by a project. The Construction General Permit contains several additional compliance items, including (1) additional mandatory BMPs to reduce erosion and sedimentation, which may include incorporation of vegetated swales, setbacks and buffers, rooftop and impervious surface disconnection, bioretention cells, rain gardens, rain cisterns, implementation of pollution/sediment/spill control plans, training, and other structural and non-structural actions; (2) sampling and monitoring for non-visible pollutants; (3) effluent monitoring and annual compliance reports; (4) development and adherence to a Rain Event Action Plan; (5) requirements for the post-construction period; (6) numeric action levels and effluent limits for pH and turbidity; (7) monitoring of soil characteristics on site; and (8) mandatory training under a specific curriculum. Under the updated permit, BMPs will be incorporated into the compliance action and monitoring requirements for each development site, as compared to the existing permit, where specific BMPs are implemented via a SWPPP. Under the updated permit, a SWPPP would be reviewed by the State Water Board.

California Department of Public Health Drinking Water Regulations

CDPH serves as the primary responsible agency for drinking water regulations. CDPH must adopt drinking water quality standards at least as stringent as federal standards, and may also regulate contaminants to more stringent standards than U.S. EPA, or develop additional standards. CDPH regulations cover over 150 contaminants, including microorganisms, particulates, inorganics, natural organics, synthetic organics, radionuclides, and DBPs. The specific regulations promulgated by CDPH, in coordination with the U.S. EPA, are summarized in **Table 6-1**.

TABLE 6-1
FEDERAL AND STATE DRINKING WATER REGULATIONS

Regulation	Promulgation Year	Contaminants Regulated
National Interim Primary Drinking Water Regulations	1975–1981	Inorganics, Organics, Physical, Radioactivity, Bacteriological
National Secondary Drinking Water Regulations	1979	Inorganics, Color, Corrosivity, Odor, Foaming Agents
Phase I Standards	1987	VOCs
Phase II Standards	1991	VOCs, SOCs, IOCs
Phase V Standards	1992	VOCs, SOCs, IOCs
Surface Water Treatment Rule	1989	Microbiological and Turbidity
Total Coliform Rule	1989	Microbiological
Lead and Copper Rule	1991 / 2003	Lead, Copper
Drinking Water Source Assessment and Protection Program	1996	Source Water Protection
Information Collection Rule	1996	Microbiological and Disinfectants / DBPs
Stage 1 Disinfectants/Disinfection Byproducts Rule	1998	Disinfectants / DBPs, Precursors
Interim Enhanced Surface Water Treatment Rule	1998	Microbiological, Turbidity
Unregulated Contaminant Monitoring Rule	1999	Organics, Microbiological
Radionuclides Rule	2000	Radionuclides
Arsenic Rule	2001	Arsenic
Filter Backwash Rule	2002	Microbiological, Turbidity
Drinking Water Candidate Contaminant List	2003	Chemical, Microbiological
Stage 2 Microbiological and Disinfection Byproducts Rules	2006	Microbiological and Disinfectants / DBPs
Secondary Maximum Contaminant Levels	2006	Metals, Color, Foaming Agents, MTBE, Odor, Thiobencarb, Turbidity, TDS, and Anions
Primary MCL for Perchlorate	2007	Perchlorate
Interim Enhanced Surface Water Treatment Rule	2008	Microbiological and Turbidity

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DBP = Disinfection by-product
IOC = Inorganic Compound
MCL = Maximum Contaminant Level
MTBE = methyl tertiary-butyl ether
SOC = Synthetic Organic Compound
TDS = Total Dissolved Solids
VOC = Volatile Organic Compound

California Water Code Section 10910 through 10915~~2~~ (SB 610 and Water Supply Assessment Requirements)

Senate Bills 610 and 221 (Chapters 643 and 642, respectively, Statutes of 2001) amended state law, effective January 1, 2002, to improve the link between information on water supply availability and certain land use decisions made by cities and counties. The bills were meant to promote more collaborative planning between local water suppliers and cities and counties, by requiring detailed information regarding water availability to be provided to the city and county decision-makers prior to approval of certain projects. SB 221 applies to residential subdivisions, and is not further relevant to this Program EIR. Under SB 610, a water supply assessment (WSA) must be furnished to local governments for inclusion in any environmental documentation for certain projects subject to CEQA, where "project" is defined in Water Code §10912 [a] as follows:

(a) ''Project'' means any of the following:

- (1) A proposed residential development of more than 500 dwelling units.
- (2) A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space.
- (3) A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space.
- (4) A proposed hotel or motel, or both, having more than 500 rooms.
- (5) A proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area.
- (6) A mixed-use project that includes one or more of the projects specified in this subdivision.
- (7) A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project.

(b) If a public water system has fewer than 5,000 service connections, then ''project'' means any proposed residential, business, commercial, hotel or motel, or industrial development that would account for an increase of 10 percent or more in the number of the public water system's existing service connections, or a mixed-use project that would demand an amount of water equivalent to, or greater than, the amount of water required by residential development that would represent an increase of 10 percent or more in the number of the public water system's existing service connections.

The definitions provided above are currently undergoing legal challenges and scrutiny within the court system, wherein the definition of project may become more inclusive for some project categories.

6.2 Impacts and Mitigation Measures

Approach and Methods

The evaluation of impacts and mitigation measures was performed in light of current conditions in the project area, applicable regulations and guidelines, and typical construction activities and operations of anaerobic digester(AD) facilities including pre-processing and post-processing operations. In determining the level of significance, the analysis assumed that the AD facilities would comply with relevant federal, state, and local ordinances and regulations. As discussed in Chapter 2, Project Description, the project does not consider dairy manure co-digesters or co-digesters at wastewater treatment plants (WWTP).

Disposal of digestate would in many cases require acquisition of WDRs, as discussed throughout the impact analysis below. However, some AD facilities may be installed on site at a location/facility that already maintains active WDRs. Pre-existing WDRs have a variety of site-specific requirements and are not considered in detail in the ensuing impact analysis. However, installation of new AD facilities at a facility where existing WDRs are already applicable, could require modification to the existing WDRs or require obtaining new WDRs for new waste discharges.

Thresholds of Significance

The significance criteria for this analysis were adapted from criteria presented in Appendix G of the CEQA Guidelines. The project would result in a significant impact if it would:

- Violate any water quality standards or waste discharge requirements.
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there should be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted.
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site.
- Substantially alter the existing drainage pattern of the site or area, including through alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site.
- Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff.
- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.
- Place within a 100-year flood hazard area structures which would impede or redirect flood flows.
- Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam.
- Inundation by seiche, tsunami, or mudflow.

Based on the scope of the project and its geographical location, the project ~~would not~~ is not expected to result in impacts related to the following criteria. Although local considerations may need to be addressed on a project by project basis, ~~N~~no impact discussion is provided in this Program EIR for these topics for the following reasons:

Failure of Levee or Dam. AD facilities that would be installed under the Program EIR would not require the construction of a levee or dam, and are not anticipated to result in alteration of existing levees or dams. Therefore, no increase in potential levee or dam failure is expected to~~would~~ occur.

Exposure of People or Structures to Flooding. AD facilities proposed for implementation under the Program EIR are not expected to be installed within existing flood zones. In the event that an AD facility were proposed for installation within a flood zone, the facility would be required to adhere to state and local building requirements and regulations regarding construction in flood zones, including applicable building and design restrictions, and worker safety and evacuation measures. Therefore, although some facilities may be constructed in a potential inundation area, it is expected that there would be no potential impact of loss, death or injury.

Placement of Housing within a 100-Year Flood Zone. Implementation of the project would not include or result in the construction of any housing. Therefore, the project would not include or result in the construction of housing within a 100-year flood zone. No impact ~~would~~ is expected to occur.

Impact Analysis

Impact 6.1: Construction of AD Facilities could generate loose, erodible soils and other water quality pollutants that may impair water quality. (Less than Significant)

During site grading and construction activities related to installation of AD facilities, including pre-processing and post-processing facilities, large areas of bare soil could be exposed to erosion by wind and water for extended periods of time. Bare soil surfaces are more likely to erode than vegetated areas due to the lack of dispersion, infiltration, and retention created by covering vegetation. Soil disturbance, excavation, cutting/filling, stockpiling, and grading activities could increase erosion and sedimentation to storm drains that empty to local surface waters. Construction water quality impacts are temporary and managed through the standard, industry-accepted BMPs, which are managed and monitored by the contractor conducting the work.

For individual projects that would disturb less than one acre, the amount of disturbance required for the construction of digester facilities would be considered relatively minor, and current standard construction practices would be sufficient to reduce the potential for impacting receiving waters. Thus, AD facility construction activities that disturb less than one acre would have a less-than-significant impact on water quality.

For projects that disturb more than one acre, the proponent of the project is required to comply with the revised NPDES General Construction Permit. As discussed previously, permit requirements include the following measures or their equivalent:

- Preparation of a site-specific SWPPP;
- Preparation of hazardous material spill control and countermeasure programs;

- Sampling, monitoring, and compliance reporting for stormwater runoff;
- Development and adherence to a Rain Event Action Plan;
- Adherence to numeric action levels and effluent limits for pH and turbidity;
- Monitoring of soil characteristics;
- Mandatory training under a specific curriculum; and
- Mandatory implementation of BMPs, which could include, but would not be limited to:
    - Physical barriers to prevent erosion and sedimentation including setbacks and buffers, rooftop and impervious surface disconnection, rain gardens and cisterns, and other installations;
    - Construction and maintenance of sedimentation basins;
    - Limitations on construction work during storm events;
    - Use of swales, mechanical, or chemical means of stormwater treatment during construction, including vegetated swales, bioretention cells, chemical treatments, and mechanical stormwater filters; and
    - Implementation of spill control, sediment control, and pollution control plans and training.

Adherence to these and/or other similar BMPs would be required as a condition of the permit, and would substantially reduce or prevent waterborne pollutants from entering natural waters. The specific set of BMPs would be determined prior to initiation of construction activities of a project, and a schedule for implementation, as well as a series of monitoring and compliance measures would be developed in coordination with the permitting agency, to meet CWA standards. Therefore, additional mitigation for stormwater quality is not required to protect water quality during construction, over and above that which is required by the revised NPDES General Construction Permit.

If precautions are not taken to contain contaminants, construction could produce contaminated stormwater runoff. Runoff from construction of AD facilities would be contained at the project sites, and would not be discharged to waters of the State. In addition, hazardous materials associated with construction equipment and practices, such as fuels, oils, antifreeze, coolants, and other substances, could adversely affect water quality if spilled or stored improperly. Potential chemical releases are regulated by the regional boards, Department of Toxic Substances Control, and local agencies so that water quality is unlikely to be affected.

Mitigation: None required.

Impact 6.2: The operation of AD facilities could adversely affect surface and groundwater quality. (Significant)

The operation of AD facilities for the treatment of wastes considered under this Program EIR could cause environmental degradation of surface water and groundwater quality. Reductions in groundwater quality could occur as a result of pre-processing, post-processing, and to a lesser extent, digestion operations. These are reviewed below. Additional discussion of the activities associated with pre-processing, digestion, and post-processing are contained in Chapter 3, Project Description.

Pre-Processing

During pre-processing, digester feedstock is separated from incoming waste streams, stored, and transported to the anaerobic digester. Feedstocks could contain high levels of organic matter, sediment, nutrients, inorganic salts, and fugitive trash. Depending on the composition of the feedstock, other potential water quality pollutants may be present in small quantities, including heavy metals, hydrocarbons, and other species. During pre-processing, wash down of equipment, feedstock wetting, and handling operations may result in the loss of a small amount of feedstock material. Pollutants associated with pre-processing operations could be accidentally released from the project site or discharged during storm events, and enter surface waters or leach into groundwater. Implementation of Mitigation Measures 6.2a and 6.2b would be required to protect water quality.

Digestion

During the digestion process, digestion occurs within tanks that are designed to prevent leakage of feedstock or digestate. Therefore, potential effects on water quality during digestion would be limited to accidental spills or accidental releases of digestate. Accidental spills could occur as a result of digestion equipment malfunction, accidental release of materials from the anaerobic digester, or spills associated with the handling of chemicals used for the digestion process. Without mitigation, such spills or accidental releases could drain into surface waters or infiltrate to groundwater, either directly or during stormwater runoff events, resulting in degradation of surface water or groundwater quality. Implementation of Mitigation Measure 6-2c would be required.

Post-Processing

During post-processing, digestate is dewatered to separate residual solids and liquids. Residual solids are then disposed in a landfill, composted, or used as soil amendment for agriculture or other beneficial use. The liquid fraction of the digestate could potentially be discharged to a municipal sewer system for treatment, treated and then discharged to either surface waters pursuant to an NPDES permit or to percolation or evaporation ponds, or used for crop irrigation or other beneficial use. Therefore, potential effects on water quality depend upon the concentration of pollutants in the liquid and solid fractions of the digestate, and in the eventual end use or disposal method that is employed for digestate handling. The potential effects are reviewed in the following text.

Residual Solids

After digestion, residual solids may contain water quality pollutants. The type and concentration of pollutants in residual solids can vary substantially depending upon the feedstock and the digestion practices. In general, residual solids are expected to contain substantial amounts of organic matter and sediment, as well as significant levels of salt, nutrients, and in some cases, heavy metals, pathogens, and toxic organic and/or inorganic pollutants. Residual solids containing high levels of heavy metals or toxins would be required to be handled as a waste and disposed of in an appropriately managed landfill where they would not have a significant potential to adversely impact surface water or groundwater.

Composting and/or direct land application as soil amendment could be an alternative management option for residual solids. Residual solids used for composting or as a soil amendment could not contain high levels of heavy metals, or other toxins. Composting of residual solids would occur at an appropriately permitted composting facility that has undergone an environmental review, and therefore would not be likely to result in a significant increase in surface or groundwater quality pollution. However, unless properly managed, land application of residual solids and compost could adversely impact the quality of surface water and groundwater. Implementation of Mitigation Measure 6.2e would be required.

Liquid Digestate

The volume and composition of liquid digestate is expected to depend substantially on the characteristics of the anaerobic digester feedstock and, to some degree, on the type of digestion process employed. In general, liquid digestate may contain elevated levels of nutrients (nitrogen and phosphorous compounds), salts (inorganic dissolved solids), microbes (some of which may be pathogenic), heavy metals, and other organic and inorganic constituents associated with the feedstock. Liquid digestate flows having high concentrations of pathogenic microbes, heavy metals, and other toxic compounds could potentially be discharged to a municipal sewer system for further treatment, or be discharged to a lined evaporation pond. Treatment at a municipal wastewater treatment plant could reduce pollutant concentrations to levels consistent with the plant’s discharge permit, and therefore would not result in a significant decrease in water quality.

Discharge to an evaporation pond would result in evaporation of the water fraction of liquid digestate, and would leave behind a slurry or solid fraction, which would include any salts, sediment, heavy metals, and other pollutants that were present in the digestate. The solid fraction would be periodically removed and disposed of in an appropriate landfill or, if appropriate, be incorporated into a soil amendments or compost. Liquid from evaporation ponds could potentially leak and adversely impact groundwater quality. To ensure that evaporation ponds would be adequately lined and groundwater adequately protected during pond operation, implementation of Mitigation Measure 6.2d would be required.

Liquid digestate that does not have substantial concentrations of nutrients, salts, heavy metals, or other pollutants that could degrade groundwater, or that has been treated to remove such constituents, could potentially be discharged to percolation ponds. Disposal of digestate via percolation ponds would require a WDR, which would impose pollutant loading limitations that would generally minimize the potential for groundwater quality pollution associated with the percolation pond. Implementation of Mitigation Measure 6.2d would be required.

Liquid digestate could be discharged to an agricultural field in support of crop production pursuant to a WDR or waiver from the relevant regional board. Liquid digestate that contains high levels of heavy metals, salts, or other pollutants could not be discharged to agricultural land without a WDR order from the appropriate regional board. The WDR order could require that the digestate be treated to reduce such constituents to levels that would not inhibit beneficial use or threaten water quality, Implementation of Mitigation Measure 6.2e would be required. For projects implemented under this Program EIR, where liquid digestate would be land applied, additional project-level review would be required in order to determine the extent of potential water-quality impacts associated with such application.

Discharge of liquid digestate to surface waters can only occur pursuant to an NPDES permit promulgated by a regional board or by the State Water Board. Adherence to the permitting requirements for such a permit would be expected to reduce or minimize the concentration of water quality pollutants discharged to surface waters. Therefore, implementation of Mitigation Measure 6.2f would be required for all projects that would include a discharge to surface water. Additionally, in compliance with state and federal law, for each individual project implemented under this Program EIR that would result in the discharge of digestate to waste disposal facilities including landfills or wastewater treatment plants, the project would be required to comply with landfill and wastewater discharge requirements, including but not limited to relevant waste discharge requirements (WDRs) and total maximum daily loads (TMDLs), as applicable.

Mitigation Measure

Measure 6.2a: During pre-processing, all water that contacts digester feedstock, including stormwater from feedstock handling and storage facilities and water from equipment washdown and feedstock wetting, shall be contained until appropriately disposed or utilized. Best Management Practices (BMPs) may be used to reduce loading of sediment, nutrients, trash, organic matter, and other pollutants. These BMPs may include, but are not limited to, trash grates and filters, oil-water separators, mechanical filters such as sand filters, vegetated swales, engineered wastewater treatment wetlands, settling ponds, and other facilities to reduce the potential loading of pollutants into surface waters or groundwater. All discharges of stormwater are prohibited unless covered under the General Industrial Stormwater Permit, other National Pollutant Discharge Elimination System (NPDES) permit, or are exempted from NPDES permitting requirements. The NPDES permits will generally require implementation of management measures to achieve a performance standard of best available technology economically achievable (BAT) and best conventional pollutant control technology (BCT), as appropriate. The General Industrial Stormwater Permit also requires the development of a storm water pollution prevention plan (SWPPP) and a monitoring plan, in compliance with permit requirements.[3] Other liquid and solid wastes may only be discharged pursuant to an NPDES permit or waste discharge requirement (WDR) order.

Measure 6.2b: In order to minimize the amount of fugitive trash or feedstock released to surface waters, the following measures shall be implemented. When feasible, the project proponent shall preferentially select feedstocks that contain minimal amounts of trash that could become entrained in surface water, either via direct contact with stormwater flows or via other accidental release, such as due to wind. Processing of such feedstocks may, however, be unavoidable, such as in support of an AD facility that processes MSW. Therefore, the project applicant shall ensure that (1) drainage from all feedstock loading, unloading, and storage areas is contained onsite or treated to remove trash and stray feedstock, and sediment

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[3] For more information, please refer to: http://www.swrcb.ca.gov/water_issues/programs/stormwater/industrial.shtml

prior to release as permitted; (2) in all feedstock loading and unloading areas, and all areas where feedstock is moved by front loaders or other uncovered or uncontained transport machinery, the applicant shall ensure that mechanical sweeping and/or equivalent trash control operational procedures are performed at least daily, during operations; and (3) the facility operator shall train all employees involved in feedstock handling so as to discourage, avoid, and minimize the release of feedstock or trash during operations.

Measure 6.2c: In order to minimize water quality degradation associated with accidental spills at AD facilities, the applicant for individual projects that would be implemented under the Program EIR shall require project proponents to complete and adhere to the requirements of a Spill Prevention, Control, and Countermeasure (SPCC) Plan ~~(SPCC)~~, which is based on the federal SPCC rule. Notification of the SPCC Plan shall be provided to the local Certified Unified Program Agency (CUPA). The SPCC Plan shall contain measures to prevent, contain, and otherwise minimize potential spills of pollutants during facility operation, in accordance with ~~federal, state, and local~~U.S. EPA requirements. For individual projects that would utilize wet digestion systems, in which processing and holding tanks would contain the (aqueous) digestion reaction and liquid digestate containing fats and oils, the SPCC Plan shall provide for installation and monitoring of secondary containment and/or leak detection systems to ensure that AD liquids are not accidentally discharged to navigable waters or adjoining shorelines. Monitoring of these systems shall be in accordance with SPCC Plan requirements.

Additionally, the project applicant shall adhere to the requirements and recommendations of WDRs, which would be provided for the project by the applicable regional board. Requirements under WDRs include implementation of measures to minimize water quality degradation, including but not limited to restrictions on the concentration of water quality pollutants discharged from a proposed facility, and maximum acceptable flow volumes for a given facility.

Measure 6.2d: Any proposed discharge to a pond for an individual project would require the project applicant to acquire WDRs from the appropriate regional board. The project applicant shall ensure that all ponds and discharges to such ponds adhere to all requirements under applicable WDRs. The need for pond liners in order to protect groundwater quality would be assessed during the regional board's review of the project, and requirements for pond liners would be included in the WDRs, as warranted. If appropriate, the WDRs would impose requirements for Class II surface impoundments as presented in Title 27 of the California Code of Regulations. Requirements include, but are not limited to, groundwater monitoring, double liner systems with leachate collection, water balance, a preliminary closure plan for clean closure, seismic analysis, and financial assurances. Compliance with WDRs may require the installation of facilities such as tanks and containers to store and process the digestate, the use of filter presses, and implementation of other water quality protection practices.

Measure 6.2e: This measure would reduce potential for the movement of nutrients and other pollutants to groundwater and surface water for individual projects that would employ land application for liquid digestate or residual solids. The operators of individual projects implemented under this Program EIR shall ensure that land application of liquid digestate and/or residual solids adheres to all requirements of applicable WDRs. WDR requirements include but are not limited to, groundwater monitoring, completion of an anti-degradation analysis, and in some cases best practicable treatment and control to achieve salinity reduction in materials prior to discharge to land. WDRs would be issued by the appropriate regional board, and would consider site-specific conditions and waste characteristics, in order to determine applicable control measures and procedures that protect water quality.

Measure 6.2f: This measure would reduce the potential for water quality degradation from projects that include discharge of liquid digestate to surface waters. The applicant for individual projects implemented under this Program EIR shall ensure that the discharge of liquid digestate to surface waters adheres to all NPDES permitting recommendations and requirements, as established by the appropriate regional board. Specific measures may include, but are not limited to, limitations on discharge volumes, seasonal discharge restrictions, limitations on loading rates and/or concentrations of specific constituents, and other facility-specific water quality control measures designed to protect receiving water quality and preserve beneficial uses identified in Basin Plans.

Impact Significance After Mitigation: Less than Significant

> Implementation of the prescribed mitigation would reduce the potential for water quality pollution associated with operation of AD facilities that would be implemented under this Program EIR. Specific measures and regulatory limits would be employed during the permitting process, and adherence to applicable WDRs and other permitting requirements would protect the beneficial uses of waters of the State.

Impact 6.3: AD facilities could be exposed to flooding hazards. (Significant)

Many areas of California are prone to flooding, especially low-lying portions of the Central Valley, the Sacramento-San Joaquin Delta, the Russian River Watershed, low-lying coastal areas without sufficient protection from surf and/or storms, desert washes located in California's desert areas, and additional areas where levees, dams, stormwater containment, and other flood containment infrastructure is not sufficient to protect housing and other facilities. Even areas protected by levees are susceptible to flooding in the event of high-intensity storms of long duration.

The Federal Emergency Management Agency (FEMA) provides information on flood hazard and frequency for cities and counties on its Flood Insurance Rate Maps (FIRMs).[4] FEMA identifies designated zones to indicate flood hazard potential. AD facilities proposed under this project could be located in areas that have been identified as subject to 100-year floods.[5] AD facilities, including feedstock and digestate storage areas, could be damaged if located in flood hazard areas. Workers at these facilities could also be subject to injury or death as a result of flooding hazards. Given the widespread extent of potential flooding hazards in many areas of California, the risk of flooding may not be completely unavoidable. However, protection measures and design requirements can minimize potential impacts. With implementation of Mitigation Measure 6.3, the potential impacts from flooding can be reduced to less-than-significant levels.

Mitigation Measure

> **Measure 6.3:** Individual applicants seeking coverage under this Program EIR shall ensure that, for their proposed AD facilities including pre-processing areas, feedstock storage areas, and digestate handling facilities, are protected from FEMA-defined 100-year flood events. Design measures may include, but are not limited to: facility siting, access placement, grading, elevated foundations, and site protection such as installation of levees or other protective features.
>
> **Impact Significance After Mitigation:** Less than Significant
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> Implementation of the prescribed mitigation would ensure that individual proposed facilities are not located within 100-year floodplains, or are sufficiently protected from 100-year flood events.

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[4] FEMA FIRMs are downloadable at: http://msc.fema.gov

[5] A 100-year floodplain is defined as an area calculated to have a one percent chance of flooding in any given year.

Impact 6.4: Construction of AD facilities could change drainage and flooding patterns (Significant)

Construction of AD facilities would involve operation of heavy equipment, grading, earth moving, stockpiling of spoils, and other activities that would alter existing topographic and drainage features located at sites where facility installation would occur. Compaction of soils by heavy equipment could decrease the infiltration rates for surface sediments, causing increased runoff. This could in turn result in changes to drainage located onsite and, unless properly managed, result in altered or increased flooding onsite and downstream.

Installation and operation of the proposed facilities could also result in removal or realignment of minor drainages located onsite, which in most cases would eventually be tributary to natural waters. In lieu of these existing drainages, engineered swales, retention ponds, discharge channels, stormwater drains and/or other stormwater infrastructure would be installed in order to convey stormwater from AD facilities. Unless designed and managed properly, AD facilities could result in increased ponding or flooding, onsite or downstream.

Asphalt, roofs, sidewalks, concrete surfaces, and other surfaces prevent the natural drainage and infiltration of stormwater through soil. Surface water runoff has a greater volume and rate when the site is paved or otherwise covered by an impervious surface, because surface water infiltration rates are reduced or eliminated compared to undeveloped, unpaved areas. As a result, increases in impervious surfaces result in increased surface runoff volumes and peak flow rates. These can in turn produce considerable changes to downstream hydrology, as compared to pre-development conditions, resulting in increased or exacerbated flooding on site or downstream, such as by exceeding existing or proposed drainage system capacities. These impacts would be potentially significant, and implementation of Mitigation Measure 6.4 would be required.

Mitigation Measure

> **Measure 6.4:** In order to ensure that the AD facilities would not result in detrimental increases in stormwater flow or flooding on site or downstream, the Applicant for each AD facility project shall prepare a comprehensive drainage plan (prior to construction) and implement the plan during construction. The comprehensive drainage plan shall include engineered stormwater retention facility designs, such as retention basins, flood control channels, storm drainage facilities, and other features as needed to ensure that, at a minimum, no net increase in stormwater discharge would occur during a 10-year, 24-hour storm event, as a result of project implementation. Project related increases in stormwater flows shall be assessed based on proposed changes in impervious surface coverage on site, as well as proposed grading and related changes in site topography.
>
> **Impact Significance after Mitigation:** Less than Significant.
>
> The effect of potential changes in drainage and flooding patterns would be minimized on a site-by-site basis by implementation and adherence to a comprehensive drainage plan that would in turn ensure that the AD facilities would minimize potential changes in stormwater discharge rates and minimize onsite flooding.

Impact 6.5: AD facilities could require additional water supplies resulting in depletion of available water supplies ~~groundwater~~. (Less than Significant)

The volume of water required to operate AD facilities, including pre-processing, digestion, and post-processing~~,~~ is expected to vary widely depending upon the anaerobic digester and digester feedstock’s characteristics. Generally speaking, the digestion process is enabled by substantial water content during digestion. The amount of water that would need to be added in order to support digestion activities would, however, vary primarily as a function of the type of feedstock used. For instance, very wet feedstocks, such as liquid food processing wastes, may not require any additional water to support digestion. However, drier feedstocks, such as greenwaste, may require more substantial addition of water to support digestion.

For anaerobic digesters using feedstock that requires the addition of water, the total volume of water required would also be substantially influenced by the capacity of the digester. Larger capacity anaerobic digesters would generally require larger volumes of water for processing, as compared to smaller capacity digesters. Thus a larger anaerobic digester using dry feedstock is expected to have substantially higher water use requirements as compared to a smaller digester using dry or wet feedstocks.

Post-processing of liquid wastes from the anaerobic digester may require water as a diluent prior to reuse or disposal. The volume of water needed for dilution purposes is expected to vary substantially, based on project design, effluent flow rates, and levels of water quality pollutants contained in the effluent.

As discussed in Chapter 3, Project Description, most AD facilities are anticipated to be co-located with permitted solid waste facilities or located in areas zoned for industrial or solid waste handling activities, which would have existing water uses on site. The volume of water required for digester operation is expected to be minor in comparison to the total volume of water required for the indicated waste handling facilities or that should be available in industrial zoned areas. Therefore, it is assumed that digesters implemented under this Program EIR would rely on municipal water supplies, or water available onsite from sources such as wastewater produced onsite, stormwater, high-moisture feedstocks, recycled wastewater, or water made available through increased water use efficiency. ~~Therefore, i~~It is anticipated that AD facilities operated under this Program EIR would not require new or additional water supplies that would be sourced from new or additional direct surface or groundwater withdrawals. In the unlikely event that a digester implemented under this Program EIR would require the use of new or additional direct surface or groundwater withdrawals~~supplies~~, including the installation of new wells or surface diversions, or increases in production of existing wells or surface diversions, the potential effects on groundwater levels or surface water flows must be evaluated separately, under subsequent environmental review.

Additionally, larger projects that would be over 40 acres in area, that would result in the use of water at rates equivalent to or exceeding the volume used by a residential development of 500 units, or that would otherwise trigger regulation under SB 610, would be required to undergo a formal Water Supply Assessment (WSA). The WSA would evaluate proposed water supplies in order to ensure that sufficient water supply is available, during normal, dry, and multiple dry years, to enable the operation of individual AD projects. In the event that identified water supply sources are insufficient for the project, pursuant to SB 610, other sources of water supply would be identified or the individual AD facility would be modified to operate consistent with available water supply. Therefore, compliance with SB 610 for facilities with relatively large water use, as required by state law, would minimize potential for depletion of water supplies, and ~~Therefore,~~ this impact is considered less than significant.

Mitigation: None required.

Impact 6.6: AD facilities could become inundated as a result of seiche, tsunami, or mudflow. (Significant)

Although most areas of California where AD facilities would be installed are not susceptible to seiche, tsunami, or mudflow, installation of facilities in some areas could result in increased risk of inundation as a result of these hazards. Seiche occurs as a result of seismic, mass movement, or other events that cause formation of a standing wave within an enclosed water body, such as a lake, reservoir, or nearly closed embayment. Seiche can potentially result in the formation of surface waves up to several feet in height, which could result in inundation of low-lying areas located near susceptible water bodies. Tsunami are ocean-borne waves that result from seismic movement, often at a distant location. Tsunami can be transmitted across long distances, and can result in inundation of low-lying areas of California, that are in close proximity to the Pacific Ocean and associated inland bays.[6] Mudflows are mass movements of water and sediments that may occur as a result of a geologic event, such as volcanic eruption, or as a result of heavy rain and flooding across extensive areas that have been denuded of vegetation, such as during a forest fire. Mudflows in California are thus rare, but can still potentially occur in some areas, especially those areas having high risk of volcanic activity, and areas having fire-prone, often scrub type vegetation that is located on fine-grained sedimentary formations having high topographic relief. Siting of facilities in these areas could result in potentially significant impacts associated with seiche, tsunami, or mudflow. Implementation of Mitigation Measure 6.6 would be required.

Mitigation Measure

> **Measure 6.6:** To ensure that proposed AD facilities would not incur impacts associated with seiche, tsunami, or mudflow, the applicant for each individual project shall ensure that all facilities are located outside of potential risk areas for seiche, tsunami, and mudflow. In the event that a proposed facility would be sited within a potential risk area for one of these hazards, the facility shall be raised above projected maximum base inundation elevations, or shall be protected from inundation by the installation of berms, levees, or other protective facilities.
>
> **Impact Significance after Mitigation:** Less than Significant.
>
> Implementation of the proposed mitigation would ensure that AD facilities are located outside of areas that would be affected by seiche, tsunami, or mudflow, or would alternatively ensure that proposed AD facilities would be protected from such hazards.

* * *

Impact 6.7: AD facilities could contribute to cumulative impacts to water quality. (Significant)

The geographic scope of potential cumulative water quality impacts includes all of California. As discussed previously, many existing sources of surface water and groundwater have water quality impairment. For example, groundwater in the Tulare Lake Basin has been degraded by salt loading through a combination of natural processes and human activities. Surface waters along the Sacramento

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[6] Statewide tsunami inundation maps can be found here: http://www.conservation.ca.gov/cgs/geologic_hazards/Tsunami/Inundation_Maps/Pages/Statewide_Maps.aspx

River and the Sacramento-San Joaquin Delta have been substantially affected by urban-related point and nonpoint discharges, including wastewater treatment effluents, industrial effluents, urban runoff, and agricultural runoff. Naturally intermittent water courses in metropolitan areas of southern California have become perennial streams, with dry season flows being comprised almost entirely of wastewater treatment effluent and summertime urban runoff.

On a cumulative basis, on-going activities, including waste management and energy production have the potential for additional cumulative degradation of surface water and groundwater. However, the operation of AD facilities, as required by Mitigation Measures 6.2 (a-f), would be prohibited from discharging into surface waters unless covered by a separate NPDES permit with effluent limitations to protect surface water quality. Mitigation Measures 6.2 (a-f) would also provide for protection of water quality associated with discharges of digester wastes to land, evaporation ponds, infiltration ponds, and other facilities, as described previously. Adherence to WDRs and other permit conditions, as required under Mitigation Measures 6.2 (a-f) would help to ensure that discharges from AD facilities would not degrade water quality to the point that beneficial use would be affected. Therefore, the cumulative contribution of AD facilities on water quality is not expected to be cumulatively considerable.

The existing regulatory environment for California, including state and federal antidegradation provisions, as well as resolutions, orders, conditional waivers, end enforcement actions promulgated by the State Water Board and regional boards, impose measures designed to protect water quality. In recent years, a large percentage of existing projects that have caused environmental impact have come under more stringent regulatory requirements, which include measures designed to reduce the impacts to surface waters and groundwater. Regional boards are also implementing various efforts aimed at reducing water quality pollution through basin planning efforts and implementation plans to achieve water quality objectives.

The AD facilities that would be developed under this project have the potential to contribute pollutants to groundwater through waste handling and disposal procedures. An analysis of the range of potential impacts to groundwater has already been presented in this chapter. As discussed under Impact 6.2, potential groundwater impacts will vary from constituent to constituent. For most constituents of concern, the addition of AD facilities with associated mitigation practices will be effective in reducing the pollutant loading that might otherwise occur.

In certain areas in California, the management of salts is critical for achieving water quality goals identified by the regional boards. For instance, salt concentrations in the San Joaquin Valley are highly managed, yet in many areas remain above existing planning goals.

Any increase in salt loading resulting from AD facility operations that could cause degradation or affect beneficial use, as defined under State Water Board Resolution No. 68-16 (see previous discussion of California State Nondegradation Policy), would be required to implement Best Practicable Treatment and Control Technology to prevent water quality degradation, or must be regulated under Title 27 of the California Code of Regulations (CCR) to install liner systems to protect beneficial uses. Measures that could be implemented in order to minimize salt loading may include control of salt loads in incoming feedstock, export of digester effluents or digestate to regional disposal facilities, and/or on-site or off-site treatment options such as vacuum distillation or deionization for liquid effluents.

Specific treatment measures applicable to a specific project site would be identified via required coordination with the applicable regional board. Treatment would ensure that salt loads emanating from the proposed facility are consistent with regional basin planning, as promulgated by the relevant regional board. Adherence to these requirements, along with Mitigation Measures 6.2 (a-f) and 6.3, would be required.

Mitigation Measure

> **Measure 6.7:** Implement Mitigation Measures 6.2 (a-f) and 6.3.
>
> **Impact Significance After Mitigation:** Not Cumulatively Considerable
>
> Implementation of the mitigation measures discussed in impacts 6.2 and 6.3, combined with adherence to the requirements of the California State Nondegradation Policy and CCR Title 27 would reduce the impacts to a less than significant level on an incremental project basis. With implementation of these measures, this impact would not be cumulatively considerable.

6.3 References

California Department of Water Resources (DWR), 2003. California's Groundwater Bulletin 118, Update 2003. Available at http://www.water.ca.gov/groundwater/bulletin118/gwbasin_maps_descriptions.cfm Accessed on October 5, 2010.

CHAPTER 7
Noise

7.1 Environmental Setting

Environmental Noise Fundamentals

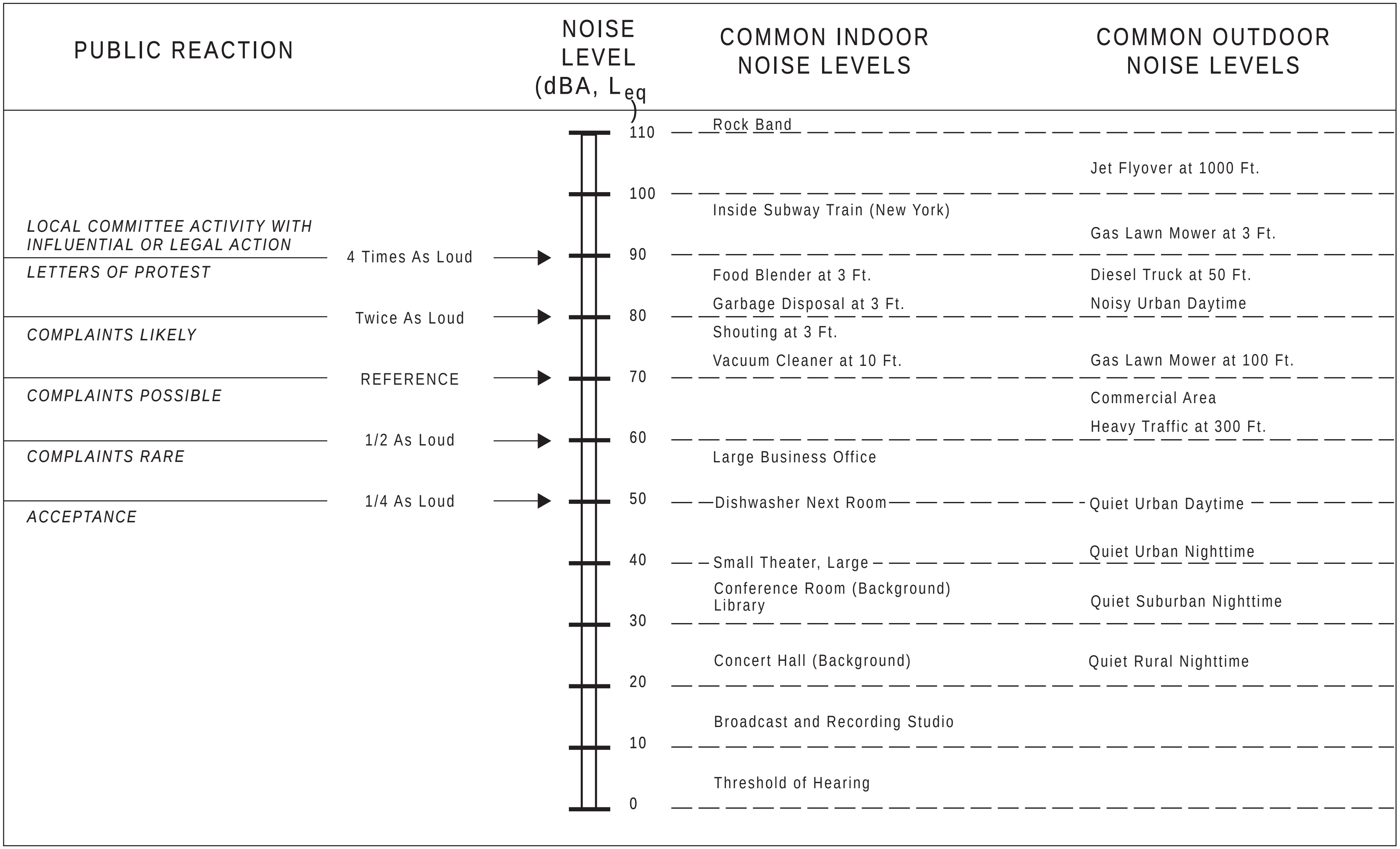
Noise is defined as unwanted sound. Sound, traveling in the form of waves from a source, exerts a sound pressure level (referred to as sound level) which is measured in decibels (dB), with zero dB corresponding roughly to the threshold of human hearing, and 120 to 140 dB corresponding to the threshold of pain. Pressure waves traveling through air exert a force registered by the human ear as sound.

Sound pressure fluctuations can be measured in units of hertz (Hz), which correspond to the frequency of a particular sound. Typically, sound does not consist of a single frequency, but rather a broad band of frequencies varying in levels of magnitude (sound power). When all the audible frequencies of a sound are measured, a sound spectrum is plotted consisting of a range of frequencies spanning 20 to 20,000 Hz. The sound pressure level, therefore, constitutes the additive force exerted by a sound corresponding to the sound frequency/sound power level spectrum.

The typical human ear is not equally sensitive to all frequencies of the audible sound spectrum. As a consequence, when assessing potential noise impacts, sound is measured using an electronic filter that de-emphasizes the frequencies below 1,000 Hz and above 5,000 Hz in a manner corresponding to the human ear's decreased sensitivity to extremely low and extremely high frequencies. This method of frequency weighting is referred to as A-weighting and is expressed in units of A-weighted decibels (dBA). Frequency A-weighting follows an international standard methodology of frequency de-emphasis and is typically applied to community noise measurements. Some representative noise sources and their corresponding A-weighted noise levels are shown in **Figure 7-1**.

Noise Exposure and Community Noise

An individual's noise exposure is a measure of noise over a period of time. A noise level is a measure of noise at a given instant in time. The noise levels presented in **Figure 7-1** are representative of measured noise at a given instant in time, however, they rarely persist consistently over a long period of time. Rather, community noise varies continuously over a period of time with respect to the contributing sound sources of the community noise environment. Community noise is primarily the product of many distant noise sources, which constitute a relatively stable background noise exposure, with the individual contributors unidentifiable.



SOURCE: ESA, 2007

Figure 7-1
Effect of Noise on People

The background noise level changes throughout a typical day, but does so gradually, corresponding with the addition and subtraction of distant noise sources such as traffic and atmospheric conditions. What makes community noise constantly variable throughout a day, besides the slowly changing background noise, is the addition of short duration single event noise sources (e.g., aircraft flyovers, motor vehicles, sirens), which are readily identifiable to the individual.

These successive additions of sound to the community noise environment varies the community noise level from instant to instant requiring the measurement of noise exposure over a period of time to legitimately characterize a community noise environment and evaluate cumulative noise impacts. This time-varying characteristic of environmental noise is described using statistical noise descriptors. The most frequently used noise descriptors are summarized below:

Leq	the equivalent sound level is used to describe noise over a specified period of time, typically one hour, in terms of a single numerical value. The Leq is the constant sound level which would contain the same acoustic energy as the varying sound level, during the same time period (i.e., the average noise exposure level for the given time period).
Lmax	the instantaneous maximum noise level for a specified period of time.
L50	the noise level that is equaled or exceeded 50 percent of the specified time period. The L50 represents the median sound level.
L90	the noise level that is equaled or exceeded 90 percent of the specified time period. The L90 is sometimes used to represent the background sound level.
Ldn	24-hour day and night A-weighted noise exposure level which accounts for the greater sensitivity of most people to nighttime noise by weighting noise levels at night ("penalizing" nighttime noises). Noise between 10:00 PM and 7:00 AM is weighted (penalized) by adding 10 dBA to take into account the greater annoyance of nighttime noises.
CNEL	similar to the Ldn, the Community Noise Equivalent Level (CNEL) adds a 5-dBA penalty during the evening hours between 7:00 PM and 10:00 PM in addition to a 10-dBA penalty between the hours of 10:00 PM and 7:00 AM

As a general rule, in areas where the noise environment is dominated by traffic, the Leq during the peak-hour is generally equivalent to the Ldn at that location (within +/- 2 dBA) (Caltrans, 1998).

Effects of Noise on People

The effects of noise on people can be placed into three categories:

- subjective effects of annoyance, nuisance, dissatisfaction;
- interference with activities such as speech, sleep, learning; and
- physiological effects such as hearing loss or sudden startling.

Environmental noise typically produces effects in the first two categories. Workers in industrial plants can experience noise in the last category. There is no completely satisfactory way to measure the subjective effects of noise, or the corresponding reactions of annoyance and dissatisfaction. A

wide variation in individual thresholds of annoyance exists, and different tolerances to noise tend to develop based on an individual's past experiences with noise.

Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted: the so called "ambient noise" level. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged by those hearing it. With regard to increases in A-weighted noise level, the following relationships occur (Caltrans, 1998):

- except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived;
- outside of the laboratory, a 3 dBA change is considered a just-perceivable difference;
- a change in level of at least 5 dBA is required before any noticeable change in human response would be expected; and
- a 10 dBA change is subjectively heard as approximately a doubling in loudness, and can cause adverse response.

These relationships occur in part because of the logarithmic nature of sound and the decibel system. The human ear perceives sound in a non-linear fashion, hence the decibel scale was developed. Because the decibel scale is based on logarithms, two noise sources do not combine in a simple additive fashion, rather logarithmically. For example, if two identical noise sources produce noise levels of 50 dBA the combined sound level would be 53 dBA, not 100 dBA.

Noise Attenuation

Stationary point sources of noise, including stationary mobile sources such as idling vehicles, attenuate (lessen) at a rate between 6 dBA for hard sites and 7.5 dBA for soft sites for each doubling of distance from the reference measurement. Hard sites are those with a reflective surface between the source and the receiver such as parking lots or smooth bodies of water. No excess ground attenuation is assumed for hard sites and the changes in noise levels with distance (drop-off rate) is simply the geometric spreading of the noise from the source. Soft sites have an absorptive ground surface such as soft dirt, grass or scattered bushes and trees. In addition to geometric spreading, an excess ground attenuation value of 1.5 dBA (per doubling distance) is normally assumed for soft sites. Line sources (such at traffic noise from vehicles) attenuate at a rate between 3 dBA for hard sites and 4.5 dBA for soft sites for each doubling of distance from the reference measurement (Caltrans, 1998).

Sensitive Receptors

Some land uses are considered more sensitive to ambient noise levels than others because of the amount of noise exposure (in terms of both exposure duration and insulation from noise) and the types of activities typically involved. Residences, hotels, schools, rest homes, and hospitals are generally more sensitive to noise than commercial and industrial land uses. The location of anaerobic digester (AD) facilities considered in this Program EIR would be at permitted solid waste facilities and within areas zoned for industrial or solid waste handling activities. However, these areas may be near noise-sensitive land uses, and sensitive receptors could be located along the truck routes leading to the AD facilities.

Existing Noise Environment

The noise near AD facilities would be expected to be typical of solid waste facilities such as Material Recovery Facilities (MRFs) and transfer stations. **Table 7-1** shows reference noise levels near the tipping floor of a large-scale MRF/transfer station in the City of Industry, California. Another important noise source at large scale solid waste facilities is the noise along local access routes from trucks entering and exiting solid waste facilities. As shown in **Figure 7-2** the normal acceptable decibel range in industrial areas (including solid waste facilities) would be up to 75 dBA, CNEL and the conditionally acceptable decibel range would be up to 80 dBA, CNEL.

TABLE 7-1
REFERENCE NOISE LEVELS (DBA) 50 FEET FROM THE ENTRANCE OF TIPPING FLOOR AT THE CITY OF INDUSTRY MRF/TRANSFER STATION

Source	Lmax	L2	L8	L25	L50
Truck Movements*	75	75	75	72	-
Backup Alarm*	85	-	-	-	-
Hydraulic Pumps	73	73	70	-	-
Truck Unloading	75	75	72	-	-
Air Brake*	85	-	-	-	-
Loader	72	72	72	72	69
Conveyor	65	65	65	65	65
Alarms	82	82	79	-	-
Voices	62	62	62	62	62
Sorting	68	68	68	68	65
Sweepers*	83	83	-	-	-
Total Day	**90**	**87**	**82**	**76**	**73**
Total Night	**89**	**84**	**82**	**76**	**73**

Lmax = maximum
L2 = duration of one minute in any hour
L8 = duration of 5 minutes in any hour
L25 = duration of 15 minutes in any hour
L50 = duration of 30 minutes in any hour
The total is the logarithmic sum of all sources in all categories except the Lmax metric.
The total is the highest individual event for the Lmax metric.
The MRF/TS size analyzed for the City of Industry would have a capacity of 8,500 TPD Asterisk denotes use is restricted to between 10:00 am and 7:00 pm.

SOURCE: Gordon Bricken & Associates, 2003

Regulatory Requirements

Federal

Federal regulations establish noise limits for medium and heavy trucks (more than 4.5 tons, gross vehicle weight rating) under 40 Code of Federal Regulations (CFR), Part 205, Subpart B. The federal truck pass-by noise standard is 80 dBA at 15 meters from the vehicle pathway centerline. These controls are implemented through regulatory controls on truck manufacturers. Federal OSHA regulations also protect workers from excessive occupational noise exposure (29 CFR § 1910.95, Code of Federal Regulations).

State

The California Department of Health Services' Office of Noise Control studied the correlation of noise levels and their effects on various land uses and published land use compatibility guidelines for the noise elements of local general plans. The guidelines are the basis for most noise element land use compatibility guidelines in California.

The land use compatibility for community noise environment chart identifies the normally acceptable range for several different land uses, as shown in **Figure 7-2** below. Persons in low-density residential settings are most sensitive to noise intrusion, with noise levels of 60 dBA CNEL and below considered "acceptable". For land uses such as schools, libraries, churches, hospitals, and parks, acceptable noise levels go up to 70 dBA CNEL. Industrial areas (including solid waste facilities) are land uses that can tolerate higher ambient noise level, with conditionally acceptable noise levels being up to 80 dBA CNEL.

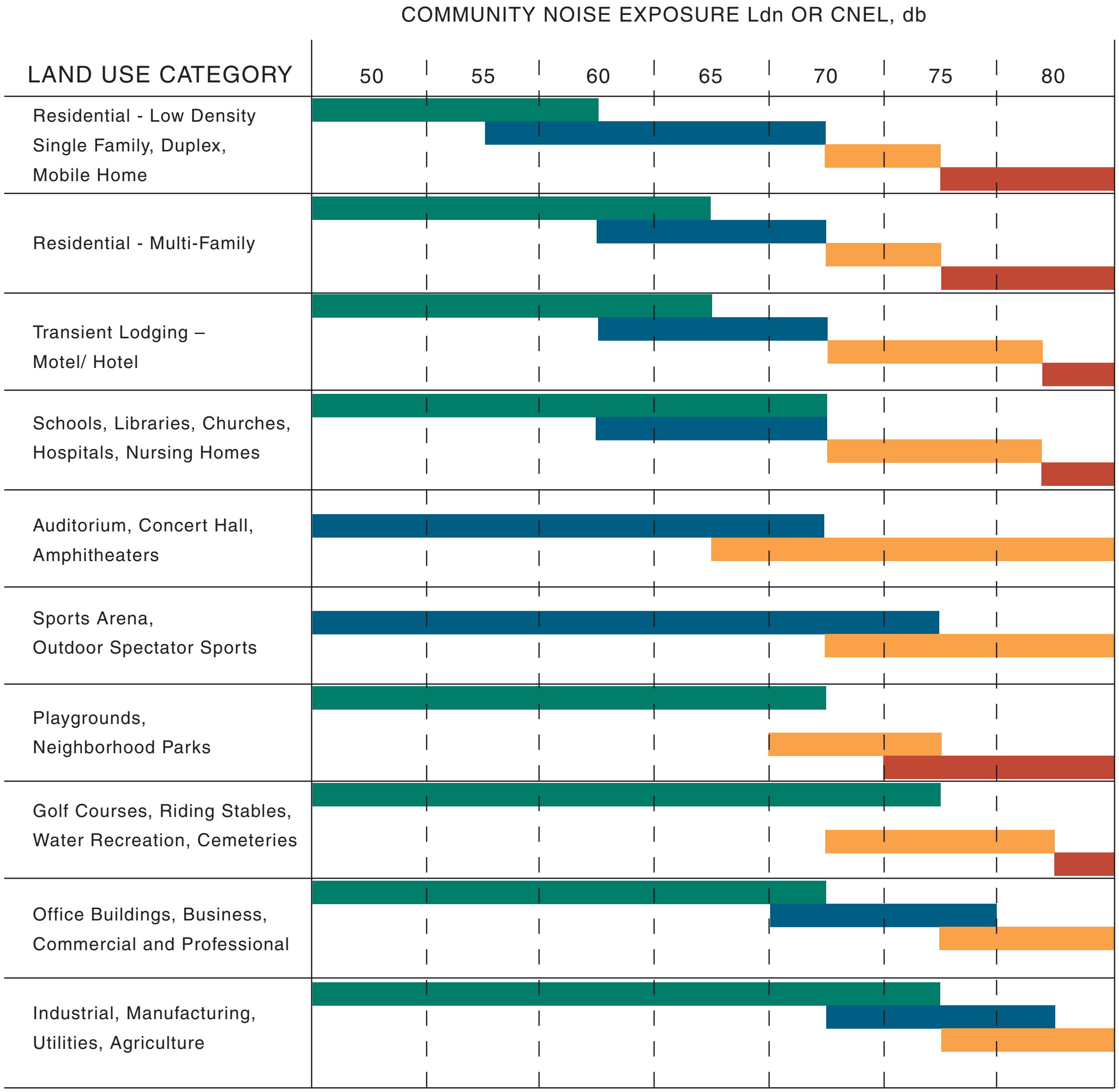
The State of California also establishes noise limits for vehicles licensed to operate on public roads. For heavy trucks, the State pass-by standard is consistent with the federal limit of 80 dB at 15 meters.

The State pass-by standard for light trucks and passenger cars (less than 4.5 tons, gross vehicle rating) is also 80 dBA at 15 meters from the centerline. These standards are implemented through controls on vehicle manufacturers and by legal sanction of vehicle operators by State and local law enforcement officials.

The State has also established noise insulation standards for new multi-family residential units, hotels, and motels that would be subject to relatively high levels of transportation-related noise. These requirements are collectively known as the California Noise Insulation Standards (Title 24, California Code of Regulations). The noise insulation standards set forth an interior standard of DNL 45 dBA in any habitable room. They require an acoustical analysis demonstrating how dwelling units have been designed to meet this interior standard where such units are proposed in areas subject to noise levels greater than DNL 60 dBA. Title 24 standards are typically enforced by local jurisdictions through the building permit application process.

Local Jurisdictions

In California, most cities and counties have noise ordinances serve as enforcement mechanisms for controlling noise. Jurisdictions also have General Plan. Noise Elements that are used as planning guidelines to ensure that long-term noise generated by a source is compatible with adjacent land uses. Both the noise ordinances and General Plan Noise Elements may include limits for industrial areas and limits for sensitive receptor noise levels.



INTERPRETATION

🟩 NORMALLY ACCEPTABLE
Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

🟦 CONDITIONALLY ACCEPTABLE
New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.

🟧 NORMALLY UNACCEPTABLE
New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirement must be made and needed noise insulation features included in the design.

🟥 CLEARLY UNACCEPTABLE
New construction or development should generally not be undertaken.

SOURCE: State of California General Plan Guidelines, Office of Planning and Research, 1998; and ESA, 2010

Figure 7-2
Land Use Compatibility for Community Noise Environment

7.2 Impacts and Mitigation Measures

Approach and Methods

The evaluation was performed in light of applicable regulations and guidelines, and typical construction activities and operations of AD facilities. In determining the level of significance, the analysis assumed that the AD facilities would comply with relevant federal, State, and local ordinances and regulations.

Noise impacts associated with implementation of the project have been evaluated at a program level of detail using standard acoustical modeling techniques that consider typical noise levels from various equipment. Potential noise levels were then compared to typical noise ordinance standards and incompatible noise levels (see Figure 7-2).

Thresholds of Significance

CEQA defines a significant effect on the environment as a substantial, or potentially substantial, adverse change in the physical conditions of the area affected by the project. An impact related to noise would be considered significant if it would result in any of the following, which are adapted from Appendix G of the CEQA *Guidelines*:

- Exposure of persons to or generation of noise levels in excess of standards established in any applicable plan or noise ordinance, or applicable standards of other agencies;
- Exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels;
- A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;
- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above existing levels existing without the project;
- Exposure of people residing or working in the project area to excessive noise levels, for a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport; or
- Expose people residing or working in the project area to excessive noise levels if the project is located in the vicinity of a private airstrip.

Site preparation and construction may result in ground borne vibration associated with earth movement and similar activities. Although these temporary activities may cause perceptible ground borne vibration, such impacts are anticipated to be minimal and limited to the project sites. Operation of the project would not involve any activity that would produce any substantial groundborne noise or vibration. This issue will not be further evaluated in the Program EIR.

Even if AD facilities were near an airport or private airstrip, the noise from the aircraft activities would be unlikely to expose people at the AD facility to excessive noise levels. AD facilities would not be considered sensitive receptors with regard to noise generated by off-site activities. Any potential impact from aircraft noise would be easy to recognize and avoid during the facility siting process. This issue will not be further evaluated in the Program EIR.

Some guidance as to the significance of changes in ambient noise levels is provided by the 1992 findings of the Federal Interagency Committee on Noise (FICON), which assessed the annoyance effects of changes in ambient noise levels resulting from aircraft operations. The recommendations are based upon studies that relate aircraft noise levels to the percentage of persons highly annoyed by the noise. Annoyance is a summary measure of the general adverse reaction of people to noise that generates speech interference, sleep disturbance, or interference with the desire for a tranquil environment. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, it has been asserted that they are applicable to all sources of noise described in terms of cumulative noise exposure metrics such as the Ldn, as shown in **Table 7-2**.

TABLE 7-2
MEASURES OF SUBSTANTIAL INCREASE FOR NOISE EXPOSURE

Ambient Noise Level without Project (Ldn)	Significant Impact Assumed to Occur if the Project Increases Ambient Noise Levels By:
<60 dB	+ 5.0 dB or more
60-65 dB	+ 3.0 dB or more
>65 dB	+ 1.5 dB or more

SOURCE: Federal Interagency Committee on Noise (FICON), 1992.

The rationale for the **Table 7-1** criteria is that the quieter the ambient noise level is, the more the noise can increase (in decibels) before it causes significant annoyance.

Construction Noise

Typically, most jurisdictions in California with Noise Ordinances exempt construction noise when it occurs during daytime hours. Noise impacts from short-term construction activities could exceed noise thresholds and could result in a significant construction impact if short-term construction activity occurred outside of the daytime hours permitted by local noise ordinances.

Stationary Noise

Operational equipment, especially those that run 24-hours a day, the appropriate noise level would be in compliance with local noise ordinances; or 45 dBA at the location of the nearest sensitive receptor. See **Table7-1** above for typical equipment noise levels. Various other grinders may be used for preprocessing and can be expected to have noise levels up to an Lmax of 80 – 90 dBA at a distance of 50 feet.

Traffic Noise

The proposed project would result in a significant traffic noise impact if traffic noise would result in an increase at the location of sensitive receptors beyond levels described in **Table 7-1** above.

Impact 7.1: Construction of AD facilities could temporarily increase noise levels at nearby sensitive receptor locations or result in noise levels in excess of standards in local general plans, noise ordinances, or other applicable standards. (Significant)

Construction of facilities could generate noise at sensitive receptors that exceed local regulations and codes. The construction-related noise levels may be from, but not necessarily limited to, the use of heavy equipment at the AD site or pipeline construction areas, or vehicles transporting material to or from the construction site. Noise levels may fluctuate depending on the distance of the sensitive receptor from the construction activity and the particular type, number, and duration of uses of various pieces of construction equipment. Construction-related material haul trips would raise ambient noise levels along haul routes, depending on the number of haul trips made and types of vehicles used. **Table 7-3** shows typical noise levels during different construction stages and **Table 7-4** shows noise levels produced by various types of construction equipment.

Although construction activities would likely occur during daytime hours, construction noise could still be considered substantially disruptive to residents. However, periods of intensive noise exposure would be temporary, and noise generated by project construction would be partially masked by other background noise such as traffic noise. Note that construction noise often varies significantly on a day-to-day basis, and the noise levels shown in **Table 7-3** represent a worst-case scenario. Such worst-case scenarios would likely exist only for short periods at any particular residence on a given day. During these times, outdoor activities at the affected residences would be negatively affected by noise and indoor activities (typically 20 to 25 dBA quieter than outdoor noise levels) could be negatively affected. These construction noise levels, especially if they were to occur during the nighttime hours, could cause sleep disturbance to nearby residences. Construction noise on typical days off including Sundays and Holidays could also be annoying to nearby residences and therefore this impact would be potentially significant.

TABLE 7-3
TYPICAL NOISE LEVELS FROM CONSTRUCTION ACTIVITIES

Construction Phase	Noise Level[a] (dBA, Leq)
Ground clearing	84
Excavation	89
Foundations	78
Erection	85
Finishing	89

---

a Average noise levels correspond to a distance of 50 feet from the noisiest piece of equipment associated with a given phase of construction and 200 feet from the rest of the equipment associated with that phase.

SOURCE: Bolt, Baranek, and Newman, 1971; Cunniff, 1977.

TABLE 7-4
TYPICAL NOISE LEVELS FROM CONSTRUCTION EQUIPMENT

Construction Equipment	Noise Level[a] (dBA, Leq at 50 Feet)
Dump truck	88
Portable air compressor	81
Concrete mixer (truck)	85
Scraper	88
Jackhammer	88
Dozer	87
Paver	89
Generator	76
Backhoe	85
Rock Drilling	98

---

[a] Average noise levels correspond to a distance of 50 feet from the noisiest piece of equipment associated with a given phase of construction and 200 feet from the rest of the equipment associated with that phase.

SOURCE: Bolt, Baranek, and Newman, 1971; Cunniff, 1977.

Mitigation Measures

Measure 7.1a: Construction activities shall be limited to the hours between 7 a.m. and 7 p.m., Monday through Saturday, or an alternative schedule established by the local jurisdiction, or other limits to construction hours normally enforced by the local jurisdiction (see Measure 7.1d below).

Measure 7.1b: Construction equipment noise shall be minimized by muffling and shielding intakes and exhaust on construction equipment to a level no less effective than the manufacture's specifications, and by shrouding or shielding impact tools.

Measure 7.1c: Construction contractors within 750 feet of sensitive receptors shall locate fixed construction equipment, such as compressors and generators, and construction staging areas as far as possible from nearby sensitive receptors.

Measure 7.1d: Construction contractors shall comply with all local noise ordinances and regulations and other measures deemed necessary by the Lead Agency.

Impact Significance After Mitigation: Less than Significant

Implementation of the mitigation measures listed 7.1a-d would significantly reduce construction-related noise impacts by locating staging areas away from adjacent residences when necessary, and prohibiting construction activities during the most noise-sensitive hours of the day. Implementation of these mitigation measures would reduce this impact to less than significant.

Impact 7.2: Noise from operation of AD facilities could substantially increase ambient noise levels at nearby land uses or result in noise levels in excess of standards in local general plans, local noise ordinances, or other applicable standards. (Significant)

Stationary Noise

Operations of facilities could generate noise at sensitive receptors that exceed local regulations and codes. Operational activities associated with the project that would generate noise include pre-processing, vehicle circulation, and the operation of certain mechanical equipment such as stationary pumps, motors, compressors, fans, generators, and other equipment. Operation of pipelines would not result in any discernible noise. Noise impacts would be limited to inspection of pipelines during daytime hours and would be temporary.

Pre-processing activities include noise generating steps such as sorting and grinding. The amount of pre-processing equipment would differ from facility to facility; furthermore, pre-processing activities could occur prior to delivery to the AD facility, thus eliminating pre-processing noise at these locations. Some equipment such as electrical generators operates 24-hours a day, creating operational noise during night time hours. In areas with local general plans, ordinances, or where other applicable standards are available, they shall apply to project operations. Where regulations are not available, continuous noise levels should not exceed the constant background level (for sites near traffic noise) or 45 decibels at sensitive receptors.

Mitigation Measure

> **Measure 7.2:** AD facilities located within 2,000 feet of a sensitive receptor shall conduct a site specific noise study. If operational sound levels would exceed local regulations, or 45 dBA at a sensitive receptor (if no regulations are available), additional sound-proofing such as enclosures, muffling, shielding, or other attenuation measures shall be installed to meet the required sound level.
>
> **Impact Significance After Mitigation:** Less than Significant
>
> Implementation of the mitigation measures 7.2 would reduce operation-related noise to below local regulations, and would reduce this impact to less than significant.

Impact 7.3: AD facility operational activities associated with transportation would not increase ambient noise levels at nearby land uses. (Less than Significant)

Transportation Noise

It is not anticipated that implementation of the project would result in large numbers of new employees or truck trips. Therefore operational vehicle trip increases would be minimal and would not generate a substantial increase in noise along local roadways. Because of the low number of trips associated with the AD facilities, noise levels on roadways would not be expected to increase by more than 3 dBA. This impact would be less than significant.

Mitigation: None required.

Impact 7.4: Development of AD facilities could result in a cumulative increase in noise levels. (Significant)

Cumulative impacts refer to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts (CEQA Guidelines §15355).

The scope of cumulative construction noise impacts is construction noise from AD facilities, and pipelines combined with construction noise from other projects within the vicinity of the project area. This combination of noise could affect existing ambient noise conditions at or near the construction site. If construction of the project coincides with and affects the same sensitive receptors as construction noise from other projects, this cumulative impact could be significant. Mitigation Measure 7.4 would restrict construction activities to daytime hours for AD facilities, and would reduce the cumulative construction noise impact to less than significant.

The scope of cumulative operational noise impacts is operational noise from AD facilities combined with operational noise from other stationary or mobile sources in the project area. These other sources may contribute considerably to unacceptable ambient noise levels. However, with implementation of Mitigation Measure 7.4, operation of AD facilities would not result in significant increases in operational noise. Therefore, the contribution of noise from AD facilities would not contribute to any cumulative operational noise impact and would be less than significant.

Mitigation Measure

Measure 7.4: Implement Mitigation Measures 7.1a through 7.1d and Measure 7.2.

Impact Significance After Mitigation: Less than Significant

7.3 References

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CHAPTER 8
Public Services and Utilities

8.1 Environmental Setting

The following is a discussion of the impact of the project on public services and utilities. Setting information and impact analysis is provided for relevant issues including water, wastewater, stormwater drainage, solid waste, natural gas, electricity, and fire protection.

Water Supply

Potable water and non-potable water within California are supplied by many purveyors. Public or quasi-public facilities in urban/developed areas typically receive water from a municipal system and may receive reclaimed water if it is available. Public or quasi-public facilities located in urban transition areas may have on-site water facilities such as groundwater wells if water infrastructure from a municipal system has not been extended to the site.

Wastewater

Wastewater service within California may be provided by either a public or private system. Public or quasi-public facilities within urban/developed area are typically connected to a municipal system. Public or quasi-public facilities in urban transition areas may use on-site septic systems for domestic wastewater (such as restroom facilities) if wastewater infrastructure for a municipal system has not been extended to the site.

Stormwater Drainage

Urban/developed areas typically contain linked storm drain systems where stormwater is aggregated and treated by the local jurisdiction. Water quality treatment and flow reduction measures are incorporated into projects as required by local ordinances and the Regional Water Quality Control Board (RWQCB). Rural areas are not typically connected to public storm drain system and incorporate facilities on site in accordance with local ordinances and the RWQCB. These may include vegetated swales, oil/water separators, sediment detention/retention basins, among others.

Solid Waste

According to the California 2008 Statewide Solid Waste Characterization Study, approximately 35 million tons of waste are disposed annually in California landfills (CalRecycle, 2009a). The compostable organic portion comprises approximately 25% (CalRecycle, 2009b). CalRecycle is the State agency which administers programs formerly managed by the State's Integrated Waste Management Board and Division of Recycling. Under its Strategic Directive 6.1, CalRecycle seeks to reduce by 50 percent the amount of organic waste disposed in the state's landfills by 2020.

One technology for reducing organic waste in landfills is anaerobic digester (AD) facilities, for which this Program EIR has been prepared. There are currently no full-scale AD facilities in California devoted to processing the organic portion of municipal solid waste, though they are used in other countries and pilot-scale projects have been developed in California and other parts of the U.S. As discussed more extensively in Section 3.13, the proposed AD facilities shall~~could~~ be regulated under CalRecycle's existing composting or~~and~~ transfer/processing regulations.

Natural Gas

Natural gas service is provided by several providers in California. The largest providers include Pacific Gas and Electric (PG&E), Southern California Gas Company, San Diego Gas and Electric (SDG&E) and Southwest Gas Corporation (CEC, 2008). Most properties in rural areas do not utilize natural gas, as they are not connected to a distribution network, though they may be located in proximity to a larger transmission pipeline. The California Energy Commission (CEC) publishes an updated map of major natural gas transmission pipelines in California on its website (CEC, 2010a).

Electricity

There are several electricity providers in California that serve both urban and rural areas. The largest providers in the State include PG&E, Southern California Edison, Los Angeles Department of Water & Power, SDG&E, and Sacramento Municipal Utility District, though there are many smaller providers (CEC, 2010b). As with natural gas, CEC publishes an update map of major electric transmission facilities.

Fire Protection

Local fire protection services are provided by many agencies within the California, including municipal fire departments, California Department of Forestry and Fire, fire districts, and volunteer departments. Services provided by fire protection services include building inspections during construction, fire suppression, emergency medical response, and hazardous materials response (CSFM, 2010).

Regulatory Requirements

Federal

There are no federal regulations which apply to this discussion.

State

California Composting and Transfer/Processing Regulations

CalRecycle's existing composting and transfer/processing regulations apply to the proposed project. These regulations are discussed in more detail in Section 3.13. CalRecycle's compostable material handling, design and operations regulatory requirements are located at Title 14 California Code of Regulations (CCR) Section 17850 et seq. The transfer/processing regulatory requirements are located at Title 14 CCR Section 17400 et seq.

California Public Utilities Commission

The California Public Utilities Commission (CPUC) primarily regulates the provision of investor owned utilities in California. These utilities include privately owned telecommunications, electric, natural gas, water, railroad, rail transit, and passenger transportation companies. The CPUC is responsible for assuring that California utility customers have safe, reliable utility services at reasonable rates, protecting utility customers from fraud, and promoting the health of California's economy (CPUC, 2010). General Order No. 112-E includes the State rules on Testing, Operation and Maintenance of Gas Gathering, Transmission and Distribution Piping Systems.

Local Jurisdictions

Local agencies that regulate public services and publicly-owned utility systems include county fire departments and fire districts, county water departments and water districts, county environmental health departments for wells and septic systems, and county flood management departments and drainage districts for flood protection and drainage services. Local agencies regulate facilities within their jurisdiction by enforcing State and local laws and ordinances. Local agencies currently adopt and enforce the 2007 California Fire Code (Title 24 California Code of Regulations Part 9; CBSC, 2010). Local jurisdictions also provide goals, objectives and policies related to public services and utilities in the jurisdiction's general plan.

8.2 Impacts and Mitigation Measures

Approach and Methods

This evaluation was performed considering the potential locations (co-located with permitted solid waste facilities or located in areas zoned for industrial or solid waste handling activities), applicable regulations and guidelines and typical construction activities and operations of AD facilities. In determining the level of significance, the analysis assumed that the AD facilities would comply with relevant federal, State, and local laws, regulations, ordinances and guidance.

To assess potential impacts, ESA completed a literature review of documents including feasibility studies and overviews of AD facilities. ESA also consulted with members of the Technical Advisory Group for the EIR including persons currently involved in the permitting or environmental documentation for siting AD facilities.

Thresholds of Significance

An impact related to public services and utilities would be considered significant if it would result in any of the following, which are adapted from Appendix G of the CEQA *Guidelines*:

- Result in substantial adverse physical impacts associated with the provision of, or the need for, new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for fire protection, police protection, schools, parks or other public facilities
- Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board
- Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects
- Require or result in the construction of new storm water drainage facilities, or expansion of existing facilities, the construction of which could cause significant environmental effects
- Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed
- Result in a determination by the wastewater treatment provider that would serve the project that it has adequate capacity to serve the project’s projected demand in addition to the provider’s existing commitments
- Be served by a landfill with sufficient permitted capacity to accommodate the project’s solid waste disposal needs
- Comply with federal, state and local statutes and regulations related to solid waste
- Require or result in the construction of new sources of energy supplies or additional energy infrastructure capacity the construction of which could cause significant environmental effects
- Conflict with applicable energy policies or standards

The discussion of environmental impacts is limited to those potential impacts that could result in some level of potentially significant environmental change, as defined by CEQA Guidelines (§15382). The following issues were evaluated to have less than significant or no impact and will not be discussed further within the EIR for the following reasons:

Police Protection. AD facilities would require law enforcement services to a similar extent as other businesses, such as patrol services and infrequent calls for service; the project does not present unique issues which would create significant demands on law enforcement services.

Schools and Parks. The proposed AD facilities are not anticipated to increase demands for schools or parks as the project is proposed to divert organics from the existing waste stream and not to induce new growth; thus, the project would not increase demands for school or park facilities.

Solid Waste Facilities. The AD process results in mass reduction of solid waste, and thus by using AD facilities, there would be a net decrease in the amount of waste which would normally be sent to landfills or other solid waste facilities. Additionally, while landfill disposal or composting is an option for disposal or reuse of digestate, there are other options including use as a soil amendment and discharge to a wastewater treatment facility which would further reduce demands on solid waste facilities from what they are currently.

Solid Waste Regulations. As discussed in Section 3.13, the proposed AD facilities could be regulated under CalRecycle's existing compostable material handling and transfer/processing regulations and thus no conflict with existing regulations would occur from the project.

Energy Policies or Standards. The project may indirectly facilitate the production of biogas and biomethane within the project area. This would be beneficial in helping to meet the California's Renewable Portfolio Standard. If a facility proposes to inject conditioned biogas into a natural gas pipeline, the developer is required to provide evidence to the purchasing utility that the biogas meets the utilities quality standards. No conflicts with existing energy policy or standards would occur and thus there would be no impact.

This chapter discusses the impacts to water, wastewater treatment and stormwater treatment facilities and utility requirements from a utilities capacity perspective. The anticipated impacts upon surface water quality and groundwater quality from AD facilities are discussed within **Chapter 6**, Hydrology.

Impact Analysis

Impact 8.1: The project ~~w~~could ~~not~~ substantially increase demands on fire protection services. (~~Less than~~ Significant)

Construction and operation of AD facilities would need to adhere to the building code and the fire code adopted by the relevant local jurisdiction. Building and fire inspections would be conducted during construction of AD facilities to ensure code compliance and thereby reduce the risk of fire/explosion hazards associated with new facilities. Hazardous issues associated with biogas production and distribution are addressed in Chapter 11, Hazards and Hazardous Materials.

The project would require similar fire protection services as other businesses. Fire protection services are funded though local impact/mitigation fees and property taxes, to which the project would contribute. The on-site flare periodically required for burning excess gas may be visible at night from off-site areas leading to increased calls to the local fire district/department from concern of a potential fire; however, no physical response would be required. With implementation of Mitigation Measure 11.4a, which addresses development of a Fire Safety Plan in coordination with the local fire enforcement agency, individual~~Because the~~ projects are~~is~~ not likely to require a substantial need for additional response from local fire service providers~~, this impact is considered less than significant~~. However, calls to local fire agencies can be reduced through implementation of Mitigation Measures 10.1b and 10.3c as discussed below.

~~**Mitigation:** None required.~~

Mitigation Measure

Measure 8.1: Implement Mitigation Measures 10.1b, 10.3c, and 11.4a.

~~While no mitigation is required,~~ Mitigation Measures 10.1b and 10.3c recommend the use of berms or landscaping to minimize views of the facility and the enclosure of flares, which would reduce the likelihood of calls from the general public related to the flare. Mitigation Measure 11.4a would ensure coordination with the local fire enforcement agency on a project by project basis. After implementation of these mitigation measures, this would be~~remain~~ a less-than-significant impact.

Impact 8.2: The project could potentially exceed wastewater treatment requirements of the Regional Water Quality Control Board (RWQCB). (Significant)

There are various options for reuse or disposal of the digestate by-product from operation of the proposed facilities. One option is to send a portion or all of the digestate by-product to a wastewater treatment plant via trucks or sewer line. The quality of the digestate is dependent on many factors including feedstocks used, pre-processing methods, and the specific AD technology which is in use. The digestate may require pre-treatment prior to acceptance by a municipal wastewater treatment provider, for example, to reduce biological oxygen demands or remove contaminants, in order for the wastewater treatment facility to meet the treatment/disposal requirements of the RWQCB. For this reason, this is a potentially significant issue for projects proposing to convey digestate to a wastewater treatment provider. It should be noted that AD facilities which do not propose to send digestate by-product to a wastewater treatment plant would have a less-than-significant impact.

Mitigation Measures

Measure 8.2a: Implement Mitigation Measure 8.3b if the operator does not have an existing agreement, such as for co-located facilities.

Measure 8.2b: In addition to an agreement for service, coordination with the wastewater treatment provider would be needed to determine if pre-treatment would be required to meet the RWQCB requirements for the existing wastewater treatment facility.

Impact Significance After Mitigation: Less than Significant

With an agreement for service and coordination regarding the quality of the digestate conveyed to the wastewater treatment facility, this impact would be reduced to a less-than-significant level.

Impact 8.3: The project could result in significant environmental effects from the construction and operation of new water and wastewater treatment facilities or expansion of existing facilities. (Significant)

Development of AD facilities co-located with existing permitted solid waste facilities would not increase water or wastewater treatment demands substantially above those levels already needed for the existing facilities. Potential new sources of water and wastewater treatment demands include the following:

- Water for Feedstock – Due to the high liquid content of organics, it is unlikely that a significant amount of water would be needed for pre-processing or during the AD process. Non-potable or recycled water could also be used, for example from liquid produced after dewatering digestate in the post-processing phase.
- Wastewater Treatment – The digestate (liquid and solid waste) produced from the AD facility would receive anaerobic treatment. Depending on the feedstocks and process used, the digestate may require additional treatment. A facility operator may choose to send digestate to a wastewater treatment plant which would require coordination with the wastewater treatment provider. This impact is assessed separately under Impact 8.2. There are other options for digestate disposal including disposal to agricultural crops or use as a soil amendment, and thus coordination would not be required for all cases.
- Domestic Water and Wastewater Demands for Employee Facilities (such as restrooms) – Due to the limited number of employees, these demands could be satisfied by the facilities needed for existing solid waste facilities and would not likely require additional treatment capacity.
- Water for Fire Suppression – Fire suppression demands could be satisfied by water already needed for the existing facilities.

Thus, for co-located facilities, the demand for new water and wastewater treatment and expansion facilities is anticipated to be less than significant as water and wastewater service is provided to an existing facility on-site, and the project represents a minor increase in demands.

The development of independent AD facilities could require new water and wastewater treatment facilities or connection to a municipal system. Potential new sources of water and wastewater treatment demands include water for feedstock, wastewater treatment for digestate (see Impact 8.2), domestic water/wastewater demands, and water for fire suppression as discussed above for co-located facilities. Private water and wastewater facilities (such as an on-site groundwater wells or septic systems) would need to be evaluated at the project level. It is assumed these types of facilities would be part of a project plan submitted for local site plan review and would be constructed to the standards of the applicable local jurisdiction which would reduce impacts to a less-than-significant level. For service from a municipal system, the developer would need to ensure that service is available with adequate treatment capacity and thus this impact is potentially significant.

Mitigation Measures

> **Measure 8.3a:** If the project proposes to obtain water from a water supplier (municipal system or other public water entity), the developer would enter into an agreement for service with the supplier.

Measure 8.3b: If the project proposes to obtain wastewater service from a wastewater treatment provider (municipal or other public entity), the developer would enter into an agreement for service with the provider.

Measure 8.3c: Alternate water sources, such as non-potable and recycled water, shall be used during the pre-processing and AD process phases where needed and as available.

Impact Significance After Mitigation: Less than Significant

Impact 8.4: The project would not result in significant environmental effects from the construction of new stormwater treatment facilities or expansion of existing facilities. (Less than Significant)

The development of an AD facility would increase impermeable surfaces. On-site water quality treatment and flow control would be needed through development of on-site stormwater treatment facilities or expansion of facilities at a co-located facility. These facilities would be sized based on the individual project and would need to be evaluated further at the project level. Stormwater facilities would be part of the project plans submitted for local site plan review and would be constructed to the standards of the applicable jurisdiction and RWQCB. As this condition must be met, the impact would be less than significant.

Mitigation: None required.

Impact 8.5: The project would not require significant levels of new or expanded water supply resources or entitlements. (Less than Significant)

As discussed in Impact 8.3, there would be little to no increase in water demands for AD facilities co-located with permitted solid waste facilities, and thus these types of facilities would have a less-than-significant effect on expanded water supplies or entitlements.

As discussed in Impact 8.3, development of independent AD facilities could create water demands for dilution of feedstock, domestic water uses and fire suppression. These demands are similar to other businesses which could be established in an industrial area. New or expanded water supply resources or entitlements could be needed for projects without access to a municipal provider which would need to establish a groundwater well. The establishment of a groundwater well would need to be evaluated at the project level. It is assumed these types of facilities would be part of a project plan submitted for local site plan review and would be constructed to the standards of the applicable local jurisdiction which would reduce impacts to a less-than-significant level. However, most facilities would not require establishment of a groundwater well as most industrial properties have or are near a municipal water connection.

Mitigation: None required.

Impact 8.6: The project could result in exceeding the capacity of a wastewater treatment provider. (Significant)

As discussed in Impact 8.3, use of a wastewater treatment provider is an option for digestate disposal in addition to demands from domestic uses (such as restrooms). As the developer would need to ensure that adequate wastewater conveyance and treatment capacity is available, this impact is potentially significant.

Mitigation Measure

> **Measure 8.6:** If the project proposes to obtain wastewater service from a wastewater treatment provider (municipal or other public entity), implement Mitigation Measure 8.3b.
>
> **Impact Significance After Mitigation:** Less than Significant

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Impact 8.7: The project could result in the construction of new energy supplies and could require additional energy infrastructure. (Significant)

The project could facilitate the construction of new energy supplies within the project area through the production of biogas as part of the AD process. The energy created from biogas at AD facilities is considered renewable. As there is currently a demand for renewable energy in California, there is a beneficial effect to providing energy from renewable resources, and it is expected that the biogas from AD facilities would be used as such for this beneficial purpose. It is assumed that projects located in existing facilities or in industrial areas would be in proximity to electricity infrastructure, however accessing additional power on-site or generating electricity to export from the project could require additional energy infrastructure, with potentially significant impacts from construction.

The amount of energy infrastructure needed would be dependent on how the biogas is used. As an energy source, biogas may be used in internal combustion engines to produce electricity, conditioned to biomethane for use in fuel cells or in natural gas vehicles, or conditioned to biomethane for injection into natural gas pipelines. The need for additional infrastructure for each of these uses is described in greater detail below.

Biogas uses that would not require substantial off-site infrastructure improvements include the production of electricity through the combustion of biogas in internal combustion engines and the upgrading of biogas to biomethane for use in fuel cells or in natural gas vehicles. The construction of the facilities for each of these options could have less-than-significant environmental effects.

As described previously, biogas may also be conditioned to biomethane and then injected into existing and future natural gas pipelines. The conditioning of biogas could occur at AD facilities, or it may be collected as raw biogas and conditioned at an off-site facility. After processing, the biomethane would then likely need to be piped (at least short distances) from the facility to natural gas pipelines. Each of these production scenarios would require the construction of new energy infrastructure, such as pipelines, to connect to the existing gas utility network. Likewise, if biogas is converted into electricity on site and sold to a utility provider, then off-site infrastructure, or upgrades to existing off-site electrical distribution infrastructure, may be needed.

The development of new energy infrastructure or expansion of existing energy infrastructure on-site or off-site has the potential to cause significant impacts to biological, cultural, air quality, and/or other environmental resources. Typically, energy infrastructure can be located within existing easements or rights-of-way (i.e., public roads or utility easements). Specific impacts associated with off-site energy improvements would be evaluated at the project level during the local project review process. Mitigation Measure 8.7 would reduce impacts associated with the construction of off-site energy infrastructure improvements to less than significant.

Mitigation Measure

> **Measure 8.7:** Projects requiring off-site energy infrastructure must complete CEQA review for the proposed energy improvements as a separate project. Infrastructure improvements may qualify as a categorical exemption pursuant to CEQA.
>
> **Impact Significance After Mitigation:** Less than Significant

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Impact 8.8: Development of AD facilities would not contribute to cumulative impacts to public services and utilities. (Less than Significant)

AD facilities are anticipated to be dispersed throughout California similar to existing solid waste facilities. As with other types of development, the development of an AD facility may have cumulatively significant impacts when considered with other past, present and future actions in the vicinity of the project as detailed below. Implementation of the applicable mitigation measures above would reduce the project’s contribution to cumulative impacts to a less-than-significant level.

Mitigation: None required.

8.3 References

California Building Standards Commission (CBSC), 2010. California Building and Fire Code, available online at: http://www.bsc.ca.gov/default.htm, accessed June 01, 2010.

California Energy Commission (CEC), 2008. California Natural Gas Detailed Utility Service Areas Map, September 2008, available online at: http://www.energy.ca.gov/maps/gasmap.html, accessed June 01, 2010.

California Energy Commission (CEC), 2010a. California Natural Gas Pipelines Map, January 2010, available online at: http://www.energy.ca.gov/maps/natural_gas.html, accessed October 5, 2010.

California Energy Commission (CEC), 2010b. California Electric Utility Service Areas Map. April 2010, available online at: http://www.energy.ca.gov/maps/maps-pdf/UTILITY_SERVICE_AREAS_DETAIL.PDF, accessed October 5, 2010.

California Public Utilities Commission (CPUC), 2010. *Electricity and Natural Gas Regulation in California*, available online at: http://www.cpuc.ca.gov/PUC/energy/, accessed April 21, 2010.

California State Fire Marshall (CSFM), 2010. Mission and Programs of the State of California Office of the State Fire Marshall, available online at: http://osfm.fire.ca.gov/, accessed June 01, 2010.

CHAPTER 9

Transportation

9.1 Environmental Setting

Regional and Local Roadways

The network of regional and local roadways in areas potentially affected by the project consists of Interstate freeways, state highways, and numerous local roads that are under the jurisdiction of a particular city or county public works department. Local roads provide access to adjacent parcels and also provide a connection between local land uses and major thoroughfares.

Public Transit

Public transit service varies from area to area throughout the state, and while buses might operate in areas potentially affected by the project, the transit service in less built-up areas tends to be less frequent than in urban areas.

Bikeways/Pedestrian Circulation

In built-up areas, bicycle facilities consist of Class I (bicycle paths), Class II (bicycle lanes, striped in roads), and Class III (bicycle routes without striping) bikeways, and pedestrian facilities consist of sidewalks and intersection crosswalks. While rural areas tend to have less of these bicycle and pedestrian facilities, bicyclists often travel on local roads without designated bikeways.

Truck Routes

Cities often develop a truck route plan, which designates truck routes to provide contractors with the preferred travel roadways to and from connecting local roadways. Typically, counties do not develop a similar system of truck routes for unincorporated areas.

Regulatory Requirements

Federal and State

The California Department of Transportation (Caltrans) is responsible for planning, designing, constructing, operating, and maintaining all State-owned roadways. Federal highway standards for interstates are implemented in California by Caltrans. Caltrans' construction practices require temporary traffic control planning "during any time the normal function of a roadway is suspended". In addition, Caltrans has the discretionary authority to issue special permits for the movement of vehicles/loads exceeding statutory limitations on the size, weight, and loading of vehicles contained in Division 15 of the California Vehicle Code. Requests for such special permits require the completion of an application for a Transportation Permit. The California Highway Patrol is notified about transportation of oversize/overweight loads.

State highway weight and load limitations are specified in the California Vehicle Code, Sections 35550 to 35559. The following general provisions would apply to the project:

- The gross weight imposed upon the highway by the wheels on any axle of a vehicle shall not exceed 20,000 pounds, and the gross weight upon any one wheel, or wheels, supporting one end of an axle, and resting upon the roadway, shall not exceed 10,500 pounds.
- The maximum wheel load is the lesser of the following: (a) the load limit established by the tire manufacturer, or (b) a load of 620 pounds per lateral inch of tire width, as determined by the manufacturer's rated tire width.

For vehicles with trailers or semi-trailer, the following provision applies:

- The gross weight imposed upon the highway by the wheels on any one axle of a vehicle shall not exceed 18,000 pounds, and the gross weight upon any one wheel, or wheels, supporting one end of an axle and resting upon the roadway, shall not exceed 9,500 pounds, except that the gross weight imposed upon the highway by the wheels on any front steering axle of a motor vehicle shall not exceed 12,500 pounds, according to California Vehicle Code Sections 35550-35559.

These weight and load limitations for state highways would also apply to county or city roadways if no limitations are specified by the local jurisdiction.

Local Jurisdictions

County and City Land Use Regulations and Ordinances

Local regulations and ordinances vary widely from area to area. Typically, local jurisdictions adopt building, grading, and erosion control ordinances, but no specific ordinances for anaerobic digester (AD) facilities. In addition, local jurisdictions typically require a traffic safety / traffic management plan for any project that includes lane closures, partial road closures, and road closures with detours. An encroachment permit is required for any work to be performed in the roadway right-of-way.

9.2 Impacts and Mitigation Measures

Approach and Methods

This chapter assesses the transportation impacts that could result from the adoption of a comprehensive program to foster the development of AD facilities that process the organic fraction of municipal solid waste and other organic wastes throughout the State of California. As described in Chapter 3, Project Description, the AD Initiative will encourage the establishment of in-vessel digester facilities co-located with permitted solid waste facilities or located in areas zoned for industrial or solid waste handling activities.

Construction and operations of AD facilities would result in increased traffic on roads that provide access to those facility sites. The traffic increases would be greatest for AD facilities developed at new locations, and less when the AD facilities are located at existing solid waste facilities that already receive and handle the mixed solid waste to be used as feedstock for the digester. Due to the geographic scale of the project area and the range of actions that fall within the scope of development of future facilities, this impact analysis was conducted at a programmatic level, and impacts are discussed on a qualitative basis. Assumptions regarding the types of transport and the types of roads used to haul materials were used to assess the overall significance of project impacts. In determining the level of significance, the analysis assumed that the facilities would comply with relevant federal, state, and local ordinances and regulations. It also is assumed that project-level analysis of transportation-related safety hazards (associated with turning movements by large trucks) would be required for site-specific facilities as they are designed and constructed.

Thresholds of Significance

CEQA defines a significant effect on the environment as a substantial, or potentially substantial, adverse change in the physical conditions of the area affected by the project. An impact related to transportation would be considered significant if it would result in any of the following, which are from Appendix G of the CEQA *Guidelines*:

- Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit;
- Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways;
- Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks;
- Substantially increase hazards due to a design feature (e.g. sharp curves or dangerous intersections) or incompatible uses (e.g. farm equipment);
- Result in inadequate emergency access;

- Conflict with adopted policies, plans or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.

Additionally, the Institute of Transportation Engineers recommends the following screening criterion for assessing the effects of development projects that create permanent traffic increases (ITE, 1991):

- In lieu of other locally preferred thresholds, a traffic access/impact study should be conducted whenever a proposed development will generate 100 or more added (new) peak direction trips to or from the site during the adjacent roadway's peak hours or the development's peak hours.

The above criterion is intended to assess the effect of a traffic mix consisting primarily of automobiles and lightweight trucks. To account for the large percentage of heavy trucks associated with the project, the threshold level would reasonably be reduced to 50 new peak-direction trips. Therefore, project-related traffic is considered significant if transporting materials to an off-site location would cause a substantial increase in traffic volumes, defined as the generation of 50 or more trips per hour. Trips using private roads are not counted because that type of travel activity would not affect state, county or other public roadways.

The following discussion of environmental impacts is limited to those potential impacts that could result in some level of potentially significant environmental change, as defined by CEQA. Implementation of the project would not affect air traffic patterns of airports in the project area (bullet 3 above). In addition, implementation of the project would neither directly or indirectly eliminate existing or planned alternative transportation corridors or facilities (e.g., bike paths, lanes, bus turnouts, etc.), include changes in policies or programs that support alternative transportation, nor construct facilities in locations in which future alternative transportation facilities are planned (bullet 6 above). Therefore, no impact would occur under either of these two categories, and these two categories are not discussed further within this section. It is noted, however, that the potential effect of project construction on bus transit service is discussed in Impact 9.1.

Impact Analysis

Impact 9.1: Construction of AD facilities would intermittently and temporarily increase traffic congestion due to vehicle trips generated by construction workers and construction vehicles on area roadways. (Significant)

Although the project being evaluated under this Program EIR does not directly include construction of specific AD facilities, general information about construction is evaluated for facilities that could be developed as a result of the project. The analysis is based on the construction of project facilities as presented in Chapter 3, Project Description. The intensity and nature of the construction activity would vary over the construction period, and the number of vehicle trips generated by that activity would similarly vary. Vehicle trips would be generated primarily by construction workers commuting to and from the AD facility sites, and by trucks hauling materials and equipment to and from the sites.

Construction equipment would be delivered to and removed from each AD facility site in phases for site clearing, grading, excavation and foundation work; structure and building construction; interior, mechanical and electrical work; and finally, for road work, utilities and site finishing / landscaping. Earthwork (cut and fill) is expected to be balanced on-site (i.e., any excavated material cut would be used as fill on-site during the construction process), resulting in no off-hauling of cut or fill material, but that assumption will need to be confirmed during site-specific design of each AD facility.

If biogas at an AD facility is delivered by pipeline offsite, construction activities could include surface preparation, excavation, trench shoring, pipeline installation, trench backfilling, and surface restoration, which may include paving if the pipelines are constructed within roadway rights-of-way. Trenches would be temporarily closed at the end of each work day, by covering with steel trench plates and installing barricades to restrict access to staging areas. Jack and bore drilling may also be required for some areas of pipeline installation.

The primary offsite impacts resulting from the movement of construction trucks would include a short-term and intermittent lessening of roadway capacities due to the slower movements and larger turning radii of the trucks compared to passenger vehicles. Drivers could experience delays if they were traveling behind a heavy truck. The added traffic would be mostly apparent on the minor roadways serving the AD facility sites. Although project-related traffic is unlikely to exceed the threshold of significance of 50 or more trips per hour, project-level analysis of site-specific facilities could determine that addition of project-generated traffic would be considered substantial in relation to traffic flow conditions on local roadways. For this program level analysis, this impact is considered potentially **significant**.

Mitigation Measures

Measure 9.1: The contractor(s) will obtain any necessary road encroachment permits prior to installation of pipelines within the existing roadway right-of-way. As part of the road encroachment permit process, the contractor(s) will submit a traffic safety / traffic management plan (for work in the public right-of-way) to the agencies having jurisdiction over the affected roads. Elements of the plan will likely include, but are not necessarily limited to, the following:

- Develop circulation and detour plans to minimize impacts to local street circulation. Use haul routes minimizing truck traffic on local roadways to the extent possible. Use flaggers and/or signage to guide vehicles through and/or around the construction zone.
- To the extent feasible, and as needed to avoid adverse impacts on traffic flow, schedule truck trips outside of peak morning and evening commute hours.
- Limit lane closures during peak traffic hours to the extent possible. Restore roads and streets to normal operation by covering trenches with steel plates outside of allowed working hours or when work is not in progress.
- Limit, where possible, the pipeline construction work zone to a width that, at a minimum, maintains alternate one-way traffic flow past the construction zone.
- Install traffic control devices as specified in Caltrans' Manual of Traffic Controls for Construction and Maintenance Work Zones where needed to maintain safe

driving conditions. Use flaggers and/or signage to safely direct traffic through construction work zones.

- Coordinate with facility owners or administrators of sensitive land uses such as police and fire stations, hospitals, and schools. Provide advance notification to the facility owner or operator of the timing, location, and duration of construction activities.
- Coordinate with the local public transit providers so that bus routes or bus stops in work zones can be temporarily relocated as the service provider deems necessary.

Impact Significance After Mitigation: Less Than Significant

Implementation of Mitigation Measure 9.1 would lessen the impacts to traffic flow and congestion on area roadways to a less-than-significant level by avoiding as needed truck trips during peak commute hours, minimizing use of local roads by haul trucks, and coordinating with emergency service providers, schools, and transit providers.

Impact 9.2: AD facility operations would not substantially increase on-going (operational) traffic volumes on roadways serving the facilities. (Significant)

The AD facilities would operate 24 hours a day, but most of the digestion process would be automated, and most traffic activities limited to daytime hours. The expectation is that development of AD facilities (new facilities or located at existing solid waste facilities) would generate fewer than 50 vehicle trips (combined trucks and employee) per hour, which is the threshold of significance. For existing facilities, it is reasonable to expect that most of the traffic will already be coming to the facility, reducing the net increase in traffic volumes on area roads compared to AD facilities sited at new locations in areas zoned for industrial or solid waste handling activities. The trips generated by AD facilities would be assessed under subsequent environmental documents as specific facilities are defined and submitted for approval. As part of those assessments, mitigation measures would be identified, as needed, to reduce impacts to a less-than-significant level. For this program level analysis, this impact is considered potentially **significant**, but reliance on the site-specific analysis and identification of facility-required mitigation measures permits a program-level determination of a less-than-significant impact after mitigation.

Mitigation Measures

Measure 9.2: Measures will be imposed by applicable local agencies, as needed, to address site-specific significant traffic impacts identified during subsequent facility-specific analyses, implementation of which would reduce those impacts to a less-than-significant level.

Impact Significance After Mitigation: Less Than Significant

Implementation of Mitigation Measure 9.2 would lessen the impacts to traffic flow and congestion on area roadways to a less-than-significant level by requiring implementation of measures, as needed, to address site-specific significant traffic impacts identified during subsequent facility-specific analyses.

Impact 9.3: AD facilities could potentially cause traffic safety hazards for vehicles, bicyclists, and pedestrians on public roadways, and could increase traffic hazards due to possible road wear or to accidental spills of digestate (liquids and solids). (Significant)

Neither construction nor operation of AD facilities would likely alter the physical configuration of the existing roadway network serving the area, and would likely not introduce unsafe design features, but trucks generated by the project would interact with other vehicles on project area roadways. Creation of a construction work zone on high-volume roadways would potentially create traffic safety hazards where traffic is routed into the travel lane adjacent to the work zone. Potential conflicts could also occur between construction traffic and bicyclists and pedestrians. For this program level analysis, this impact is considered potentially **significant**.

In addition, construction activity along roads as well as heavy truck traffic delivering equipment and materials to AD facilities sites could result in road wear and damage that result in a driving safety hazard. The degree to which this impact would occur depends on the existing roadway design (pavement type and thickness) and existing condition of the road. Freeways, major arterials and collectors are designed to accommodate a mix of vehicle types, including heavy trucks. The project's impacts are expected to be negligible on those roads. However, rural roadways may not have been constructed to support the weight and use of large construction equipment. For this program level analysis, this impact is considered potentially **significant**.

The accidental spill of digestate along project-related access roads could create potential safety hazards for other motorists. Although the probability of accidental spills during the transport of materials is anticipated to be low, the consequences of a spill could be substantial, and this impact is considered potentially **significant**.

Mitigation Measures

> **Measure 9.3a:** Implement Measure 9.1, which stipulates actions required of the contractor(s) to reduce potential traffic safety impacts to a less-than-significant level.
>
> **Measure 9.3b:** Prior to construction, the contractor(s), in cooperation with the agencies having jurisdiction over the affected roadways, will survey and describe the pre-construction roadway conditions on rural roadways and residential streets. Within 30 days after construction is completed, the affected agencies will survey these same roadways and residential streets in order to identify any damage that has occurred. Roads damaged by construction will be repaired to a structural condition equal to the condition that existed prior to construction activity.
>
> **Measure 9.3c:** Prior to initiation of project operations, the project sponsor(s) will submit a Spill Prevention Plan to the appropriate local agency. The Spill Prevention Plan will include, among other provisions, a requirement that each truck driver know how to carry out the emergency measures described in the Spill Prevention Plan (therefore reducing roadway hazards if an accidental spill were to occur).
>
> **Impact Significance After Mitigation:** Less Than Significant

> Implementation of Mitigation Measures 9.1, 9.3b and 9.3c would lessen the impacts to traffic safety on area roadways to a less than significant level by using traffic control devices to safely direct vehicular movements through the construction area, by repairing damage to roadway pavement caused by project-generated heavy trucks, and by requiring submittal of a Spill Prevention Plan, as well as by avoiding as needed truck trips during peak commute hours, minimizing use of local roads by haul trucks, and coordinating with emergency service providers, schools, and transit providers.

Impact 9.4: AD facilities could intermittently and temporarily impede access to local streets or adjacent uses (including access for emergency vehicles), as well as disruption to bicycle/pedestrian access and circulation. (Significant)

Operations of project facilities would have no effect on access to local streets or adjacent uses (including access for emergency vehicles). Nor would bicycle/pedestrian access and circulation be adversely affected by facility operations. The project could, however, result in construction of new pipelines within right-of-way of the public roadways. Such construction activity could result in road restrictions that affect the vehicle travel lanes in order to provide adequate construction work area, and could temporarily block vehicle, bicycle and pedestrian access to local streets or property driveways, including access for emergency vehicles. For this program level analysis, this impact is considered potentially **significant**.

Mitigation Measures

> **Measure 9.4:** Implement Measure 9.1, which stipulates actions required of the contractor(s) to reduce potential access impacts to a less-than-significant level.
>
> **Impact Significance After Mitigation:** Less Than Significant
>
> Implementation of Mitigation Measure 9.1 would lessen the impacts to access to local streets or adjacent uses to a less than significant level by coordinating with emergency service providers, including advance notification of the timing, location, and duration of construction activities.

Impact 9.5: The project could contribute to cumulative impacts to traffic and transportation (traffic congestion, traffic safety, and emergency vehicle access). (Significant)

The geographic scope of potential cumulative traffic impacts includes access routes to regional and local roadways used for haul routes and construction equipment/vehicle access throughout the project area. As described under Impact 9.2, operating the facilities associated with the project is expected to generate less-than-substantial increases in traffic volumes on area roadways for various reasons, including the fact that if an AD facility were already an existing solid waste facility, most of the traffic will already be coming to the facility, reducing the net increase in traffic volumes on area roads. While the less-than-substantial increase in traffic volumes associated with individual AD facilities is reasonable for this program-level analysis, determination of the cumulative impact related to the increase in traffic volumes generated by the total number of AD facilities (of different types and character) is speculative at this time. However, given the dispersion of truck trips over the statewide network of roads, and the fact that the vehicle trips would occur over the course of a day, the expectation is that project-related traffic would not exceed the threshold of significance of 50 or more trips per hour, and the contribution to cumulative traffic conditions would be less than significant. As described under Impact 9.2, there would be assessment of cumulative traffic increases under subsequent environmental documents as specific facilities are defined and submitted for approval. As part of those assessments, mitigation measures would be identified, as needed, to reduce impacts to a less-than-significant level.

However, constructing those facilities, also described above, could result in intermittent and temporary traffic-related impacts in the cumulative context. Traffic impacts include temporary increases in traffic congestion, increased potential for traffic safety hazards, and temporary and intermittent impedances to access.

The project has the potential to contribute to potentially significant cumulative construction-related impacts as a result of (1) cumulative projects (such as land development projects) that generate increased traffic at the same time on the same roads as would the proposed project, causing increased congestion and delays; and (2) infrastructure projects in roads that would be used by project construction workers and trucks, which could affect detour routes around project work zones or could delay project-generated vehicles past the work zones of those other projects.

Implementation of circulation and detour plans, installing traffic control devices, and scheduling (to the extent feasible) truck trips outside of peak morning and evening commute hours (as identified in Mitigation Measures 9.1, 9.3b and 9.3c) would reduce the project's contribution to the cumulative impacts. However, some traffic disruption and increased delays would still occur during project construction, even with mitigation. Given the lack of certainty about the timing (and identification) of development of AD facilities, as well as that for other projects within the AD project's vicinity (specifically projects that would overlap), it is prudent to conclude for this program-level analysis that significant cumulative traffic and circulation impacts could occur.

Mitigation Measures

Measure 9.5a: Prior to construction, the project sponsor will coordinate with the appropriate local government departments, Caltrans, and utility districts and agencies regarding the timing of construction projects that would occur near AD project sites. Specific measures to mitigate potential significant impacts will be determined as part of the interagency coordination, and could include measures such as employing flaggers during key construction periods, designating alternate haul routes, and providing more outreach and community noticing.

Measure 9.5b: Implement Mitigation Measure 9.2.

Measure 9.5c: Implement Mitigation Measures 9.1, 9.3b and 9.3c.

Impact Significance After Mitigation: Less than Significant.

Implementation of Mitigation Measure 9.5 would lessen the cumulative impacts to a less than significant level by coordinating mitigating strategies among the concurrent projects.

9.3 References

Institute of Transportation Engineers (ITE), 1991. *Traffic Access and Impact Studies for Site Development – A Recommended Practice*, 1991.

CHAPTER 10
Aesthetics

10.1 Environmental Setting

Visual Landscape

California contains a number of distinct types of landscapes with varying levels of development. For the purposes of the EIR, the visual environment has been divided into several categories based on typical land uses: urban/developed, urban transition, agricultural, and natural open space.

Urban/Developed – Urban/developed areas are typical for incorporated areas within California. These areas include existing commercial, industrial, public and/or residential uses.

Urban Transition – Urban transition or urban fringe areas are located on the edge of urban development and provide a buffer between urban and agricultural or open space uses. Transitional land uses on the edge of urban fringe areas may include commercial, industrial or public uses compatible with agricultural or open space uses.

Agricultural - Agricultural areas are typified by broad open agricultural fields including dairies, cropland, vineyards, orchards, and grazing land. Typical elements include farm structures and equipment and scattered rural residences.

Natural Open Space - Undeveloped natural areas include expanses of valleys, foothills, mountains, deserts, forests, wetlands, and coastal resources among others which are not utilized for agriculture. Some natural open space areas are designated as federal, state or local parklands or recreation areas.

Scenic Roadways

A highway may be designated scenic under California's Scenic Highway Program depending upon how much of the natural landscape can be seen by travelers, the scenic quality of the landscape, and the extent to which development intrudes upon the traveler's enjoyment of the view. The corridor protection program does not preclude development, but seeks to encourage quality development that does not degrade the scenic value of the corridor. Scenic Highways are identified as either eligible (E) for listing or officially designated (OD). A list of eligible and officially designated routes is available on the California Department of Transportation website (Caltrans, 2010).

Anaerobic Digester (AD) Facilities

Descriptions and photographs of typical wet and dry AD facility components are included within Chapter 3, Project Description.

Sensitive Receptors

Sensitive receptors subject to the potential effects of visual changes resulting from the project include travelers along local roadways and regional highways as well as residents living near new AD facilities. Given the programmatic nature of this analysis, specific locations of potential receptors cannot be identified at this time.

Regulatory Requirements

Federal

There are no federal aesthetic regulations applicable to this program.

State

California Department of Transportation – California Scenic Highways Program

California's Scenic Highway Program, run by Caltrans, was created by the Legislature in 1963. Its purpose is to protect and enhance the natural scenic beauty of California highways and adjacent corridors, through special conservation treatment. The State laws governing the Scenic Highway Program are found in the Streets and Highways Code, §260 through §263. Responsibility for the development of scenic highways, and the establishment and application of specific planning and design standards and procedures falls to State and local agencies.

Local Jurisdictions

California counties and cities have general plan documents which provide guidance and policies related to land use. Some general plans may designate scenic vistas or corridors in addition to those recognized at the state level. Local zoning ordinances establish design guidelines such as minimum setbacks, maximum height requirements, maximum density and/or landscaping requirements.

10.2 Impacts and Mitigation Measures

Approach and Methods

The following program-level evaluation of aesthetic impacts was conducted using available research and consultation with technical professionals who have visited pilot-scale and full-scale AD facilities.

The impact analysis focuses on foreseeable changes to existing conditions attributable to the project. At the program-level site-specific conditions are unknown but it is assumed that most projects would be proposed in urban/developed or urban transition areas or co-located with other solid waste facilities.

The evaluation assumes that individual projects would perform required design review (including review of minimum setbacks, maximum height requirements, maximum density and/or landscaping requirements) although specific requirements are unknown as they vary by jurisdiction. The evaluation also assumes individual projects would comply with applicable ordinances related to lighting (such as night-sky ordinances).

Thresholds of Significance

An impact related to aesthetics would be considered significant if it would result in any of the following, which are adapted from Appendix G of the CEQA *Guidelines*:

- Have a substantial adverse effect on a scenic vista;
- Substantially damage scenic resources, including but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway;
- Substantially degrade the existing visual character or quality of the site and its surroundings; or
- Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

Impact Analysis

Impact 10.1: AD facilities could have adverse effects on a scenic vista and/or scenic resources. (Significant)

If AD facilities are located in an urban/developed, urban transition, or other area with an existing permitted solid waste facility, significant effects to scenic vistas or resources would not be expected due to existing development or planned development on the site and in the vicinity. However, this impact must be evaluated further at the individual project level. At the individual project level, impacts to scenic vistas and resources could occur from construction, pre-processing equipment (grinding, screening, sorting, etc.), buildings and/or structures (digester, administrative facilities), or biogas equipment (gas boosters, fuel cells, flares, IC engines, etc). These activities and facilities could interfere with existing views of scenic vistas or resources and thus this impact is potentially significant.

Mitigation Measures

Measure 10.1a: Avoid siting AD facilities near scenic vistas and corridors designated within an applicable land use plan and the State Scenic Highway Program.

Measure 10.1b: Landscaping and/or vegetated berms should be used to minimize views of facilities from sensitive views.

Impact Significance After Mitigation: Less than Significant

Implementation of these mitigation measures would reduce impacts to scenic vistas and resources to a less-than-significant level.

Impact 10.2: AD facilities could degrade the existing visual character/quality of the site and its surroundings. (Significant)

The visual character of an AD facility would be similar to many large-scale permitted solid waste facilities. Pre-processing and post-processing may be done either on a pad or in a building. The digestion process would occur within a tank (wet processes) or other enclosed facility (dry processes). AD activities and facilities could potentially affect sensitive viewsheds such as residences or views along a scenic corridor. Potential concerns include the following:

- Litter - Any facility receiving solid waste needs to be concerned with the potential for blowing litter. This is particularly true if the facility uses an outdoor or unenclosed tipping area. Outdoor pre-processing equipment (grinding, screening, sorting, etc) can also be a source of blowing litter.
- Piling - Handling and storage of feedstock and digester byproducts can create visibly deteriorated site conditions if outdoor piling occurs.
- Buildings – AD facilities could include administrative buildings or buildings that enclose operations. These buildings have the potential to degrade visual quality based on the height and design of the buildings.
- Cylindrical Tanks (Wet processes) – The tanks that enclose wet digester processes can be large in order to hold substantial processed feedstock. These tanks have the potential to degrade the character of areas without existing facilities of this scale. An extensive literature review shows variations of tanks ranging from 20 feet to 75 feet in height. Tank size is dependent on a number of factors including planned capacity, specific technology, number of tanks and diameter. For example, based on a range of digester technologies it is estimated that an 18,000 ton per year digester would be approximately 25 to 33 feet in height (Remade Scotland, 2003). The Ecoparc Montcada in Barcelona, an example of a large AD facility, has a treatment capacity of 240,000 tons per year (Valorga International, 2011) and includes three digester tanks which are 75 feet in height (Columbia University, 2005).
- Flare - Outdoor processing of biogas could also affect surrounding views. Post-processing facilities would require an outdoor gas booster pump and flare to combust raw biogas; facilities conditioning biogas would still require flare facilities in the event of equipment failure. Effects from flare are specifically addressed in Impact 10.3.

This is a potentially significant impact to the site character that would be reduced through mitigation to less than significant.

Mitigation Measures

Measure 10.2a: Implement Mitigation Measures 10.1a and 10.1b.

Measure 10.2b: Facilities using truck tippers or other un-enclosed unloading should consider using litter fences to manage blowing litter. Facilities should educate haulers delivering materials to the AD facility through literature, web links, or provide training on the acceptance of waste at the facilities to minimize litter. Facility operators should develop a protocol to identify feedstocks that are severely contaminated with potential litter and reject unacceptable loads.

Measure 10.2c: Clean-up crews can be used as necessary to control litter.

Measure 10.2d: Feedstocks and digestate byproducts should be stored in enclosed facilities or processed in a timely manner to prevent visibly deteriorated site conditions.

Measure 10.2e: Project operators should consider enclosure of pre-processing operations if it provides an aesthetic and/or noise attenuating benefit.

Impact Significance After Mitigation: Less than Significant

The implementation of these mitigation measures would reduce impacts to the visual character/quality of the site and surroundings to a less-than-significant level.

Impact 10.3: AD facilities could create a new source of light or glare with adverse affects to daytime and/or nighttime views. (Significant)

Project operations may require the use of portable or permanent outdoor lighting during low light conditions or nighttime for safe operations. This may be a source of concern in light sensitive areas (such as areas near observatories, residences, roads or in rural locations). Additionally, flares from biogas processing may be visible, particularly at night. An example of a flare from an AD facility can be seen below in **Figure 10-1**. This impact is potentially significant.

Mitigation Measures

Measure 10.3a: Implement 10.1b.

Measure 10.3b: Any lighting (portable or permanent) should be hooded and directed onto the project site. This would reduce effects to nighttime skies from uplighting, reduce glare, and prevent light from spilling onto adjoining properties and roads.

Measure 10.3c: Flares may be enclosed to reduce the visibility of flames during operation.

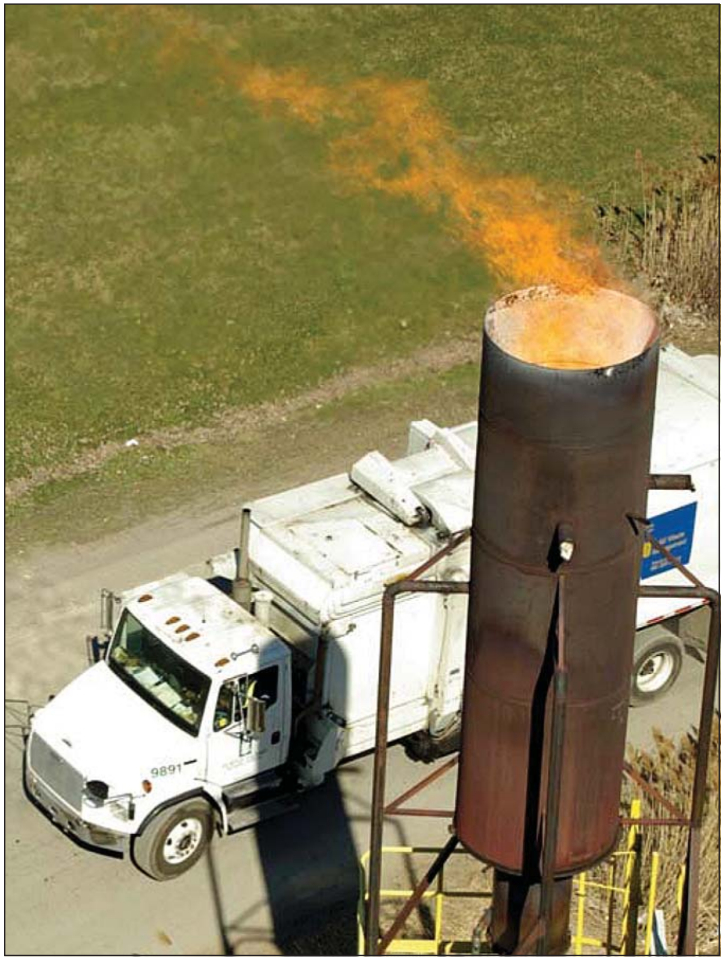
Impact Significance After Mitigation: Less than Significant

The implementation of these mitigation measures would reduce impacts from light and glare to a less-than-significant level.

Impact 10.4: The project could result in cumulative impacts to visual resources. (Significant)

Future development is guided by city and county General Plans, and other applicable planning and environmental documents. New development would be subject to the local jurisdiction’s design review process and lighting regulations if established. While AD facilities would be spread throughout the State, individual projects have the potential to cumulatively impact visual resources at the project-

PHOTOGRAPH 1. Dufferin facility in Toronto, Canada (City of Toronto, 2009).



PHOTOGRAPH 2. Flare at Dufferin facility (City of Toronto, 2009).

SOURCE: ESA, 2010

Figure 10-1
Dufferin Facility Photographs

level when combined with other development in the vicinity of the proposed AD facility. For example, several projects including an AD facility may be proposed in a previously undeveloped area or within a scenic area. While these cumulative impacts have the potential to be significant, incorporation of the mitigation measures in this chapter (10.1a, 10.1b, 10.2a, 10.2b, 10.2c, 10.2d, 10.2e, 10.3a, 10.3b, 10.3c) would reduce the project's contribution to a less-than-significant level.

Mitigation Measures

> **Measure 10.4:** Implement Mitigation Measures 10.1a, 10.1b, 10.2a, 10.2b, 10.2c, 10.2d, 10.2e, 10.3a, 10.3b, and 10.3c.
>
> **Impact Significance After Mitigation:** Less than Significant
>
> The implementation of these mitigation measures would reduce the project's contribution to cumulative aesthetic impacts to a less-than-significant level.

10.3 References

Caltrans, 2010. Eligible (E) And Officially Designated (OD) Routes http://www.dot.ca.gov/hq/LandArch/scenic/cahisys.htm. Last updated May 19, 2008.

California Integrated Waste Management Board, 2008. *Current Anaerobic Digestion Technologies Used for Treatment of Municipal Organic Solid Waste*. March 2008.

City of Toronto, 2009. City of Toronto Case Study in the Anaerobic Digestion of Source Separated Organic Material, Prepared by Brian Van Opstal, Manager, Operational Planning Solid Waste Management Services, City of Toronto, November 17, 2009.

Columbia University, 2005. Solid Waste Management Alternatives for the City of New York. Prepared for the New York City Economic Development Corporation by Columbia University's School of International and Public Affairs and The Earth Institute Master of Public Administration Program in Environmental Science and Policy, Spring 2005, available online at: http://www.columbia.edu/cu/mpaenvironment/pages/projects/EDC%20Submission.pdf, accessed January 7, 2011.

Humboldt Waste Management Authority, 2010. Humboldt Regional Food Waste Digester Project Description. August 4, 2010.

Remade Scotland, 2003. An Introduction to Anaerobic Digestion of Organic Wastes, November 2003, available online at: http://www.remade.org.uk/media/9102/an%20introduction%20to%20anaerobic%20digestion%20nov%202003.pdf, accessed January 7, 2011.

Valorga International, 2011. Valorga International References, Barcelona - Ecoparque II (Spain), available online at: http://www.valorgainternational.fr/en/pag8-OUR-REFERENCES.html, accessed January 7, 2011.

CHAPTER 11

Hazards and Hazardous Materials

11.1 Environmental Setting

For the purposes of this analysis, the term “hazardous materials” refers to both hazardous materials and hazardous wastes. Under federal and State laws, any material, including wastes, may be considered hazardous if it is specifically listed by statute as such or if it is toxic (causes adverse human health effects), ignitable (has the ability to burn), corrosive (causes severe burns or damage to materials), or reactive (causes explosions or generates toxic gases). The term “hazardous material” is defined as any material that, because of quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment.[1]

Potential Presence of Hazardous Materials in Soil and Groundwater

Hazardous materials, including but not limited to pesticides and herbicides, heavy metals, volatile organic compounds, oil and gas, may be present in soil and groundwater in areas where land uses have resulted in leaking fuel or chemical storage tanks or other releases of hazardous materials have occurred. Land uses that typically involve the handling of hazardous materials include commercial or industrial operations, as well as agricultural areas where soils may contain pesticides and herbicides.

Various federal, State, and local regulatory agencies maintain lists of hazardous materials sites where soil and/or groundwater contamination is known or suspected to have occurred, typically as a result of leaking storage tanks or other spills. These facilities are readily identified through regulatory agency database searches, such as the State Water Resources Control Board (SWRCB) GeoTracker online database, the California Environmental Protection Agency (CalEPA) Department of Toxic Substances Control (DTSC) Envirostor online database, and several other federal, State and local regulatory agency databases. **Table 11-1** includes these, and other database references.

For this project, a search of the GeoTracker database was conducted. This database alone identified over 60,000 cleanup sites within the California Regional Water Quality Control Board (RWQCB) regions, as shown in **Table 11-2**. These facilities included hazardous materials cleanup sites, leaking underground storage tank (LUST) cleanup sites, land disposal cleanup sites, and cleanups on military properties.

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[1] State of California, Health and Safety Code, Chapter 6.95, Section 25501(o).

TABLE 11-1
DESCRIPTION OF REGULATORY AGENCY LISTS

Regulatory Agency Database List	Description
National Priorities List (NPL)	Compilation of over 1,200 sites for priority cleanup under the Federal Superfund Program.
Proposed National Priorities List (PNPL)	Sites considered for NPL listing.
Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS)	Contains data on potentially hazardous waste sites that have been reported to the USEPA by California. CERCLIS contains sites which are either proposed to or on the NPL and sites which are in the screening and assessment phase for possible inclusion on the NPL.
CERCLIS No Further Remedial Action Planned (CERC-NFRAP)	CERC-NFRAP are archived sites which indicate an assessment of the site has been completed and that the EPA has determined no further steps will be taken to list the site on NPL.
Resource Conservation and Recovery Act (RCRA) Corrective Action Plan (CORRACTS)	The Resource Conservation and Recovery Act database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste. Identifies hazardous waste handlers with RCRA corrective action activity.
Resource Conservation and Recovery Information System - Treatment, Storage or Disposal Facilities (RCRIS-TSDF)	TSDF's treat, store, or dispose of waste from sites which generate, transport, store, treat and/or dispose of hazardous waste.
RCRA Registered Large and Small Quantity Generators of Hazardous Waste (LQG/SQG)	Registered generators of hazardous waste.
Emergency Response Notification System (ERNS)	The ERNS records and stores information on reported releases of oil and hazardous substances. The source of the ERNS information is from the USEPA.
Formerly Used Defense Sites Properties (FUDS)	Includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.
Cal-Sites	Previously referred to as the Abandoned Sites Program Information System, this list identifies potential hazardous waste sites, which are then screened by the Department of Toxic Substances Control (DTSC) to evaluate the need for further action.
California Hazardous Materials Incident Report System (CHMIRS)	Spills and other incidents gathered from the California Office of Emergency Services.
Hazardous Wastes & Substances Sites List (Cortese)	Historical compilation of sites listed in the LUST, SWF/LF and CALSITES databases. No longer maintained as an active database.
Proposition 65 Records (Notify 65)	This database, maintained by the State Water Resources Control Board (SWRCB), contains facility notifications about any release that could impact drinking water and thereby expose the public to a potential health risk.
Toxic Pits Cleanup Act Sites (Toxic Pits)	Sites suspected of containing hazardous substances that have not yet been cleaned up. Maintained by SWRCB.
Solid Waste Facilities/Landfill Sites (SW/LF)	Solid waste facilities and landfills that are active, inactive or closed.
Waste Management Unit Database (WMUDS/SWAT)	Waste Management Unit Database System (WMUDS) is used by the State Water Resources Control Board staff and the Regional Water Quality Control Boards for program tracking and inventory of waste management units.
Leaking Storage Tanks (LUST)	List of LUSTs compiled by the SWRCB.
Registered Underground Storage Tanks (USTs)	Active UST facilities gathered from the local regulatory agencies.
Facility Inventory Database (CA FID UST)	The Facility Inventory Database (FID) contains a historical listing of active and inactive underground storage tank locations from the State Water Resource Control Board.
Hazardous Substance Storage Container Database (HIST UST)	The Hazardous Substance Storage Container Database is a historical listing of UST sites.

TABLE 11-1
DESCRIPTION OF REGULATORY AGENCY LISTS

Regulatory Agency Database List	Description
Aboveground Storage Tank database (AST)	Registered Aboveground Storage Tanks.
Statewide Environmental Evaluation and Planning System (SWEEPS)	Statewide Environmental Evaluation and Planning System (SWEEPS) is an underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1980's.
Dry Cleaners	A list of drycleaner related facilities that have EPA ID numbers.
California Spills, Leaks, Investigation and Cleanup Cost Recovery Listing (CA SLIC)	This database, maintained by the SWRCB, lists spills, leaks, investigation and cleanup costs from sites.
Haznet	The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000 - 1,000,000 annually, representing approximately 350,000 - 500,000 shipments.
Response	Identifies confirmed release sites where DTSC is involved in remediation, either in a lead or oversight capacity.
Envirostor	EnviroStor database identifies sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites.

SOURCE: EDR 2006.

TABLE 11-2
SWRCB GEOTRACKER LISTED CLEANUP SITES IN CALIFORNIA

ORGANIZATION NAME	Cleanup Program Site	LUST Cleanup Site	Land Disposal Site	Military Cleanup Site	Military Privatized Site	Military UST Site
NORTH COAST RWQCB (REGION 1)	771	2220	159	64	0	52
SAN FRANCISCO BAY RWQCB (REGION 2)	2013	10222	140	295	78	548
CENTRAL COAST RWQCB (REGION 3)	310	1963	77	107	9	311
LOS ANGELES RWQCB (REGION 4)	3334	8417	213	476	0	79
CENTRAL VALLEY RWQCB (REGION 5F)	634	2920	711	60	0	50
CENTRAL VALLEY RWQCB (REGION 5R)	183	887	44	0	0	3
CENTRAL VALLEY RWQCB (REGION 5S)	1465	4515	313	689	54	559
LAHONTAN RWQCB (REGION 6T)	80	429	26	37	0	7
LAHONTAN RWQCB (REGION 6V)	37	564	105	952	0	236
COLORADO RIVER BASIN RWQCB (REGION 7)	53	856	97	135	0	109
SANTA ANA RWQCB (REGION 8)	446	4181	163	170	0	174
SAN DIEGO RWQCB (REGION 9)	2196	3370	146	546	0	704
NO REGIONAL BOARD SPECIFIED	0	1	4	0	0	0
Total	**11522**	**40545**	**2198**	**3531**	**141**	**2832**

SOURCE: State Water Resources Control Board GeoTracker website, 2010

Anaerobic Digester and Biogas Hazards

Anaerobic digesters are confined spaces that pose a potential immediate threat to human life. They are designed to seal out oxygen making death by asphyxiation possible within seconds of entry. Further, gases such as hydrogen sulfide and ammonia accumulate inside a digester. Notably, Cal/OSHA is responsible for developing and enforcing workplace safety standards, including confined space and lockout procedures.

Biogas consists primarily of methane, carbon dioxide, with small amounts of hydrogen sulfide, and ammonia. Typically, biogas is saturated with water vapor and may have trace amounts of hydrogen, nitrogen, oxygen, dust and siloxanes (Greer, 2010). Theoretically, two-stage digester systems could be used to produce biogas richer in hydrogen if isolated after the first stage of the process, and a methane rich biogas after the second stage. Although the hydrogen rich biogas would have potentially greater concentrations of hydrogen than the typical biogas generated through anaerobic digestion, the hydrogen would still be in low concentrations and would not pose a substantial combustion hazard. There are no known commercial systems that are designed to produce hydrogen-rich biogas. However, biogas can be reformulated into hydrogen if fuel cells are used to generate heat and electricity. For the typical anaerobic digestion process, the majority of hydrogen is converted into methane through hydrogenotrophic methanogenesis. Methane is not toxic, but is classified as a simple asphyxiate, possessing a slight inhalation hazard. If breathed in high concentration, oxygen deficiency can result in serious injury or death. Biogas itself is not explosive and will not burn unless oxygen is available at low concentrations. Biogas is explosive when mixed with air in concentrations of 5 to 15 percent. A leak in a gas line can create a fire hazard if an ignition source is present and the concentration of flammable constituents is at a hazardous level, however, in open spaces biogas readily mixes with air reducing its potential to reach flammable concentrations. The risk of fire hazard is generally low because anaerobic digestion (AD) facilities and biogas transmission lines operate with very low pressures, similar to residential natural gas distribution lines. Typical construction standards for AD facilities include redundant fire safety relief valves to prevent over pressurizing, flame arresters, gas detectors and physical barriers to minimize fire and explosion hazards.

Wildfire Hazards

While all of California is subject to some degree of wildfire hazard, there are specific features that make certain areas more hazardous. The California Department of Forestry and Fire Protection (CAL FIRE) is required by law to map areas of significant fire hazards based on fuels, terrain, weather, and other relevant factors (PRC 4201-4204 and Govt. Code 51175-89). Factors that increase an area's susceptibility to fire hazards include slope, vegetation type and condition, and atmospheric conditions. CAL FIRE has created maps of each county that depict the fire hazard severity zoning of the area. These maps can be obtained at:

http://www.fire.ca.gov/fire_prevention/fire_prevention_wildland_zones.php.

These maps identify high fire hazard areas that are subject to regulations designed to minimize fire potential and assist local planning agencies to develop policies and programs for these high risk areas.

Pathogens and Vectors

Pathogens are disease-causing organisms, such as certain bacteria, viruses and parasites. Vectors are organisms, such as flies, mosquitoes, rodents and birds that can spread disease by carrying and transferring pathogens (U.S. EPA, 1994). Vectors can transmit pathogens to humans and other hosts physically through contact or biologically by playing a specific role in the life cycle of the pathogen.

Regulatory Requirements

There are numerous federal, State, and local laws, regulations, ordinances and guidance intended to protect public health and safety and the environment. The U.S. Environmental Protection Agency (U.S. EPA), CalEPA, DTSC, RWQCB, California Air Resources Board (CARB), federal and California Occupational Safety and Health Administration (OSHA), California Department of Resources Recycling and Recovery (CalRecycle), CAL FIRE and the local oversight agencies are the major federal, State, and regional agencies that enforce these regulations. The main focus of OSHA is to prevent work-related injuries and illnesses, including from exposures to hazardous materials. CalRecycle is mandated to reduce waste, promote the management of materials to their highest and best use, and protect public health and safety and the environment (CalRecycle, 2010). CAL FIRE implements fire safety regulations. In accordance with Chapter 6.11 of the California Health and Safety Code (§ 25404, et seq.), local regulatory agencies enforce many federal and state regulatory programs through the Certified Unified Program Agency (CUPA) program, including:

- Hazardous materials business plans (Chapter 6.95 of the Health and Safety Code, §25501 et seq.).
- State Uniform Fire Code requirements (§80.103 of the Uniform Fire Code as adopted by the state fire marshal pursuant to Health and Safety Code §13143.9).
- Underground storage tanks (Chapter 6.7 of the Health and Safety Code, §25280 et seq.).
- Aboveground storage tanks (Health and Safety Code §25270.5[c]).
- Hazardous waste generator requirements (Chapter 6.5 of the Health and Safety Code, §25100 et seq.).

The following is a summary of how hazardous materials and public health and safety are regulated by applicable topic. Within each summary is a discussion of the relevant federal, State and local regulatory structure.

AD Facilities and Operations

CalRecycle regulates AD facilities as either compost facilities or transfer and processing facilities, depending upon whether the feedstock is compostable (CIWMB, 2009). Regulations regarding solid waste facilities and compostable materials handling, operations, and regulatory requirements are established in California Code of Regulations Title 14 and can be obtained at:

> http://www.calrecycle.ca.gov/Laws/Regulations/title14/default.htm.

These regulations are overseen by CalRecycle and its designated local enforcement agencies (LEAs). These regulations include, but are not limited to, the following for compost facility operations: establishes permitting and inspection requirements; prohibits acceptance of hazardous wastes, liquids and sludges; outlines general operating standards; provides for removal of contaminants from compost and feedstock; requires materials handling in a manner that minimizes vectors and prevents unauthorized access by individuals and animals; outlines pathogen reduction and sampling requirements; establishes recordkeeping and facility closure requirements.

Specific regulations that provide LEAs the means to address issues regarding vectors, odor, and other nuisances include the following for composting operations and transfer/processing operations respectively:

1. “All handling activities shall be conducted in a manner that minimizes vectors, odor impacts, litter, hazards, nuisances, and noise impacts; and minimizes human contact with, inhalation, ingestion, and transportation of dust, particulates, and pathogenic organisms” (Composting Operating Standards in CA Title 14, Division 7, Chapter 3.1, Article 6, Section 17867); and,
2. “The operator shall take adequate steps to control or prevent the propagation, harborage and attraction of flies, rodents, or other vectors, and animals, and to minimize bird attraction” (Minimum Standards for Solid Waste Handling and Disposal are in CA Title 14, Division 7, Chapter 3. Article 6.1, Section 17410.4).

LEAs perform routine inspections to certify compliance with permit conditions to ensure that State programs are effectively implemented. CalRecycle can also initiate enforcement actions in addition to, or in lieu of, the LEA.

Soil and Groundwater Contamination

Remediation of contaminated sites is generally performed under the oversight of the local CUPA, or in some instances, the RWQCB and/or DTSC. At sites where contamination is suspected or known to have occurred, the site owner is required to perform a site investigation and perform site remediation, if necessary. Site remediation or development may also be subject to regulation by other agencies. For example, if a project required dewatering near a hazardous waste site, the project sponsor might be required to obtain a permit from the municipal sewer agency before discharging the water to the sewer system, or a National Pollutant Discharge Elimination System (NPDES) permit from the RWQCB before discharging to the storm water collection system.

Worker Safety Requirements

The federal Occupational Safety and Health Administration (Fed-OSHA) and the California Occupational Safety and Health Administration (Cal-OSHA) are the agencies responsible for assuring worker safety in the handling and use of chemicals in the workplace. The federal regulations pertaining to worker safety are contained in Title 29 of the Code of Federal Regulations (CFR), as authorized in the Occupational Safety and Health Act of 1970. They provide standards for safe workplaces and work practices, including standards relating to hazardous materials handling. In California, Cal-OSHA assumes primary responsibility for developing and enforcing workplace safety regulations; Cal-OSHA standards are generally more stringent than federal regulations.

The state regulations concerning the use of hazardous materials in the workplace are included in Title 8 of the California Code of Regulations, which contain requirements for safety training, availability of safety equipment, accident and illness prevention programs, hazardous substance exposure warnings, and emergency action and fire prevention plan preparation. Cal-OSHA also enforces hazard communication program regulations, which contain worker safety training and hazard information requirements, such as procedures for identifying and labeling hazardous substances, communicating hazard information related to hazardous substances and their handling, and preparation of health and safety plans to protect workers and employees.

At sites where hazardous materials are present, workers must receive training in hazardous materials operations and a site health and safety plan must be prepared. The health and safety plan establishes policies and procedures to protect workers and the public from exposure to potential hazards at the site.

Hazardous Materials Business Plans

State and federal laws require detailed planning to ensure that hazardous materials are properly handled, used, stored, and disposed of, and, in the event that such materials are accidentally released, to prevent or to mitigate injury to health or the environment. California’s Hazardous Materials Release Response Plans and Inventory Law, sometimes called the “Business Plan Act,” aims to minimize the potential for accidents involving hazardous materials and to facilitate an appropriate response to possible hazardous materials emergencies. The law requires businesses that use hazardous materials to provide inventories of those materials to designated emergency response agencies, to illustrate on a diagram where the materials are stored on-site, to prepare an emergency response plan, and to train employees to use the materials safely.

Use and Storage of Hazardous Materials

State and federal laws require detailed planning and management to ensure that hazardous materials are properly handled, used, stored, and disposed of, and, in the event that such materials are accidentally released, to reduce risks to human health and the environment. Hazardous waste regulations establish criteria for identifying, packaging, and labeling hazardous wastes; dictate the management of hazardous waste; establish permit requirements for hazardous waste treatment, storage, disposal, and transportation; and identify hazardous wastes that cannot be disposed of in landfills.

State laws governing underground storage tanks (USTs) specify requirements for permitting, monitoring, closure, and cleanup of these facilities. Regulations set forth construction and monitoring standards for existing tanks, release reporting requirements, and closure requirements. In general, the local CUPA has regulatory authority for permitting, inspection, and removal of USTs. Any entity proposing to remove a UST must submit a closure plan to the CUPA prior to tank removal. Upon approval of the UST closure plan, the CUPA would issue a permit, oversee removal of the UST, require additional subsurface sampling if necessary, and issue a site closure letter when the appropriate removal and/or remediation has been completed. USTs are not typically associated with AD facilities; however, these regulations are relevant due to the potential of leaking USTs to affect subsurface conditions at potential project sites.

The Aboveground Petroleum Storage Act of 1990 requires facilities storing petroleum products in a single tank greater than 1,320 gallons, or facilities storing petroleum in aboveground tanks or containers with a cumulative storage capacity of greater than 1,320 gallons to file a storage statement with the State Water Board and prepare a spill prevention, control, and countermeasure plan. The plan must identify appropriate spill containment or equipment for diverting spills from sensitive areas, as well as discuss facility-specific requirements for the storage system, inspections, recordkeeping, security, and personnel training.

Transport of Hazardous Materials

The United States Department of Transportation (DOT) regulates hazardous materials transportation on all interstate roads. Within California, the state agencies with primary responsibility for enforcing federal and State regulations and for responding to transportation emergencies are the CHP and Caltrans. Together, federal and State agencies determine driver-training requirements, load labeling procedures, and container specifications. Although special requirements apply to transporting hazardous materials, requirements for transporting hazardous waste are more stringent, and hazardous waste haulers must be licensed to transport hazardous waste on public roads.

Emergency Response

California has developed an emergency response plan to coordinate emergency services provided by federal, State, and local government and private agencies. Responding to hazardous materials incidents is one part of this plan. The plan is administered by the State Office of Emergency Services (OES), which coordinates the responses of other agencies. The local Emergency Response Team (ERT) coordinates response to hazardous materials emergencies within the project area. ERT members respond and work with local fire and police agencies, emergency medical providers, California Highway Patrol (CHP), California Department of Fish and Game, and California Department of Transportation (Caltrans).

Natural Gas Pipelines

The DOT also provides oversight for the nation’s natural gas pipeline transportation system. Its responsibilities are promulgated under Title 49, United States Code (USC) Chapter 601. The Pipeline and Hazardous Materials Safety Administration (PHMSA), Office of Pipeline Safety (OPS), administers the national regulatory program to ensure the safe transportation of gas and other hazardous materials by pipeline.

The OPS shares portions of this responsibility with State agency partners and others at the federal, State, and local levels. The State of California is certified under 49 USC Subtitle VIII, Chapter 601, §60105. The State has the authority to regulate intrastate natural and other gas pipeline facilities. The California Public Utilities Commission has rules governing design construction, testing, operation, and maintenance of gas gathering, transmission, and distribution piping systems (General Order No. 112-E). The State requirements for designing, constructing, testing, operating, and maintaining gas piping systems are stated in CPUC General Order Number 112. These rules incorporate the federal regulations by reference, but for natural gas pipelines, they do not impose any additional requirements affecting public safety. The federal pipeline regulations are published in Title 49 CFR, Parts 190 through 199.49 CFR 192 specifically addresses natural and other gas pipelines. These regulations include specific standards for material selection and qualification, design requirements, protection from corrosion, worker training, safety and provisions for safety standards specific to the location of the pipeline relative to population densities and sensitive land uses.

Fire Hazards

The California Uniform Fire Code (CCR, Title 24, Part 9) and local building codes establish requirements for the construction and maintenance of structures for fire safety. The National Fire Protection Association (NFPA) develops and publishes consensus codes and standards intended to minimize the possibility and effects of fire and other risks. While not regulations, these codes and standards are industry-accepted guidelines for construction and fire protection systems. NFPA Code 820 establishes the standard for fire protection in waste water treatment and collection facilities, which would be applicable to all AD facilities. Additional relevant codes include a fuel gas code, standard on explosion prevention systems, standards for fire prevention during welding, etc.

The California Public Resources Code (PRC) includes fire safety regulations that restrict the use of equipment that may produce a spark, flame, or fire; require the use of spark arrestors[2] on construction equipment that use an internal combustion engine; specify requirements for the safe use of gasoline-powered tools in fire hazard areas; and specify fire suppression equipment that must be provided onsite for various types of work in fire-prone areas during the time of high fire danger to reduce the risk of wildland fires.

Wildlife-Related Aviation Hazards

Section 503 of the Wendell H. Ford Aviation Investment and Reform Act for the 21st Century (Public Law 106-181) limits the construction or establishment of new municipal solid waste landfill (MSWLF) facilities[3] within 6 statute miles of certain public-use airports, when both the airport and the landfill meet very specific conditions. The Federal Aviation Administration (FAA) Advisory Circular No. 150/5200-34A (FAA, 2006) describes these requirements.

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[2] A spark arrestor is a device that prohibits exhaust gases from an internal combustion engine from passing through the impeller blades where they could cause a spark. A carbon trap is commonly used to retain carbon particles from the exhaust.

[3] Municipal Solid Waste Landfill Facility is defined by the FAA Advisory Circular as “publicly or privately owned discrete area of land or an excavation that receives household waste, and that is not a land application unit, surface impoundment, injection well, or waste pile.”

The U.S. EPA requires any MSWLF operator proposing a new or expanded waste disposal operation within 5 statute miles of a runway end to notify the appropriate FAA Regional Airports Division Office and the airport operator of the proposal (40 CFR 258, Criteria for Municipal Solid Waste Landfills, Section 258.10, Airport Safety). The U.S. EPA also requires owners or operators of new MSWLF units, or lateral expansions of existing MSWLF units, that are located within 10,000 feet of any airport runway end used by turbojet aircraft, or within 5,000 feet of any airport runway end used only by piston-type aircraft, to demonstrate successfully that such units are not hazards to aircraft. When new or expanded MSWLF are being proposed near airports, MSWLF operators must notify the airport operator and the FAA of the proposal as early as possible pursuant to 40 CFR 258.

FAA Advisory Circular No. 150-5200-33B (FAA, 2007) provides guidance regarding hazardous wildlife attractants near airports. Separation distances depend on the type of airport (serving piston vs. turbine powered aircraft) and the proposed land use. Guidance applies to composting operations, transfer stations, other municipal solid waste facilities and associated stormwater detention facilities. Exceptions to separation criteria for waste facilities include off-airport property composting operations and fully-enclosed transfer stations. Off-airport property composting operations that do not accept food waste or other municipal solid waste (green waste only) are permissible at distances no closer than 1,200 feet from the airport operations area. Transfer stations are compatible with safe airport operations provided these facilities (1) are not located on airport property or in the runway protection zone, and (2) meet the FAA's definition of a fully enclosed trash transfer station[4]. Facilities not meeting these requirements are subject to greater separation distances.

Pest Control

Under the State Health and Safety Code, local vector control agencies (often public health departments or mosquito abatement districts) have the authority to conduct surveillance for vectors, prevent the occurrence of vectors, and abate production of vectors. These agencies also have the authority to review, comment, and make recommendations during planning and environmental quality processes, permits, licenses, etc, regarding the potential effects related to vector production of proposed projects. Additionally, agencies have broad authority to enforce abatement of vector sources on public and private property.

11.2 Impacts and Mitigation Measures

Approach and Methods

The evaluation was performed in light of applicable laws, regulations and guidelines, and typical construction activities and operations anticipated for AD facilities. In many cases, compliance with laws, regulations, and mandatory regulatory permits prescribe actions that would reduce the adverse

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[4] "These facilities should not handle or store putrescible waste outside or in a partially enclosed structure accessible to hazardous wildlife. Trash transfer facilities that are open on one or more sides; that store uncovered quantities of municipal solid waste outside, even if only for a short time; that use semi-trailers that leak or have trash clinging to the outside; or that do not control odors by ventilation and filtration systems (odor masking is not acceptable) do not meet the FAA's definition of fully enclosed trash transfer stations" (FAA, 2007).

effects of implementation of future AD facilities. Should potential impacts remain significant or potentially significant under CEQA, even after compliance with legal requirements, mitigation measures are proposed to reduce project impacts to less-than-significant levels.

Thresholds of Significance

CEQA defines a significant effect on the environment as a substantial, or potentially substantial, adverse change in the physical conditions of the area affected by the project. An impact related to hazards and hazardous materials, including fire hazards, would be considered significant if it would result in any of the following, which are adapted from Appendix G of the CEQA *Guidelines*:

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials;
- Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment;
- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one quarter mile of an existing or proposed school;
- Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code §65962.5 and, as a result, would create a significant hazard to the public or the environment;
- Be located within an area covered by an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, and would result in a safety hazard for people residing or working in the project area;
- Be located within the vicinity of a private airstrip and would result in a safety hazard for people residing or working in the project area;
- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan;
- Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands; or,
- Generate vectors (flies, mosquitoes, rodents, etc) to such an extent that the applicable enforcement agency determines that any of the vectors occurs in numbers considerably in excess of those found in the surrounding environment, disseminate widely from the property, and cause harmful effects on the public health of the surrounding population.

Impact 11.1: Construction of AD facilities could result in the potential exposure of construction workers, the public and the environment to preexisting soil and/or groundwater contamination. (Significant)

Construction activities associated with development of projects could involve excavation and trenching to install AD facilities and pipelines. If hazardous materials, such as pesticides or herbicides, VOC or other hazardous materials are present in excavated soil or groundwater, hazardous materials could be released to the environment resulting in exposures to construction workers or the public to potential health risks depending on the nature and extent of any contamination encountered.

Contaminated soil or groundwater could also require disposal as a hazardous waste. This is considered a significant impact.

The greatest potential for encountering contaminated soil and groundwater during project construction would be in areas where past or current land uses have resulted in leaks from fuel or chemical storage tanks or other releases of hazardous materials have occurred. Federal, State and local agencies maintain databases of hazardous materials sites including those listed in **Table 11-1.** As shown in **Table 11-2**, the GeoTracker database identified thousands of hazardous materials sites within California. If sites with soil and/or groundwater contamination are located at or in close proximity to proposed project facilities, hazardous materials could be encountered in the subsurface during excavation and grading activities. Encountering hazardous materials in soil or groundwater during construction could further disperse existing contamination into the environment and expose construction workers or the public to contaminants, potentially resulting in health and safety risks to workers and the public.

Hazardous materials in soil and groundwater, if identified, could be managed appropriately according to applicable laws and regulations to reduce the risks associated with exposures to individuals or releases to the environment. Cal/OSHA regulations require the preparation and implementation of a site health and safety plan to protect workers who could encounter hazardous materials, ensure that construction workers have specialized training and appropriate personal protective equipment. Regulations also require that excavated materials suspected of contamination be segregated, sampled and hauled to a landfill licensed for this type of waste. If groundwater dewatering is required for excavation of subsurface facilities, the groundwater may require treatment prior to discharge, in accordance with regulations.

Mitigation Measure

> **Mitigation Measure 11.1:** Prior to final project design and any earth disturbing activities, the applicant or agency(ies) responsible shall conduct a Phase I Environmental Site Assessment (ESA). The Phase I ESA shall be prepared by a Registered Environmental Assessor (REA) or other qualified professional to assess the potential for contaminated soil or groundwater conditions at the project site; specifically in the area proposed for construction of AD facilities. The Phase I ESA shall include a review of appropriate federal, State and local hazardous materials databases to identify hazardous waste sites at on-site and off-site locations within a one quarter mile radius of the project location. This Phase I ESA shall also include a review of existing and past land uses through aerial photographs, historical records, interviews of owners and/or operators of the property, observations during a reconnaissance site visit, and review of other relevant existing information that could identify the potential existence of contaminated soil or groundwater.
>
> If no contaminated soil or groundwater is identified or if the Phase I ESA does not recommend any further investigation then the project applicant or agency(ies) responsible shall proceed with final project design and construction.
>
> OR
>
> If existing soil or groundwater contamination is identified, and if the Phase I ESA recommends further review, the applicant or agency(ies) responsible shall retain a REA to conduct follow-up sampling to characterize the contamination and to identify any required remediation that

shall be conducted consistent with applicable regulations prior to any earth disturbing activities. The environmental professional shall prepare a report that includes, but is not limited to, activities performed for the assessment, summary of anticipated contaminants and contaminant concentrations at the proposed construction site, and recommendations for appropriate handling of any contaminated materials during construction.

Impact Significance After Mitigation: Less than Significant

Mitigation Measure 11.1 requires preparation of a Phase I ESA to identify the potential for known soil or groundwater contamination on or in the vicinity of proposed construction of AD facilities. If no contamination is identified, then construction can proceed. If contaminated sites are identified that could affect construction, then the applicant shall conduct follow-up sampling to characterize soil and groundwater contamination and would conduct any remediation consistent with applicable laws, regulations, ordinances and guidance. With implementation of Mitigation Measure 11.1, and regulatory compliance, the potential for exposure to hazardous materials during construction activities would be reduced to a less-than-significant level.

Impact 11.2: Transportation, use, disposal or accidental spill of hazardous materials during construction of AD facilities would not result in the potential exposure of construction workers, the public and the environment to hazardous materials. (Less than Significant)

Construction activities would likely require use of limited quantities of hazardous materials such as fuels for construction equipment, oils, and lubricants. The types and quantities of hazardous materials would vary at each proposed AD facility. The improper use, storage, handling, transport or disposal of hazardous materials could result in accidental release of hazardous materials, thereby exposing construction workers, the public and the environment, including soil and/or ground or surface water, to hazardous materials contamination.

As discussed in the Regulatory Setting above, numerous laws and regulations govern the transport, use, storage, handling and disposal of hazardous materials to reduce the potential hazards associated with these activities. Cal/OSHA is responsible for developing and enforcing workplace safety standards, including the handling and use of hazardous materials. Transportation of hazardous materials is regulated by the DOT and Caltrans. Together, federal and State agencies determine driver-training requirements, load labeling procedures, and container specifications designed to minimize the risk of accidental release. Construction activities would also be required to comply with the California fire code to reduce the risk of potential fire hazards. The local fire agency would be responsible for enforcing the provisions of the fire code.

As described in Chapter 6, Hydrology and Water Quality, the federal Clean Water Act prohibits discharges of stormwater from construction projects unless the discharge is in compliance with a National Pollutant Discharge Elimination System (NPDES) permit. The State Water Resources Control Board is the permitting authority in California and has adopted a Statewide General Permit for Stormwater Discharges Associated with Construction Activity (Construction General Permit, Order No. 99-08) that encompasses one or more acres of soil disturbance. Because soil surface disturbance for AD projects would generally be greater than one acre, specific erosion control measures would be identified as part of the NPDES permit and Storm Water Pollution Prevention Plan (SWPPP) required for construction. During construction, erosion control measures would be implemented that utilize Construction Water Quality Best Management Practices (BMPs) to avoid or minimize soil erosion and off-site sediment or hazardous materials transport. Examples of typical construction BMPs include scheduling or limiting activities to certain times of the year; installing sediment barriers such as silt fence and fiber rolls along the perimeter of the construction area; maintaining equipment and vehicles used for construction; developing and implementing a spill prevention and cleanup plan; and construction worker training. The SWPPP (and associated BMPs) would be prepared and implemented prior to commencing construction, and BMP effectiveness would be ensured through the sampling, monitoring, reporting, and record keeping requirements contained in the construction general permit.

Because numerous laws and regulations govern the transport, use, storage, handling and disposal of hazardous materials to reduce the potential hazards associated with these activities, this impact would be less than significant.

Mitigation: None required.

Impact 11.3: Transportation, use, disposal or accidental spill of hazardous materials during the operation and maintenance of AD facilities would not result in potential harmful exposures of the public or the environment to hazardous materials. (~~Less than~~ Significant)

Operation and maintenance of AD facilities would involve the transport, use, storage and disposal of hazardous materials such as fuels, lubricants and hydraulic fluids for vehicles and onsite equipment. The phases of AD operations are discussed below.

Pre-Processing

Pre-processing involves the activities necessary to prepare the feedstocks for delivery into the AD vessel. Pre-processing could include screens, picking lines or mechanical removal of glass and plastic, magnetic separation, eddy current separation, and wet separation. Mixed solid wastes must be sorted prior to delivery to remove any household hazardous wastes, as these materials cannot be accepted. AD facilities would be responsible for load checking of deliveries to ensure that hazardous wastes are not received.

Digestion

As described in the project description, AD processes vary and include both dry digestion and wet digestion. These processes would take place within enclosed tanks or vessels.

Post-Processing

Digestate: Upon completion of the digestion process, the digestate would probably undergo a solids separation process. The water could also be further processed for beneficial uses (recycled) or be routed to a wastewater treatment facility. The dewatered solid digestate could require additional aerobic curing (composting) to ensure stabilization and pathogen reduction. When cured and tested according to regulatory requirements, the digestate or compost produced with the digestate could be suitable for land application. The Waste Discharge Requirements (WDRs) for each permitted facility would set the specific criteria for digestate handling. If the solid digestate does not meet these requirements, it could require disposal at a landfill.

Biogas: The biogas resulting from the AD process could be used for internal combustion or flared. If biogas conditioning is required for use either in a fuel cell or production of liquefied biogas, scrubber facilities would be needed to clean the biogas to remove sulfides. Flushing of the scrubbers would produce sulfide effluent that would require appropriate disposal. Biogas presents an inhalation hazard that, if breathed in high concentration, can result in serious injury or death. Biogas itself is not explosive and will not burn unless oxygen is available at low concentrations.

Handling of hazardous materials and hazardous wastes is covered by federal and State laws that minimize worker safety risks from both physical and chemical hazards in the workplace. Cal/OSHA is responsible for developing and enforcing workplace safety standards, including the handling and use of hazardous materials, including gases. Workers must be trained to understand the hazards and appropriate work procedures associated with confined spaces, flammable gases, etc. Businesses that use hazardous materials are required to submit a Hazardous Materials Business Plan to the local CUPA, which performs inspections to ensure compliance with hazardous materials labeling, training, and storage regulations. For example, hazardous materials must be stored in containers according to the manufacturer’s guidelines and appropriately labeled. The Material Safety Data Sheet for each chemical must be available for review. Employers must inform workers of the hazards associated with the materials they handle and maintain records documenting training. Hazardous wastes must be segregated, sampled and disposed of at appropriately licensed landfill facilities. Transportation of hazardous materials is regulated by the DOT and Caltrans. Together, federal and State agencies determine driver-training requirements, load labeling procedures, and container specifications designed to minimize the risk of accidental release.

Because numerous laws and regulations govern the transport, use, storage, handling and disposal of hazardous materials to reduce the potential hazards associated with these activities, this impact would be less than significant in most cases. However, impacts from toxic air contaminants and water contaminants would be potentially significant without mitigation.

~~**Mitigation:** None required.~~

Mitigation Measure

Mitigation Measure 11.3: Implement Mitigation Measures 5.1a and 6.2a-f.

Impact Significance After Mitigation: Less than Significant

Impact 11.4: Operation of AD facilities could increase the risk of fire hazards due to the potential release of biogas. (Significant)

The proposed program involves the production of biogas generated through AD processes. The biogas would be captured and could be combusted in a flare, used directly in internal combustion engines to produce electricity and heat, or upgraded to biomethane through the removal of hydrogen sulfide, carbon dioxide (CO_2), and moisture. Biomethane could be used in place of natural gas for various processes, including use by utility companies. The biomethane could be transported through pipelines to the end user. As described in the environmental setting, biogas is comprised primarily of methane, which can be flammable. Methane itself is not explosive and will not burn unless oxygen is available at low concentrations. Methane has an ignition temperature of 1,000 degrees Fahrenheit (°F) and is flammable at concentrations between 5 percent and 15 percent in air. Because methane is buoyant at atmospheric temperatures and disperses rapidly in air, unconfined mixtures of methane in air are not explosive. However, a flammable concentration within an enclosed space in the presence of an ignition source can explode, potentially resulting in property damage, injuries, and/or death. Although biogas has the potential to ignite or explode, the risk of fire hazard is generally low because all factors must be present for ignition: a methane concentration between 5 and 15 percent, generally requiring a confining space, and an ignition source. As discussed above, a leak to the atmosphere would disperse into the air rather than ignite or explode. Further, AD facilities and transmission lines operate with very low pressures, similar to residential natural gas distribution lines, which minimizes the potential for reaching flammable concentrations.

Compliance with existing safety regulations and widely-accepted industry standards would minimize the hazard to the public and the environment. With respect to the flaring of biogas and potential fire hazards associated with the storage and transport of methane and small quantities of other materials used in operations, the NFPA has established standards for fire protection which would be applicable to the construction of AD facilities. These standards have been successfully implemented by numerous wastewater treatment facilities across the country. Construction and operation of facilities would comply with the California fire code, local building codes (including requirements for the installation of fire suppression systems), and gas pipeline regulations. The local fire agency would be responsible for enforcing the provisions of the fire code. The OPS and CPUC regulate the safety of gas transmission pipelines. Standard safety features of AD facilities that would minimize the potential for exposure to biogas include leak detection systems, redundant safety relief valves, warning signals, physical barriers and safety flares to reduce excess gas capacity. Additional safety measures would prohibit the use of spark-producing equipment within a designated area surrounding flammable materials, worker safety training, routine inspections and recordkeeping.

Any biogas transmission pipelines would be designed, constructed and operated consistent with State and federal regulations to minimize the risk of rupture and accidental release. As described in the Regulatory Setting, the CPUC has rules governing design construction, testing, operation, and maintenance of gas gathering, transmission, and distribution piping systems. These rules incorporate the federal regulations by reference, but for natural gas pipelines, they do not impose any additional requirements affecting public safety. The federal pipeline regulations include specific standards for material selection and qualification, design requirements, protection from corrosion, worker training, safety and provisions for safety standards specific to the location of the pipeline relative to population densities and sensitive land uses.

The project considers AD facilities located at existing or new solid waste facilities and in areas zoned for industrial or solid waste handling activities. Due to odor and other siting considerations, AD facilities at these locations would not be expected to be adjacent to residential structures. Compliance with existing laws and regulations would reduce the potential for fires and explosions associated with AD facilities; however, in the unlikely event of a fire, it would have the potential to expose nearby people or structures to a significant risk. This impact could be reduced to a less than significant level with implementation of Mitigation Measure 11.4.

Mitigation Measure

> **Mitigation Measure 11.4a:** Prior to project approval, AD facility operators shall prepare and implement a Fire Safety Plan that outlines fire hazards, describes facility operations procedures to prevent ignition of fires, requires regular inspection of fire suppression systems, and provides for worker training in safety procedures as well as protocols for responding to fire incidents. The Fire Safety Plan shall be reviewed and approved by the local fire enforcement agency.
>
> **Mitigation Measure 11.4b**: Implement Mitigation Measure 11.5.
>
> **Impact Significance after Mitigation:** Less than significant.
>
> Implementation of Mitigation Measure 11.4a requires worker training in fire safety procedures, reducing the potential for fire incidents and providing for prompt response in the event of a fire. Mitigation Measure 11.5 restricts locating AD facilities within one quarter mile of sensitive land use, and would reduce the potential for exposure to fire hazards.

Impact 11.5: AD facilities could be located within one quarter mile of a school resulting in potential hazards associated with accidental release of hazardous materials, including biogas. (Less than Significant)

Existing compost facilities, waste transfer facilities and landfills are typically not sited within close proximity to schools. Because AD facilities would most likely be associated with existing facilities, potential AD facilities would be unlikely to be located within one quarter mile of a school. However, as the location of AD facilities and biogas pipelines that could be constructed under this program have not been identified, it is possible that AD facilities could be located within one quarter mile of a school.

As discussed above under Impacts 11.2 and 11.3, small quantities of hazardous materials could be used in the construction and operation AD facilities. Compliance with environmental laws and regulations would reduce the potential for an accidental release of those materials to affect nearby schools. Anaerobic digesters and biogas transmission pipelines would not emit hazardous emissions, such as biogas, under normal operating conditions and biogas transmission pipelines and ancillary facilities would be designed, constructed, operated, and maintained in accordance with State and federal regulations. Although leak detection systems would minimize the potential for substantial biogas releases, any such releases would mix readily in the air and would not present a health risk at nearby properties. As a result potential fire hazards associated with siting AD facilities within one quarter mile of a school would be less than significant.

Although not required, to further reduce the magnitude of this less-than-significant impact, Mitigation Measure 11.5 recommends that AD facilities not be constructed and operated within one quarter mile of existing or proposed schools and other sensitive land uses.

Mitigation Measure

Mitigation Measure 11.5: AD facilities shall be sited at least one quarter mile from existing or proposed schools, daycare facilities, hospitals and other sensitive land uses.

Impact Significance After Mitigation: Less than Significant

Implementation of Mitigation Measure 11.5 would ensure that AD facilities would be located more than one quarter mile from sensitive land uses; therefore, further reducing the potential for exposure to hazardous materials and fire hazards.

Impact 11.6: AD facility operations could generate vectors (flies, mosquitoes, rodents, etc.) exceeding regulatory agency thresholds for the presence of vectors. (Less than Significant)

Incoming food wastes, green wastes and mixed solid wastes would be deposited on a tipping floor for sorting and pre-processing or placed directly in containers. The pre-processing operations of AD facilities could provide an attractive environment for pests such as flies, cockroaches, rodents, etc. These pests could be present in the waste material and transported to the facility or attracted to the facility from the surrounding area. Digestion and post-processing would be largely contained within vessels, diminishing the potential for vector access. Storage or aerobic curing of the digestate may occur outside of enclosed vessels, such as in windrows on adjacent parcels, which could be an attractant to vectors. It is also possible that some AD facilities may have associated stormwater detention ponds or effluent ponds which could provide a fertile mosquito breeding habitat.

Pathogens may be present in incoming waste feedstock and digestate (depending upon the temperature of digestion). Regulations for composting operations, enforced by CalRecycle, require reducing pathogen concentrations in composted material to acceptable levels. These regulations (Title 14, Chapter 3.1, Article 7) outline maximum acceptable pathogen (e.g., fecal coliform and Salmonella sp. Bacteria) concentrations and requirements for pathogen reduction at composting facilities. These requirements establish methods for enclosed vessel, windrow, and static pile composting processes to meet pathogen reduction criteria by maintaining a temperature of 55 degrees Celsius (131 degrees Fahrenheit) for varying durations, as well as sampling and record keeping criteria.

For facilities designated as compost facilities, Title 14, Chapter 3.1, Article 6, Section 17867 stipulates that “all activities shall be conducted in a manner that minimizes vectors, odor impacts, litter, hazards, nuisances and noise impacts…”. If regulated as a transfer processing facility, the AD site would be required to “take adequate steps to control or prevent the propagation, harborage and attraction of flies, rodents, or other vectors, and animals, and to minimize bird attraction” (CA Title 14, Division 7, Chapter 3. Article 6.1, Section 17410.4). These articles give the LEA and CalRecycle broad discretion to ensure that AD facilities do not provide a suitable environment to promote the generation of vectors. In addition, local pest management agencies (i.e., mosquito abatement districts, environmental health departments) have the authority to inspect facilities and enforce compliance with vector control. Vector populations can be kept under control with implementation of best management practices such as enclosing waste storage areas within a building, routine cleaning, insect traps, rodent control services, chemical treatment, and minimizing stagnant waters. With compliance with existing laws and regulations, this impact would be less than significant.

Mitigation: None required.

Impact 11.7: AD facilities could be located within five miles of a public airport or private airstrip and create an aviation hazard. (Significant)

Waste disposal facilities, such as proposed AD operations that include food wastes, can provide wildlife with ideal locations for feeding, loafing, reproduction and escape. Even small facilities can produce substantial attractions for hazardous wildlife. During the past century, wildlife-aircraft strikes have resulted in the loss of hundreds of lives worldwide, as well as billions of dollars in aircraft damage.

AD facilities would include food materials that could result in increased numbers of scavenging birds at the site, thus increasing the risk of bird strikes for aircraft departing or approaching any nearby airports. The FAA Advisory Circular 150/5200-33B recommends minimum separation criteria for various land uses practices that attract wildlife in the vicinity of airports. For all airports, the FAA recommends a distance of 5 statute miles between the farthest edge of the airport’s air operations area and the hazardous wildlife attractant if the attractant could cause hazardous wildlife movement into or across the approach or departure airspace. The FAA discourages the development of waste disposal and other facilities located within 5,000/10,000-feet of airports serving piston-powered and turbine-powered aircraft, respectively. For projects that are located outside the 5,000/10,000-foot criteria but within 5 statute miles of the airport’s air operations area, the FAA may review development plans, proposed land-use changes or operational changes, to determine if such changes present potential wildlife hazards to aircraft operations and if further investigation is warranted.

The U.S. EPA requires any Municipal Solid Waste Landfill (MSWLF) operator proposing a new or expanded waste disposal operation within 5 statute miles of a runway end to notify the appropriate FAA Regional Airports Division Office and the airport operator of the proposal. The U.S. EPA also requires owners or operators of new MSWLF units, or lateral expansions of existing MSWLF units, that are located within 10,000 feet of any airport runway end used by turbojet aircraft, or within 5,000 feet of any airport runway end used only by piston-type aircraft, to demonstrate successfully that such units are not hazards to aircraft.

Proposed AD facilities would not be subject to the same regulations as MSWLFs; however AD facility operations could create a hazardous wildlife attractant and a potential safety hazard to aviation if located within 5 miles of an airport.

As identified in Impact 11.6, for facilities designated as compost facilities, Title 14, Chapter 3.1, Article 6, Section 17867 stipulates that “all activities shall be conducted in a manner that minimizes vectors, odor impacts, litter, hazards, nuisances and noise impacts…”. If regulated as a transfer processing facility, the AD site would be required to “take adequate steps to control or prevent the propagation, harborage and attraction of flies, rodents, or other vectors, and animals, and to minimize bird attraction” (CA Title 14, Division 7, Chapter 3. Article 6.1, Section 17410.4). These articles give the LEA and CalRecycle broad discretion to ensure that AD facilities minimize bird attraction.

This potential impact would be significant, but could be reduced to a less-than-significant level with implementation of Mitigation Measure 11.7.

Mitigation Measures

> **Mitigation Measure 11.7:** For any AD facility proposed within 5 statute miles of an airport's air operations area, the operator will notify the Federal Aviation Administration (FAA) Regional Airports Division office and the airport operator of the proposed facility as early in the process as possible. ~~Such~~ AD facilities with any open air (outdoor) activities must receive an FAA Determination of No Hazard prior to project approval.
>
> **Significance after Mitigation:** With FAA review and approval of proposed AD facility operations, the potential hazard to aviation safety from wildlife would be less than significant.

Impact 11.8: Development of AD facilities could contribute to cumulative impacts related to hazardous materials. (Less than Significant)

The context for potential cumulative hazards and hazardous materials impacts is projects that could result in an increased risk of exposure due to a release of hazardous materials in the project area. The potential for cumulative projects to result in a release resulting in an increased risk of exposure and the project's contribution would be limited. Exposure to existing soil and groundwater contamination is generally site-specific and depends on past, present, and future uses and existing soil, sediment, and groundwater conditions. Any hazardous materials uncovered during construction activities would be managed consistent with applicable federal, State and local laws to limit exposure and clean up the contamination. In addition, the storage, handling and transport of hazardous materials are also regulated by federal, State and local regulatory agencies to limit risk of exposure.

The contribution of the project to cumulative risk of exposure would not be considerable. While construction and operational activities could result in accidental spills or leaks in the vicinity, the extent of the contamination is not likely to extend beyond the project site boundaries due to the type and limited quantities of hazardous materials likely to be used (for example, motor fuels, hydraulic oils, paint, and lubricants). Furthermore, as identified above, all AD facility activities associated with the use, storage and transportation of hazardous materials would be required to adhere to all applicable laws and regulations. Operation of AD facilities would capture and use biogas for energy production or the gas would be flared in accordance with a local air quality permit. Handling of biogas could be hazardous due to its health risks and flammability. Compliance with existing laws and regulations and mitigation measures established for AD facilities would minimize the potential for harmful exposures to hazardous materials, fires associated with the handling of biogas, aviation safety hazards, and vector impacts.

In sum, the construction and operation of AD facilities in combination with other projects in the project area would not create a significant hazard to the public or the environment through the routine transport, use, disposal or accidental release of hazardous materials, vector population growth, and fire hazards due to the site-specific nature of the potential impacts and existing laws and regulations that minimize the risk of exposure, and implementation of mitigation measures for AD facilities in this Chapter of the Program EIR. Therefore, this is considered a less-than-significant cumulative impact.

Mitigation Measure

> **Mitigation Measure 11.8:** Implement Mitigation Measures 11.1, 11.4, 11.5, and 11.7.
>
> **Impact Significance After Mitigation:** Less than Significant

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11.3 References

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CHAPTER 12
Other CEQA Considerations

12.1 Resources without Program Level Impacts

As required by CEQA, this Draft Program EIR focuses on expected significant or potentially significant environmental effects (CEQA Guidelines §15143). An NOP was prepared for the project to identify issues to be evaluated in this Draft Program EIR (**Appendix A**).

Resources identified with less than significant impacts during the Program EIR scoping process include agricultural and forest resources, biological resources, cultural resources, geology, soils, and seismicity, land use and land use planning, mineral resources, population and housing, and recreation. The NOP dismissed potential impacts in these resource areas as they are not anticipated to have potentially significant impacts at the program level, although they could require evaluation for individual projects due to the potential for local effects.

Agricultural and Forest Resources

Anaerobic digester (AD) facilities would be co-located with permitted solid waste facilities or located in areas zoned for industrial or solid waste handling activities and are not anticipated to adversely affect agricultural and forest resources. However, if an AD facility includes acquisition and development of undisturbed areas to expand the existing footprint, then impacts to agricultural and forest resources may need to be analyzed on a project-by-project basis to ensure compliance with land use zoning and that any loss of farmland or forest uses would be mitigated appropriately. Due to these site-specific considerations of individual facilities, further analysis would not apply at the statewide programmatic level.

Biological Resources

Since AD facilities would be co-located with permitted solid waste facilities or located in areas zoned for industrial or solid waste handling activities, they are not anticipated to adversely affect biological resources. However, if an AD facility includes footprint expansion onto undeveloped and undisturbed areas, then impacts to biological resources may need to be analyzed on a project-by-project basis. These analyses would be based on local species and habitats and would ensure compliance with any applicable conservation plans and that potential biological impacts would be mitigated. Due to these site-specific considerations of individual facilities, further analysis would not apply at the statewide programmatic level.

Cultural Resources

Since AD facilities would be co-located with permitted solid waste facilities or located in areas zoned for industrial or solid waste handling activities, they are not anticipated to adversely affect cultural resources. However, if an AD facility includes footprint expansion onto undeveloped and undisturbed areas, then impacts to cultural resources may need to be analyzed on a project-by-project basis. These analyses would be based on site-specific information and would determine any impacts to historical, archaeological, and paleontological resources on the site to be developed and would ensure that potential impacts to these cultural resources would be mitigated appropriately. Due to these site-specific considerations of individual facilities, further analysis would not apply at the statewide programmatic level.

Geology, Soils, and Seismicity

AD facilities would be co-located with permitted solid waste facilities or located in areas zoned for industrial or solid waste handling activities and are not anticipated to adversely affect, or be affected by, geology, soils, and seismicity. However, if an AD facility includes footprint expansion onto undeveloped and undisturbed areas, then geological, soil, and seismicity impacts may need to be analyzed on a project-by-project basis. This analysis would include a site-specific geotechnical study to comply with building requirements. Due to these site-specific considerations of individual facilities, further analysis of geology, soils, and seismicity would not apply at the statewide programmatic level.

Land Use and Land Use Planning

AD facilities would be co-located with permitted solid waste facilities or located in areas zoned for industrial or solid waste handling activities and are thus anticipated to comply in most cases with land use planning and zoning requirements. However, if an AD facility includes acquisition and development of undisturbed areas to expand the existing footprint, then compliance with applicable land use plans, policies, and regulations may need to be analyzed on a project-by-project basis. Due to these site-specific considerations of individual facilities, further analysis would not apply at the statewide programmatic level.

Mineral Resources

Since AD facilities would be co-located at solid waste facilities and within areas zoned for industrial or solid waste handling activities, it is anticipated that AD facilities would be located in areas which have previously been disturbed or developed. In this case, the AD facilities would not prohibit recovery of known mineral resources of value to the state and would not result in foreseeable loss in mineral resources. However, if an AD facility includes footprint expansion onto undeveloped and undisturbed areas, then impacts to mineral resources may need to be analyzed on a project-by-project basis. Due to these site-specific considerations of individual facilities, further analysis would not apply at the statewide programmatic level.

Population and Housing

AD facility operation would create a small number of jobs throughout California; however, this increase would not be considered substantial. The project does not involve the construction of features (i.e., roads, residences) that would induce population growth. Biogas generated by the AD facilities would provide for an existing need for renewable energy and is not proposed to be used for new off-site developments. In addition, AD facilities would not displace residences or people, as they would be located at either existing or new permitted solid waste facilities or in areas zoned for industrial or solid waste handling activities. Less than significant impacts to existing housing and population growth would occur. The program would not result in foreseeable displacement of populations or housing.

Recreation

AD facilities would not induce population growth, restrict recreational opportunities, or increase use or demand for recreational facilities. The project description does not include recreational facilities. Considering these factors the project would not result in foreseeable significant impacts on recreation.

12.2 Cumulative Impacts

CEQA Guidelines §15130(a) requires that an EIR discuss the cumulative impacts of a project when the project's incremental effect is "cumulatively considerable," meaning that the project's incremental effects are considerable (as defined in §15065(c)). Cumulative impacts refer to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts (CEQA Guidelines §15355). Further, such impacts can result from individual effects which may be minor, but collectively significant over time. The discussion on cumulative impacts shall reflect the severity of the impacts and their likelihood of occurrence (CEQA Guidelines §15130(b)). CEQA Guidelines note that the cumulative impacts discussion does not need to provide as much detail as is provided in the analysis of project-only impacts and should be guided by the standards of practicality and reasonableness. Considering this, CEQA Guidelines §15130(b)(1) recommends the use of a "list" or "projection" approach in the discussion of significant cumulative impacts to adequately address cumulative impacts.

The cumulative impact analysis considered the combined effect of the proposed project and other closely related, past, present and reasonably foreseeable future projects that may be constructed or commence operation during the time of activity associated with the proposed project. The cumulative impacts of the project are analyzed in detail in the final impact discussion located in each of the environmental resource chapters (Chapters 5 – 11). Please refer to those impacts for a detailed discussion.

12.3 Growth-Inducing Impacts

The CEQA Guidelines §15126.2(d) require that an EIR evaluate the growth-inducing impacts of a proposed action (Section). A growth-inducing impact is defined by the CEQA Guidelines as:

> [T]he ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth.... It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment.

A project can have direct and/or indirect growth-inducement potential. Direct growth inducement would result if a project involved construction of new housing. A project can have indirect growth-inducement potential if it would establish substantial new permanent employment opportunities (e.g., commercial, industrial or governmental enterprises) or if it would involve a substantial construction effort with substantial short-term employment opportunities and indirectly stimulate the need for additional housing and services to support the new employment demand. Similarly, under CEQA, a project would indirectly induce growth if it would remove an obstacle to additional growth and development, such as removing a constraint on a required public service. An example of this indirect effect would be the expansion of a wastewater treatment plant, which might allow for more development in service areas.

The proposed project would not result in a substantial increase in employment, and correspondingly, would not result in a substantial increase in population and associated demand for housing in the area. Mitigation of impacts resulting from the Draft Program EIR would not require the construction of any additional roadways or public services or utilities. For these reasons, the project is not anticipated to result in substantial growth inducement.

12.4 Significant and Unavoidable Environmental Impacts

CEQA §21100(b)(2) requires that any significant effect on the environment that cannot be avoided or becomes irreversible if the project is implemented must be identified in a detailed statement in the environmental impact report. CEQA Guidelines §15126.2(b) provides that an environmental impact report must discuss, preferably separately, the significant environmental effects which cannot be avoided if the proposed project is implemented. In addition, CEQA Guidelines §15093(a) requires the decision making agency to balance, as applicable, the economic, legal, social, technological, or other benefits of a proposed project against its unavoidable environmental risks when determining whether to approve a project. Benefits may include, but not be limited to, those that are region-wide or statewide. If the benefits of a proposed project outweigh the unavoidable adverse environmental effects, the adverse environmental effects may be considered: “acceptable.” If CalRecycle approves a project which would result in the occurrence of significant effects which are identified in the final EIR but are not avoided or substantially lessened, CalRecycle shall state in writing the specific reasons to support this action based on the final EIR and/or other information in the record (CEQA Guidelines §15093(b)). The Statement of Overriding Considerations shall be supported by substantial evidence in the record. CEQA Guidelines §15093 provides that if an agency makes a Statement of Overriding Consideration the statement should be included in the record of the project approval and should be mentioned in the notice of determination. This statement does not substitute for and shall be in addition to findings that CalRecycle must make before approving a project for which the EIR was prepared (CEQA Guidelines §15091). The analyses in Chapters 5 through 11 of this Draft Program EIR identify recommended mitigation measures that could reduce all potentially significant impacts to a level that would be less than significant, therefore, CalRecycle will not have to prepare a Statement of Overriding Considerations.

12.5 Significant Irreversible Environmental Changes

Section 15126.2(c) of the CEQA Guidelines requires an EIR to describe significant irreversible environmental changes that would occur if a proposed project is implemented. The guidelines further state that:

> *Uses of nonrenewable resources during the initial and continued phases of the project may be irreversible since a large commitment of such resources makes removal or nonuse thereafter unlikely. Primary impacts and, particularly, secondary impacts [such as highway improvement which provides access to a previously inaccessible area] generally commit future generations to similar uses. Also irreversible damage can result from environmental accidents associated with the project. Irretrievable commitments of resources should be evaluated to assure that such current consumption is justified.*

The proposed project would use non–renewable fuel resources during construction and such resources would also be used to some degree for the duration of the project (i.e., some petroleum for deliveries of digestion substrates and electricity generated off-site that is used for the digester facilities). The materials in the AD facilities (i.e., steel and concrete) would also be a commitment of the degree that they would not be used if the digesters are not used in the future. The materials in the AD facilities would have some potential for reuse or recovery by recycling. However, development of AD facilities would provide the ability to process the municipal solid waste and other organic substrates to generate and capture biogas, which is a flexible renewable energy source. Overall, AD facilities should have a net positive energy condition compared to the long-haul of MSW to landfills that can be expected to lose some additional energy (compared to AD facilities) due to fugitive emissions of landfill gas. In essence, the development of the AD facilities would provide future generations access to the equipment that can generate renewable energy.

CHAPTER 13
Alternatives

13.1 Introduction

CEQA Guidelines §15126(a) requires an Environmental Impact Report (EIR) to describe a range of reasonable alternatives to the project which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate comparative merits of the alternatives. A range of reasonable alternatives to the project must be addressed because the EIR will identify ways to mitigate or avoid the significant effects that a project may have on the environment (CEQA Guidelines §15126.6(b)). Consideration of a range of potentially feasible alternatives promotes informed decision making and public participation. An EIR is not required to consider infeasible alternatives, but the alternatives discussion should present alternatives to the project which are capable of avoiding or substantially lessening any significant effects of the project, even if these alternatives would impede to some degree the attainment of the project objectives, or would be more costly (CEQA Guidelines §15126.6(b)).

CEQA Guidelines §15126.2(f) provides that the range of alternatives is governed by the "rule of reason", requiring the EIR to set forth only those alternatives necessary to permit a reasoned choice. In the evaluation of alternatives, the EIR shall contain sufficient detail to allow meaningful evaluation, analysis and comparison with the project. If an alternative would cause one or more significant effects in addition to those that would be caused by the project as proposed, the significant effects of the alternative shall be discussed, but in less detail than the significant effects of the project as proposed (CEQA Guidelines §15126.6(d)).

The EIR must evaluate a "No Project" alternative in order to provide a comparison between the impacts of approving the project with the impacts of not approving the project (CEQA Guidelines §15126.6(e)). CEQA Guidelines §15126(e) requires that the alternatives analysis must identify the "environmentally superior" alternative among those considered. If the "No Project" alternative is identified as the environmentally superior alternative, then the EIR must also identify an environmentally superior alternative among the other alternatives.

This chapter discusses the following alternatives to the project:

1. No Project Alternative
2. Co-Digestion at Wastewater Treatment Plants (WWTPs) Alternative
3. Co-Digestion at Dairy Manure Digesters Alternative
4. Increased Aerobic Composting Alternative

5. Landfill In-Ground Digester Cell Alternative
6. Bioreactor Landfill Alternative
7. Thermal Conversion Alternative
8. Source Reduction Alternative

The components of these eight alternatives are described below, including a discussion of their impacts and how they would differ from the significant impacts of the project as proposed. A discussion of the environmentally superior alternative is included in this chapter.

Factors in the Selection of Alternatives

CEQA Guidelines §15126.6(c) recommends that an EIR briefly describe the rationale for selecting the alternatives to be discussed. A reasonable range of alternatives is considered for this analysis. The following factors were considered in identifying a reasonable range of alternatives to the project:

- Does the alternative accomplish all or most of the primary project objectives?
- Is the alternative feasible, from an economic, environmental, legal, social and technological standpoint?
- Does the alternative avoid or lessen any significant environmental effects of the project?

One of the primary goals of this project is to divert organic waste from landfill disposal. There is a high diversity of organic waste in California, and it is often concentrated in areas with limited organic processing options that make it difficult to manage due to economic and environmental constraints. This geographic distribution directly affects the feasibility of organics diversion from all of the standpoints identified above; and given the high costs of transportation; the economic feasibility of organics diversion is often determined primarily by geographic considerations. The diversity of organics also plays a significant role in identifying an appropriate technology.

This is a program level EIR analyzing statewide impacts of anaerobic digester (AD) facilities, but organics management decisions are often made at the local and regional level. There is no single best, most feasible, or most environmentally benign organics management option. Ultimately, each region must analyze its own organic waste streams and determine which management options are best based on the availability of technologically and economically feasible options.

Program Objectives

As also stated in Chapter 3, Program Description, the objectives for the project covered by this Program EIR are:

- Assist in meeting CalRecycle Strategic Directive 6.1: Reduce the amount of organics in the waste stream by 50 percent by 2020.
- Support Assembly Bill 32 (AB 32), the California Global Warming Solutions Act of 2006, greenhouse gas reduction measures related to the use of AD:

    - Measures E-3. Achieve a 33 percent renewable energy mix by 2020. (AD facilities produce biogas which is a renewable energy source.)
    - RW-3. High Recycling/Zero Waste. (AD is one of five subcategories listed under this measure.)
- Assist local governments and state agencies (both lead and responsible agencies) by providing program-level analyses that will identify potential environmental effects of AD facilities and discuss mitigation measures or best management practices that can reduce or eliminate the environmental effects.

The project objectives are considered in the evaluation of each of the alternatives.

13.2 Alternatives that Were Considered but Not Further Analyzed

The CEQA Guidelines §15126.6(a) require that an EIR briefly describe the rationale for selecting the alternatives to be discussed, and suggest that an EIR also identify any alternatives that were considered by the lead agency but were rejected as infeasible (CEQA Guidelines §15126.6(c)). The following alternatives were considered, but were eliminated from further consideration and analysis for the reasons expressed below.

Bioreactor Landfill Alternative

Typical modern landfills operate on a “dry tomb” approach. This means that they are designed to exclude as much moisture as possible to limit the production of leachate. Limiting moisture results in slowing the decomposition rate of the waste mass. Although many landfills have landfill gas systems installed to collect fugitive methane gas from the landfill, by restricting the moisture content of the mass, gas production is relatively minimized. “Bioreactor” landfills intentionally add moisture to the waste mass in an effort to accelerate anaerobic decomposition in the mass to accelerate methane production. This alternative is not further analyzed because material sent to bioreactor landfills is disposed; sending solid waste to a bioreactor landfill would not help meet the 50 percent organics diversion goal of CalRecycle Strategic Directive 6.1.

Thermal Conversion Alternative

The Thermal Conversion Alternative, including the various technologies, is discussed below in some level of detail to provide information on this subject that will be available to those that may wish to utilize the information in this EIR. It includes transformation, biomass conversion and non-combustion thermal conversion technologies (Williams, Jenkins, and Nguyen, 2003; Hacket and Williams, et al., 2004). Detailed analysis is not provided because a direct comparison of AD facilities to the Thermal Conversion Alternative technologies is not possible given that they rely on different components of the overall organics feedstock. The primary targeted organic feedstock for AD facilities is food waste which is not a primary target for thermal conversion facilities, which focus more on dryer post-MRF materials such as the paper, green waste, fossil derived organics (plastics) and wood fractions of the waste stream. The focus of the Thermal Conversion Alternative on materials that are not the key targets of AD facilities (e.g., food waste) is the reason that the Thermal Conversion Alternative (including transformation, biomass conversion and non-combustion thermal conversion technologies) is not further analyzed in this chapter.

This alternative considers thermal systems with energy recovery and includes solid fuel combustion systems (incinerators) for direct heat or electricity production via steam cycles (e.g., mass-burn or Refuse Derived Fuel [RDF] incinerators with energy recovery) and non-combustion thermal conversion technologies (i.e., gasification or pyrolysis) that can produce a range of energy products.

In California, there are currently three commercial scale mass-burn incinerators directly combusting mixed solid waste with electricity production, and approximately 30 bioenergy facilities burning woody biomass (which includes urban wood waste, agricultural residues and forest products and thinnings) for electricity production (http://www.energy.ca.gov/biomass/index.html). In addition, there is increasing interest in non-combustion thermal conversion technologies (i.e., gasification and pyrolysis).

Thermal conversion technologies vary in terms of their efficiencies, appropriate feedstock characteristics, the products (and by-products) they produce, their capital and operating costs, and how they are treated under the state's waste and energy regulatory regimes. In addition, some technologies are designed to handle a wide range of (or mix of) organic feedstocks, while others are more limited in the range of feedstocks they can process. This is of particular importance regarding Strategic Directive 6.1, which targets the subset of organics that are currently being landfilled. These disposed organics are extremely varied in energy and moisture content, and some can be separated, processed, and decontaminated more easily than others.

Thermal conversion technologies considered in this alternative include the following processes.

Transformation

Transformation is the statutory term California uses for mass-burn incineration of mixed solid waste with heat energy recovery for electricity generation. Currently there are three transformation facilities operating in California with a total permitted capacity of approximately 6,500 tons of incoming material per day producing approximately 65 MW of electricity (CalRecycle SWIS Database, 2011 & California Biomass Collaborative).

Transformation facilities are permitted under California's solid waste regulatory infrastructure. Waste processed at these sites is considered disposed. Jurisdictions are able to use material sent to the existing transformation facilities to meet up to 10 percent of their diversion requirements under the State's waste reduction and recycling laws (PRC 41783). Transformation facilities (except the facility in Stanislaus County, which was grandfathered into the renewable program) do not qualify as renewable energy facilities under the California Energy Commission's Renewable Portfolio Standard Eligibility Commission Guidebook (CEC-300-2007-006-ED3-CMF, p. 16). Pyrolysis is identified in California law as a type of transformation. Pyrolysis produces char (or "biochar" if the feedstock is a biomass) and a pyrolitic oil in addition to a combustible gas. Biochar is known to have nutrient and water retention characteristics that can make it a valuable soil amendment.

Given that waste processed at transformation facilities is considered disposed, does not count towards diversion (after 10 percent), and is not considered a renewable source of energy, new transformation facilities might not be constructed without changes in current policies and laws.

Biomass Conversion

Biomass conversion is the controlled combustion of woody biomass (agricultural or forest product resides or source-separated urban wood) for the purpose of heat or energy production. Governor Schwarzenegger signed Executive Order S-06-06 which set a goal for biomass to consist of 20 percent of the state's renewable energy portfolio in 2010, and to maintain that goal through 2020. Currently, biomass conversion accounts for approximately 20 percent of the state's current renewable energy generation (energy.ca.gov/biomass/index.html). In California, biomass conversion facilities are not considered a solid waste facility if only the waste types identified in PRC 40106[1] are processed.

Biomass plants in California burn agricultural wastes, forest slash, urban wood waste, and lumber from construction debris. According to the most recent California waste characterization, lumber is the second most prevalent material disposed in landfills, at almost 6 million tons per year (CIWMB, 2009).

Additional amounts of lumber could be diverted to biomass plants as there is currently an excess capacity. Diverting lumber from landfills to biomass conversion could be feasible in the short term and help meet Strategic Directive 6.1 as well as the 33 percent renewable goal.

Non-combustion Thermal Conversion Technologies

Non-combustion thermal conversion technologies refer to technologies that convert organic material under low-oxygen and high temperature conditions. ~~a range of technologies that use a combination of high heat, steam, high pressure, and oxygen- reduced environments to convert organic matter into heat and/or various products, including combustible gases, oils, and charcoals, as well as noncombustible ashes and molten slags (CIWMB, 2007).~~ These conversion technologies are different from direct incineration of organic matter in that they utilize environments with a range of sub-stoichiometric concentrations of oxygen and thus prevent immediate combustion of the product gasses. Much like AD, the resultant products can be used for a variety of uses including combustion for energy, transportation fuels, industrial chemicals, and soil amendments. Unlike some types of AD facilities, however, non-combustion thermal conversion technologies involve temperatures sufficiently high to guarantee pathogen reduction.

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[1] 40106. (a) "Biomass conversion" means the controlled combustion,when separated from other solid waste and used for producing electricity or heat, of the following materials:(1) Agricultural crop residues.(2) Bark, lawn, yard, and garden clippings.(3) Leaves, silvicultural residue, and tree and brush pruning.(4) Wood, wood chips, and wood waste.(5) Nonrecyclable pulp or nonrecyclable paper materials.(b) "Biomass conversion" does not include the controlled combustion of recyclable pulp or recyclable paper materials, or materials that contain sewage sludge, industrial sludge, medical waste, hazardous waste, or either high-level or low-level radioactive waste.(c) For purposes of this section, "nonrecyclable pulp or nonrecyclable paper materials" means either of the following, as determined by the board:(1) Paper products or fibrous materials that cannot be technically, feasibly, or legally recycled because of the manner in which the product or material has been manufactured, treated, coated, or constructed. (2) Paper products or fibrous materials that have become soiled or contaminated and as a result cannot be technically, feasibly, or legally recycled.

Gasification is a conversion technology that has been developed commercially worldwide for various applications, including generating gas from coal, oil refining, conversion of municipal solid waste (MSW) and other organic feedstocks, and charcoal production. Gasification processes have the potential to create combustible gasses and other products from the conversion of organic feedstocks, and both would likely require pre-processing to remove excess moisture from the organic feedstocks (Los Angeles County, 2007). In some cases, compression/pelletization may be required before the organic feedstocks could be thermally converted.

Pyrolysis, which is discussed above under transformation, generally operates in the near absence of oxygen and is therefore also a non-combustion thermal conversion technology.

Gasification differs from pyrolysis in that it often involves heating biomass with restricted amounts of oxygen and/or injected steam, and generally creates ash or molten slag as opposed to carbon-rich biochar (CIWMB, 2007).

Non-combustion thermal conversion facilities are capable of processing ~~some, but not~~ all of the organics in mixed solid wastes but efficiency and energy output is higher using dryer feedstocks. Potential feedstocks for such facilities include, among others, agricultural materials, tires, or MSW (Los Angeles County, 2007). Since non-combustion thermal conversion involves driving moisture out of the feedstock, organic feedstocks such as food waste with relatively high moisture contents (around 75 percent) are not ideal feedstocks. Subsets of the organics waste stream such as mixed solid waste, yard waste and woody components of construction and demolition debris may be more suitable for non-combustion thermal conversion.

California statute distinguishes between conversion technologies for purposes of solid waste facility permitting, and diversion/disposal status. Gasification is specifically defined in California law. Gasification is also noted in the Energy Commission’s Renewables Guidebook where it is listed as an eligible technology (CEC Guidebook p. 17). The Guidebook’s definition of gasification mirrors definition of PRC 40117.

There are no large commercial scale non-combustion thermal conversion facilities currently constructed in the state. While these facilities may be able to help divert organics from landfill disposal, it is likely that it will take at least five years to fully construct and permit such a facility. Thus conversion technologies are part of the longer-term strategy for organics diversion.

Source Reduction Alternative

Source reduction refers to reducing the amount of waste that is generated. A Source Reduction Alternative for this project would focus on reducing the amount of organic wastes that are generated and enter the waste and recycling streams.

Opportunities to reduce food waste generation focus on improving consumer purchasing habits and food service industry practices. For instance, CalRecyle has an extensive list of “Food Service Waste Reduction Tips and Ideas” on their website (CalRecycle, 2011a). The CalRecycle website also identifies opportunities to redirect edible food that otherwise would be disposed, to food banks or other appropriate venues where it can be distributed (CalRecycle, 2011b). While many of these programs provide a critically important service to help feed those in need, they do not address post consumer food waste generation.

There are other opportunities for source reducing organics which focus on preventing yard waste generation. CalRecyle promotes several yard waste prevention programs, including grasscycling, and xeriscaping (CalRecycle, 2011c). Grasscycling involves letting grass clippings remain on the lawn to be naturally recycled back into the soil. Grasscycling reduces grass clippings generation. Xeriscaping means landscaping with slow-growing drought tolerant plants to help conserve water and reduce yard trimmings. Both of these programs are valuable supportive measures to help achieve Strategic Directive 6.1.

While this alternative does address the target feedstocks of AD and is another approach for removing organics from landfills, it is not further considered because it is not an alternative to AD that could address the large volumes of post consumer food waste currently being landfilled.

13.3 Alternatives Selected for Further Consideration

No Project Alternative

CEQA Guidelines §15126.6(e) provides that a No Project Alternative shall also be evaluated along with its impact. According to the CEQA Guidelines, the No Project Alternative shall discuss the existing conditions at the time the Notice of Preparation was published, as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services.

Under the No Project Alternative, CalRecycle would not undertake the AD Initiative. This would maintain the status quo for AD facilities with respect to CEQA and permitting. AD facilities would be required to comply with current CEQA and other regulatory requirements without the benefit of the project. Development of AD facilities would continue in its current form and would be regulated by CalRecycle, by other permits from responsible agencies (i.e., County Use Permits, air and water quality permits, etc.), and by local and regional governments through local ordinances and regulations. The potential for reducing disposal of organics at California landfills would be reduced.

Impacts

Under the No Project Alternative, the proposed AD Initiative would not be implemented, so development and permitting of AD facilities would continue in its current form. Currently there are no commercial sized AD facilities that process mixed solid wastes in California or the U.S. Future development of AD facilities would be analyzed on an individual basis, and would be subject to individual federal, State, and local laws, regulations, ordinances and guidance.

For projects constructed and operated under the No Project Alternative, the impacts resulting from the construction and operation of individual facilities would be similar to those described for the project. With the No-Project Alternative, development of individual AD facilities would generally result in impacts similar to the project impacts on air quality and greenhouse gas emissions, hydrology and water quality, noise, public services and utilities, transportation and traffic, aesthetic resources, and hazards and hazardous materials. However, without the implementation of the AD Initiative, the pace of proposed project can be expected to be slower than with implementation of the AD Initiative. Thus, there would be fewer AD facilities and less impacts overall (see Table 13-1).

The No Project Alternative would not assist CalRecycle in ~~M~~ meeting the ~~G~~ goals of Strategic Directive 6.1; it would slow the pace of removing organic materials from landfills and it would not support the goals of AB 32 greenhouse gas reduction goals or the development of renewable fuels.

Co-Digestion at Wastewater Treatment Plants (WWTPs) Alternative

Under the Co-Digestion at WWTPs Alternative, the AD Initiative would apply to the construction and operation of co-digestion facilities at existing AD facilities at WWTPs for the diversion of organic materials from landfills and the production of biogas from organics in the waste stream.

There are over 130 wastewater treatment facilities in California currently using AD to reduce the volume of biosolids before they are land applied, composted, used as fuel, beneficially used at landfills, or otherwise disposed. Most of these facilities are capturing the biogas for its energy value. In California approximately 137 WWTPs have anaerobic digesters and these have an overall excess capacity of 15–30 percent (EBMUD, 2008).

Some of the existing WWTPs with anaerobic digesters have successfully co-digested liquid wastes, such as fats, oils, and grease (FOG), in an effort to increase biogas production. The increased biogas associated with digesting grease at treatment plants is well-documented, and these feedstocks are becoming increasingly sought after by WWTPs operating anaerobic digesters (York and Magner, 2010).

In contrast, a smaller number of WWTPs are now experimenting with adding processed source separated organics, such as municipally generated food scraps, to their existing digesters. Like grease, food waste has been documented to increase biogas production and reduce biosolids volume (EBMUD, 2008). Adding food waste to WWTPs anaerobic digesters requires pre-processing and the use of machinery not typically found at WWTPs to remove contaminants, adjust for moisture content, and reduce particle size. These steps can add to capital and operational costs.

The East Bay Municipal Utilities District, in Oakland, CA is co-digesting food waste with municipal sewage sludge and other liquid wastes. EBMUD is among the few WWTPs adding food waste and has been adding up to 40 tons per day of food waste into their digesters for extended periods of time. Other facilities, such as the Central Marin Sanitary Agency, are preparing to increase both their FOG processing capacity as well as install food waste pre-processing capacity at their WWTP. Central Marin Sanitation Agency has the excess capacity to take up to an additional 50 tons per day of food waste (Kennedy/Jenks, 2010).

Impacts

Under the Co-Digestion at WWTPs Alternative, the proposed AD Initiative would be implemented with a focus on diverting organic feedstocks to anaerobic digesters at existing WWTPs. Construction impacts would be greatly reduced because this alternative relies upon existing anaerobic digesters and post-processing infrastructure. As seen in Table 13-1, many of the potential significant impacts would be less significant than the impact of the project. The reduced impacts result from the fact that the Co-Digestion at WWTPs Alternative largely would rely upon existing infrastructure, and the overall construction would be reduced. Construction of pre-processing infrastructure would still be needed to implement the Co-Digestion at WWTPs Alternative.

For projects constructed and operated under the Co-Digestion at WWTPs Alternative, the impacts resulting from the construction would be less than the project because the WWTP digester and post-processing equipment and operations are already in place. Additional pre-processing equipment and operations would be on-going with the Co-Digestion at WWTPs Alternative.

With the Co-Digestion at WWTPs Alternative, development of co-digestion facilities at existing ~~individual~~ AD facilities at WWTPs would generally result in impacts similar to the proposed project with regard to air quality and greenhouse gas emissions, hydrology and water quality, noise, public services and utilities, transportation and traffic, aesthetic resources, and hazards and hazardous materials. It is even possible that the pace of AD facility development could increase under the Co-Digestion at WWTPs Alternative because the AD facilities would be developed at WWTPs with significant infrastructure in place and an operational history of running AD facilities, including electrical generation in many cases.

Co-Digestion at Dairy Manure Digesters Alternative

Under the Co-Digestion at Dairy Manure Digesters Alternative, the AD Initiative would apply to the construction and operation of co-digestion facilities at dairy manure digesters for the diversion of organic materials (as co-digestion feedstocks) from California landfills and the production of biogas from organics in the waste stream. Dairies are the only confined animal feeding operations in California that have on-going experience in operating AD facilities, it would be speculative to include other types of animals in this alternative.

Some dairies in California have manure-only anaerobic digesters. Manure digesters are generally considered to increase environmental performance of dairies, particularly in terms of water quality and methane emissions. The Central Valley Regional Water Quality Control Board prepared a Program EIR for Dairy Digester and Co-digester facilities in the Central Valley (CVRWQCB, 2010a). The Dairy Manure Digester Program EIR analyzed the impacts of the construction and operation of dairy manure digester and co-digester facilities. The Program EIR and the Waste Discharge Requirements General Order for Dairies with Manure Anaerobic Digester or Co-Digester Facilities (CVRWQCB, 2010b) were approved December 10, 2010 and are both were designed to assist in the permitting of additional dairy digesters and co-digesters in the Central Valley. Both the EIR and the General Order allow for co-digester facilities at dairies, which means the manure digesters would also accept some food waste and green materials to be added to dairy manure.

In 2009, there were 1,752 dairies operating in California (CDFA, 2010). Of these, there are approximately 11 dairies with operating dairy manure digesters. As many as 10 other dairies have operated dairy manure digesters in recent years but are no longer operating. The limited number of dairy digesters is a result of marginal economic return and a challenging regulatory environment.

Some of the existing dairies have experimented with adding additional organic materials to their dairy manure digesters to capture the additional biogas potential from co-digestion. In some instances, organics from mixed solid wastes could be co-digested with dairy manure to enhance the production of biogas. Adding food waste to dairies for co-digestion would require significant pre-processing and the use of machinery not typically found at dairies to remove contaminants, adjust for moisture content, and reduce particle size. Addition of other organics (i.e., green materials) could also add new processing requirements for dairy manure digesters. These steps can add significant capital and operational costs, as well as additional permitting steps. Another concern is that dairies are often already at or near their discharge limits for land application of nutrients and salts and additional nutrients or salts in the added co-digestion organic materials (i.e., municipal food scraps) would not be feasible at some dairies (or require changes to the Nutrient Management Plans or Salt Minimization Plans) due to the existing land application loading limitations (CVRWQCB, 2010a).. Finally, while operators of dairy manure-only digesters are optimistic about the potential for adding additional co-digestion organic feedstocks, the 11 dairies currently operating manure-only digesters do not appear to have the additional capacity to process major volumes of diverted organic solid wastes now going to landfills in California. While major expansion of dairy manure-only digesters could occur, the prospect of a larger infrastructure of such facilities, to the degree they could substantially provide an option for a major portion of the organic fraction of diverted solid waste in California, is not foreseeable. Among other challenges, dairies tend to be located remote from potential sources of other feedstocks so there would be added transportation expenses.

Impacts

The following impact analysis is provided in order to compare the impacts of the Co-Digestion at Dairy Manure Digesters Alternative to the impacts of the project. See also Table 13-1, the comparison of significant effects.

The California dairy manure digester industry is relatively undeveloped, it is impossible to know the total available additional/excess capacity that may result from maturation of that industry. What is known is that the majority of this capacity is likely to develop in California’s Central Valley, where approximately 80 percent of the dairy cows reside. Given the current issues with nutrients and salt accumulation in the valley, and the limited capacity for dairies to add more nutrients to their croplands, there are significant constraints on the total amount of nutrients and salt (entrained in the co-digestion organic feedstocks) that can be imported into the Central Valley. While co-digestion is an option to help increase biogas production, and thus return on investment, there are practical limits to the total amount of food waste and other organic materials that can be economically transported to and digested at dairies within the Central Valley. There are also major constraints on the use of biogas in the Central Valley. Because of the severe ozone air pollution problems in the Central Valley, current air regulations are the strictest in the nation for the emissions from engine/electrical generators that use biogas to generate electricity.

Increased Aerobic Composting Alternative

Under the Increased Aerobic Composting Alternative, the AD Initiative would apply to the construction and/or operation changes needed at existing or new compost facilities to divert more organic materials from California landfills.

There is an existing infrastructure for aerobic composting in California. According to a recent survey, (CalRecycle, 2010a) there are over 115 permitted composting facilities handling a variety of feedstocks. There are no reliable estimates of the capacity of the existing composting facilities, but CalRecycle has estimated that if the state is to achieve the goals under Strategic Directive 6.1, then an additional 100 facilities may be needed to assist in the diversion of 50 percent of organics from landfills by 2020. Most of the existing aerobic composting facilities (about 90 percent) use an outdoor turned windrow process or other similar process. Only a small percentage of the existing windrow facilities are currently handling significant quantities of food, soiled paper, and liquid waste. Technically, there is no reason that many of these facilities could not accept increased amounts of food scraps and other organics for composting. Another form of aerobic composting is aerated state piles (ASPs). ASPs are closely managed piles that are either outside in the open or covered by a structure. They may be covered or uncovered. The static piles are aerated by a pump that pushes or pulls air through the piles.

On balance, it is likely that there will be increased aerobic composting whether or not AD capacity is developed in California. The two systems actually complement one another. Most existing aerobic composting facilities are at least somewhat limited in how much organics other than green material they can take in relation to higher carbon containing materials like yard trimmings or wood waste. AD facilities typically create a digestate, which may be feedstock for aerobic composting.

Impacts

The following impact analysis is provided in order to compare the impacts of Increased Aerobic Composting Alternative to the impacts of the project. See also Table 13-1, the comparison of significant effects. ASP and windrow technology have similar impacts. The main environmental differences are (1) that with ASPs air can be collected for odor control and control of other air contaminants and (2) that ASPs require less land to handle the same amount of feedstock as windrow composting. The technologies are similar enough however to be jointly analyzed in comparison to AD.

Aerobic composting takes more land than AD, but the digestate from AD is typically ~~either land applied or~~ composted, so the total area needed may be very similar. Because at least some of the composting infrastructure is already developed, the amount of “new” area required for the Increased Aerobic Composting Alternative could be substantially less than siting new compost facilities, assuming that existing facilities can take in organics other than green material, without expanding their permitted footprint.

As shown in Table 13-1, the Increased Aerobic Composting Alternative has impacts that are equal or greater than the impacts of the project (prior to mitigation) in areas of air quality and greenhouse gases and hydrology and noise. The Increased Aerobic Composting Alternative has impacts that are equal or less than the project (prior to mitigation) in areas of noise, public services and utilities, transportation, aesthetics, and hazards and hazardous materials. As with the project, it is likely that the potentially significant impacts of the Increased Aerobic Composting Alternative could be mitigated to a level that is less than significant.

The addition of organics other than green material to an existing composting facility would have equal to or greater noise impacts as those described in the project. Increase in the types or volume of additional organics may require adding processing equipment or increasing operating hours.

The Odor Impact Minimization Plan (OIMP) would also need to be updated for the addition of new organic materials.

The most common form of aerobic composting utilizes a turned windrow methodology. This approach requires relatively large amounts of land in undeveloped areas of the state. Because the facilities are sited in more remote areas, this alternative will increase the amount of vehicle miles compared to the project. However, in most cases with the project, even if the facility (the anaerobic digester itself) is located in an urban area, the digestate created by the project will also need to be hauled to sites that will process or use it.

Landfill In-Ground Digester Cell Alternative

Under the Landfill In-Ground "Digester Cell" Alternative, the AD Initiative would apply to the construction and operation of in-ground digesters at a landfill that are limited to organic materials and which would utilize liquid injection and recirculation.

The Digester Cell is a batch system. Materials are loaded into the prepared cell in layers with impermeable (usually synthetic) covers and biogas extraction systems. Water is added and recirculated into the mass. The process consists of four distinct steps: filling, anaerobic, aerobic, and curing. Figure 13-1 shows photos of digester cell stages and Figure 13-2 shows the basic anaerobic and aerobic stages of the digester cell process. After the aerobic stage, the material is removed and the cell is prepared for another batch of untreated material. As part of ongoing research at the Yolo County Central Landfill, CalRecycle funded the creation of a unique type of "Digester Cell" which used liner materials to create a digester for yard trimmings and aged manure (CalRecycle, 2010b).

Facilities wishing to replicate the "Digester Cell" described in the report "Landfill-Based Anaerobic Digester-Compost Pilot Project at Yolo County Central Landfill" are likely to be located at existing landfills, which have the required space, earth-moving equipment, and other infrastructure needed for this type of project and perhaps most importantly, access to a lined landfill cell. While the "Digester Cell" concept could be sited anywhere with sufficient space and equipment, this analysis assumes that the process would only be at a landfill with an approved liner system.

Impacts

The following impact analysis is provided in order to compare the impacts of the Landfill In-Ground "Digester Cell" Alternative to the impacts of the project. See also Table 13-1, the matrix of effects of the alternatives.

In-ground digester cells are still experimental and much is still unknown about viable feedstocks, environmental performance, and economic feasibility. However, research into this technology continues to explore these factors, such as the recent article *Evolution of a Dry Anaerobic Composting Technique that Processes Food Wastes and Yard Waste Using a Reusable Series of Batch Pods* (Hater, G., et al, 2010). Digester cells may be able to play a role in diverting a portion of the organics stream from landfill disposal, but given the lack of existing systems in operation and the need for more study relative to high moisture waste such as food waste (as indicated in the Yolo County Central Landfill report discussed above), digester cells were not included in the scope of this

Program EIR. ~~of demonstration on food waste, it is unclear whether these cells will be able to achieve the same levels of efficiency and environmental performance as in-vessel digesters.~~

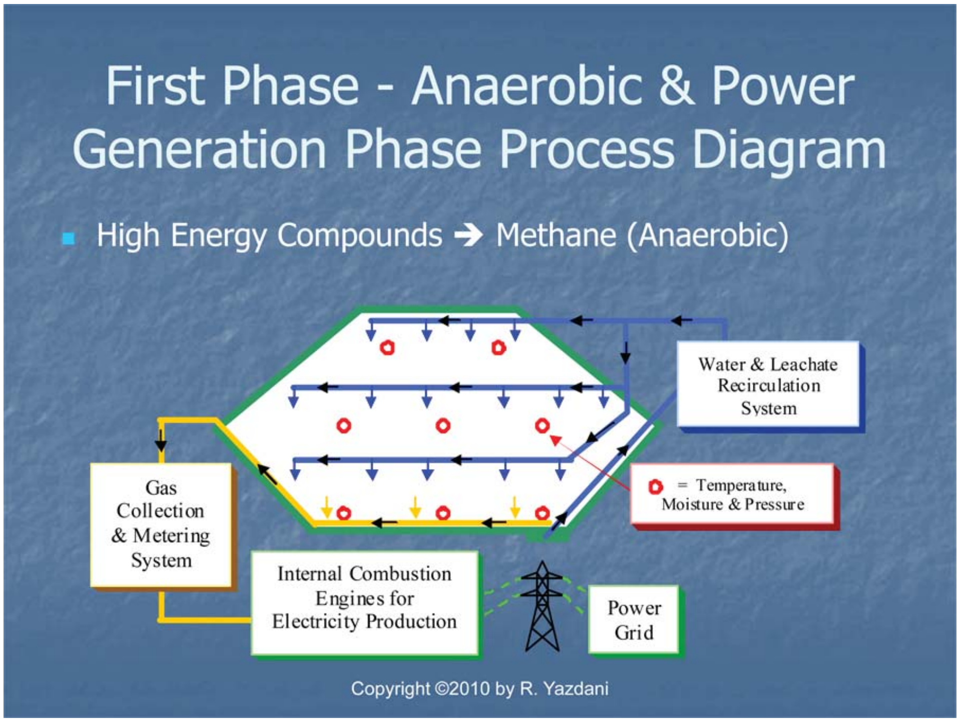
PHOTOGRAPH 1. Digester Cell project in Solon, OH.

PHOTOGRAPH 2. In-situ project material excavation (Yazdani, 2009).

PHOTOGRAPH 3. In-situ project material excavation (Yazdani, 2009).

SOURCE: ESA, 2010

Figure 13-1
Example Digester Cells



First Phase - Anaerobic & Power Generation Phase Process Diagram

- High Energy Compounds ➔ Methane (Anaerobic)

Water & Leachate Recirculation System

Gas Collection & Metering System

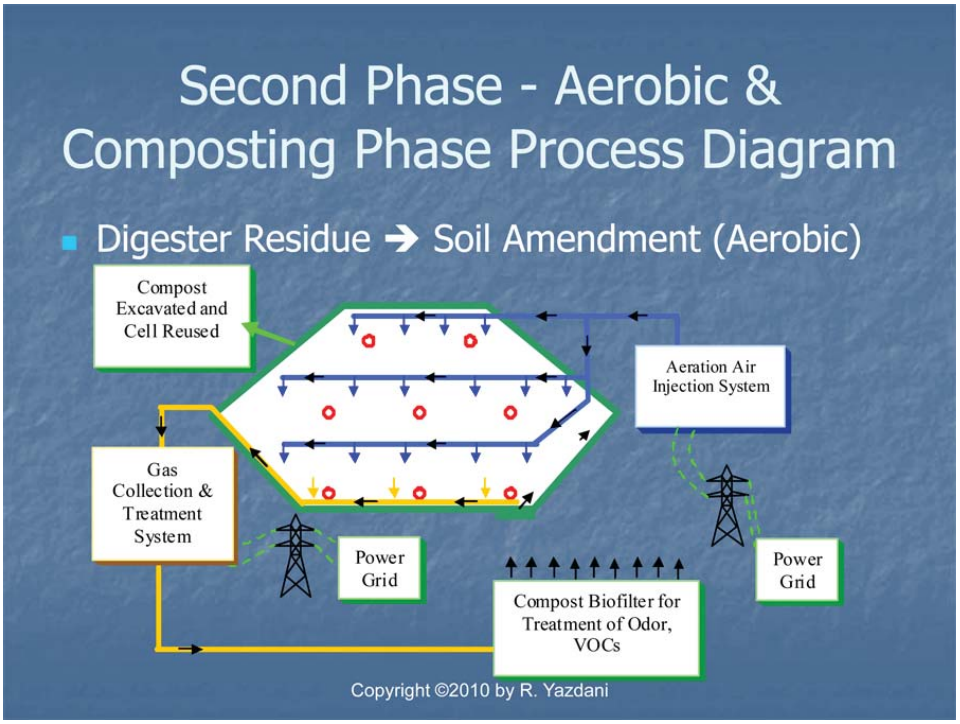
○ = Temperature, Moisture & Pressure

Internal Combustion Engines for Electricity Production

Power Grid

Copyright ©2010 by R. Yazdani

PHOTOGRAPH 1. Yazdani Digester-CalRecycle (Yolo County, 2006).



Second Phase - Aerobic & Composting Phase Process Diagram

- Digester Residue ➔ Soil Amendment (Aerobic)

Compost Excavated and Cell Reused

Aeration Air Injection System

Gas Collection & Treatment System

Power Grid

Compost Biofilter for Treatment of Odor, VOCs

Power Grid

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PHOTOGRAPH 2. Yazdani Digester-CalRecycle (Yolo County, 2006).

SOURCE: ESA, 2010

Figure 13-2
Digester Cell Process Diagrams

A review of Table 13-1 shows that the Landfill In-Ground "Digester Cell" Alternative has impacts that are equal or greater than the impacts of the project (prior to mitigation) in areas of air quality and greenhouse gases and hazards and hazardous materials. The Landfill In-Ground "Digester Cell" Alternative has impacts that are equal or less than the project (prior to mitigation) in areas of hydrology, noise, public services and utilities, transportation, aesthetics, and hazards and hazardous materials.

13.4 Comparison of Alternatives

The relative impacts of the various project alternatives identified for consideration in this document, including the project and No Project Alternative, are shown in Table 13-1. Only those project effects that are identified as significant before mitigation are listed in Table 13-1. In addition, the significance of each impact is described prior to implementation of feasible mitigation measures. This is done in order to identify which alternatives would avoid or substantially lessen one or more potentially significant impacts, as required by CEQA Guidelines §15126.6(a). For the level of significance of the proposed project after mitigation, refer to Table 1-1 and the impact analysis in Chapters 5-11. Many mitigation measures identified for the project (Table 1-1) would also be feasible under the various alternatives.

Ability to Achieve Project Objectives

Table 13-2 shows the ability of each alternative to achieve the project objectives. While the proposed project meets all the objectives, the evaluation in Table 13-2 shows that none of the alternatives meet all the project objectives.

Environmentally Superior Alternative

CEQA Guidelines §15126.6(d) requires that an EIR include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed project. CEQA Guidelines §15126(e) requires that the alternatives analysis must identify the "environmentally superior" alternative among those considered. If the "No Project" alternative is identified as the environmentally superior alternative, then the EIR must also identify an environmentally superior alternative among the other alternatives. The analysis in this chapter clearly shows that the No Project Alternative is not the environmentally superior alternative. While it has less impact than the project for several impacts because no AD construction impacts would occur, it completely fails to achieve any of the primary environmental benefits of the project. Tables 13-1 and 13-2 were reviewed in considering the environmental benefits of the other Alternatives. A review of Table 13-1 indicates that the most of the alternatives have several impacts that are less significant than the project and some impacts than are rated potentially greater (more adverse) than the impacts of the proposed project. Table 13-1 indicates that the Co-Digestion at Dairy Manure Digesters Alternative is not the environmentally superior alternative; as there are more impacts for this alternative that are rated potentially greater (more adverse) than the proposed project.

TABLE 13-1
PROJECT ALTERNATIVES: COMPARISON OF SIGNIFICANT EFFECTS[1]

	No Project Alternative	Co-Digestion at Wastewater Treatment Plants (WWTPs) Alternative	Co-Digestion at Dairy Manure Digesters Alternative	Increased Aerobic Composting Alternative	Landfill In-Ground Digester Cell Alternative
5. Air Quality and Greenhouse Gas					
Impact 5.1: Construction and operations of AD facilities within California would result in emissions of criteria air pollutants at levels that could substantially contribute to a potential violation of applicable air quality standards or to nonattainment conditions.	LS	LS	PG	E/PG	PG
Impact 5.2: Operation of AD facilities in California could create objectionable odors affecting a substantial number of people.	LS	LS	E	E/PG	E
Impact 5.3: Construction and operation of AD facilities in California could lead to increases in chronic exposure of sensitive receptors in the vicinity to certain toxic air contaminants from stationary and mobile sources.	LS	E	LS	E	E
Impact 5.5: Development of AD facilities in California, together with anticipated cumulative development in the area, would contribute to regional criteria pollutants.	E	E	PG	E	E
6. Hydrology					
Impact 6.2: The operation of AD facilities could adversely affect surface and groundwater quality.	LS	LS	PG	PG	PG
Impact 6.3: AD facilities could be exposed to flooding hazards.	LS	E	PG	PG	PG
Impact 6.4: Construction of AD facilities could change drainage and flooding patterns.	LS	LS	E	E	PG
Impact 6.6: Digesters and associated facilities could become inundated as a result of seiche, tsunami, or mudflow.	LS	LS	LS	E	E
Impact 6.7: AD facilities could contribute to cumulative impacts to water quality.	LS	E	PG	PG	LS
7. Noise					
Impact 7.1: Construction of AD facilities could temporarily increase noise levels at nearby sensitive receptor locations or result in noise levels in excess of standards in local general plans, noise ordinance, or other applicable standards.	LS	LS	PG	E	E
Impact 7.2: Noise from operation of AD facilities could substantially increase ambient noise levels at nearby land uses or result in noise levels in excess of standards in local general plans, local noise ordinances, or other applicable standards.	LS	LS	E	PG	LS
Impact 7.4: Development of AD facilities could result in a cumulative increase in noise levels.	E	E	E	E	LS
8. Public Services and Utilities					
Impact 8.2: The project could potentially exceed wastewater treatment requirements of the Regional Water Quality Control Board.	LS	LS/PG	PG	LS	LS
Impact 8.3: The project could result in significant environmental effects from the construction and operation of new water and wastewater treatment facilities or expansion of existing facilities.	LS	LS/PG	LS	LS	LS

PG Potentially Greater impact than project LS Less Significant impact than project E Equal impact to the project

TABLE 13-1
PROJECT ALTERNATIVES: COMPARISON OF SIGNIFICANT EFFECTS[1]

	No Project Alternative	Co-Digestion at Wastewater Treatment Plants (WWTPs) Alternative	Co-Digestion at Dairy Manure Digesters Alternative	Increased Aerobic Composting Alternative	Landfill In-Ground Digester Cell Alternative
Impact 8.6: The project could result in exceeding the capacity of a wastewater treatment provider.	LS	LS/PG	LS	LS	LS
Impact 8.7: The project could result in the construction of new energy supplies and could require additional energy infrastructure.	LS	E	PG	LS	LS
9. Transportation					
Impact 9.1: Construction of AD facilities would intermittently and temporarily increase traffic congestion due to vehicle trips generated by construction workers and construction vehicles on area roadways.	LS	LS	E	E	LS
Impact 9.2: AD facility operations would not substantially increase on-going (operational) traffic volumes on roadways serving the facilities.	E	LS/E	E	E	LS
Impact 9.3: AD facilities could potentially cause traffic safety hazards for vehicles, bicyclists, and pedestrians on public roadways, and could increase traffic hazards due to possible road wear or to accidental spills of digestate (liquids and solids).	LS	LS	E	E	E
Impact 9.4: AD facilities could intermittently and temporarily impede access to local streets or adjacent uses (including access for emergency vehicles), as well as disruption to bicycle/pedestrian access and circulation.	LS	LS	PG	E	LS
Impact 9.5: The project could contribute to cumulative impacts to traffic and transportation (traffic congestion, traffic safety, and emergency vehicle access).	E	LS	E	E	LS
10. Aesthetics					
Impact 10.1: AD facilities could have adverse effects on a scenic vista and/or scenic resources.	LS	LS	E	LS	LS
Impact 10.2: AD facilities could degrade the existing visual character/quality of the site and its surroundings.	LS	LS	LS	LS	LS
Impact 10.3: AD facilities could create a new source of light or glare with adverse affects to daytime and/or nighttime views.	LS	LS	PG	LS	LS
Impact 10.4: The project could result in cumulative impacts to visual resources.	E	E	E	LS	LS
11. Hazards and Hazardous Materials					
Impact 11.1: Construction of AD facilities could result in the potential exposure of construction workers, the public and the environment to preexisting soil and/or groundwater contamination.	LS	LS	LS	LS	E
Impact 11.4 Operation of AD facilities could increase the risk of fire hazards due to the potential release of biogas.	LS	E	E	LS	E
Impact 11.7: AD facilities could be located within five miles of a public airport or private airstrip and create an aviation hazard.	LS	E	E	E/PG	LS

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1. The significance of each impact is described prior to implementation of feasible mitigation measures.

SOURCE: Environmental Science Associates, 2011

PG Potentially Greater impact than project LS Less Significant impact than project E Equal impact to the project

TABLE 13-2
PROJECT ALTERNATIVES: COMPARISON OF ABILITY TO ACHIEVE PROJECT OBJECTIVES

	Proposed Project	**No Project Alternative**	**Co-Digestion at Existing Wastewater Treatment Plants (WWTPs) Alternative**	**Co-Digestion at Dairies Alternative**	**Increased Aerobic Composting Alternative**	**Landfill In-Ground Digester Cell Alternative**
Objective 1 – Assist in meeting CalRecycle Strategic Directive 6.1: Reduce the amount of organics in the waste stream by 50 percent by 2020.	✓	0	✓	✓ - 0	✓	✓ - 0
Objective 2 – Support Assembly Bill 32 (AB 32), the California Global Warming Solutions Act of 2006, greenhouse gas reduction measures related to the use of anaerobic digestion: • Measures E-3. Achieve a 33 percent renewable energy mix by 2020. (AD facilities produce biogas which is a renewable energy source.) • RW-3. High Recycling/Zero Waste. (anaerobic digestion is one of five subcategories listed under this measure.)	✓	0	✓ - 0	✓ - 0	✓ - 0	✓ - 0
Objective 3 – Assist local governments and state agencies (both lead and responsible agencies) by providing program-level analyses that will identify potential environmental effects of AD facilities and discuss mitigation measures or best management practices that can reduce or eliminate the environmental effects.	✓	0	0	0	0	0

✓ Alternative substantially achieves objective
0 Alternative does not achieve objective
✓ - 0 Alternative meets the objective but only to a limited degree

SOURCE: Environmental Science Associates, 2011

PG Potentially Greater impact than project LS Less Significant impact than project E Equal impact to the project

The analysis (Table 13-2) indicates that only the Increased Aerobic Composting Alternative and the Co-Digestion at Existing WWTPs Alternative substantially meet Objective 1 in the short term (substantially assist in reducing the amount of organics in the waste stream by 50 percent by 2020). Other alternatives will assist in meeting this objective but not as substantially in the short-term. None of the alternatives substantially meet Objectives 2 and 3.

Given the comparison of alternatives, only the Increased Aerobic Composting Alternative and the Co-Digestion at Existing WWTPs Alternative are promising for being able to substantially assist in reducing the amount of organics in the waste stream by 2020 (Objective 1). Between the two alternatives that could substantially reduce organics, the Increased Aerobic Composting Alternative would appear to have more flexibility in expanding existing facilities or adding new facilities to handle the increased organic materials. While WWTPs could use any current excess capacity they have to digest the additional organics, once that capacity is maximized, it would be a major step for a WWTP to add a new AD facility to their facility for the purpose of digesting municipal organic solid wastes, which is not the primary role of WWTPs. Therefore, compared to the alternatives analyzed in this chapter, the Aerobic Composting Alternative is the environmentally superior alternative because it is most likely to result in substantial reductions in organics in the waste stream by 2020. However, it should be noted that the proposed project (the AD Initiative) could substantially achieve all the project objectives and could be implemented with mitigation measures that would reduce ~~most of~~ the project impacts to a level that would be less than significant. None of the alternatives considered are environmentally superior to the proposed project in that they do not meet project objectives.

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CHAPTER 14
EIR Authors and Organizations/Persons Consulted

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14.3 Organizations/Persons Consulted

The organizations and persons consulted, and other referenced reports and materials can be found in the reference sections at the end of each chapter of this Draft Program EIR.

14.4 List of NOP Comment Letters

Comments received in response to the NOP were considered during preparation of the Draft Program EIR. Listed below are the agencies and persons that responded to the NOP for the preparation of the CalRecycle Statewide Anaerobic Digester Facilities Draft Program EIR:

Comment Letters:

- Riverside County Waste Management Department
- Humboldt County Waste Management Authority
- County of San Diego, Department of Planning and Land Use
- Santa Barbara County Air Pollution Control District
- South Coast Air Quality Management District
- City of San Diego, Solid Waste Local Enforcement Agency
- California Department of Food and Agriculture Animal Health and Food Safety Services (Meat and Poultry Inspection Branch)
- County of Fresno, Department of Public Health, Environmental Health Division

CHAPTER 15
Acronyms and Glossary

15.1 Acronyms

AB	Assembly Bill
AD	Anaerobic Digestion or Digester. In this Program EIR, AD is used as the acronym in referring to the Anaerobic Digester Facilities (AD Facilities) and the Anaerobic Digestion Initiative (AD Initiative).
APCDs	Air Pollution Control Districts
AQMDs	Air Quality Management Districts
AQMPs	Air Quality Management Plans
BACT	Best Available Control Technology
BMPs	best management practices
CAA	Clean Air Act
CalEPA	California Environmental Protection Agency
CAL FIRE	California Department of Forestry and Fire Protection
Caltrans	California Department of Transportation
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CAT	Climate Action Team
CCAA	California Clear Air Act
CCR	California Code of Regulations
CDFA	California Department of Food and Agriculture
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CH_4	Methane

CHP	California Highway Patrol
CNEL	Community Noise Equivalent Level
CNG	Compressed Natural Gas
CO	Carbon monoxide
CO_2	carbon dioxide
CO_2e	CO_2 equivalents
CPUC	California Public Utilities Commission
CUPA	Certified Unified Program Agency
CVRWQCB	Central Valley Regional Water Quality Control Board
CWA	Clean Water Act
dB	decibels
dBA	A-weighted decibels
DOT	U.S. Department of Transportation
DPM	diesel particulate matter
DTSC	Department of Toxic Substances Control
EIR	Environmental Impact Report (California)
EPA	U.S. Environmental Protection Agency
ERT	Emergency Response Team
ESA	Environmental Site Assessment
FEMA	Federal Emergency Management Agency
FICON	Federal Interagency Committee on Noise
FIP	Federal Implementation Plan
FOG	Fats, oils and greases
GHG	Greenhouse Gas
GWP	Global Warming Potential
H_2S	Hydrogen Sulfide
HAPs	Hazardous Air Pollutants
HARP	Hot spots Analysis Reporting Program
HFC	Hydrofluorocarbons
Hz	hertz

IC	Internal Combustion
IPCC	International Panel on Climate Change
LEA	Local Enforcement Agency
LNG	Liquefied Natural Gas
LUST	Leaking Underground Storage Tanks
MCL	Maximum Contaminant Level
MMRP	Mitigation Monitoring and Reporting Program
MSW	Municipal Solid Waste
NAAQS	National Ambient Air Quality Standards
NESHAPs	National Emission Standards for Hazardous Air Pollutants
NFPA	National Fire Protection Association
N_2O	Nitrous Oxide
NOI	Notice of Intent
NO	Nitric Oxide
NOP	Notice of Preparation
NOx	Nitrogen oxides
NO_2	Nitrogen Dioxide
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
OEHHA	Office of Environmental Health Hazard Assessment
OES	California State Office of Emergency Services
OMP	Odor Management Plan
OPR	Governor’s Office of Planning and Research
OPS	Office of Pipeline Safety
OSHA	Occupational Safety and Health Administration
PAH	Polycyclic Aromatic Hydrocarbons
PFC	Perfluorocarbons
PHMSA	Pipeline and Hazardous Materials Safety Administration
PG&E	Pacific Gas and Electric Company
PM10	particulate matter of less than 10 microns in size

PM2.5	particulate matter of less than 2.5 microns
PNPL	Proposed National Priorities List
PRC	California Public Resources Code
RCRA	Resource Conservation and Recovery Act
REA	Registered Environmental Assessor
RELs	Reference Exposure Levels
RWQCB	Regional Water Quality Control Board
ROG	Reactive organic gases
RPS	Renewable Portfolio Standards
SB	Senate Bill
SF_6	Sulfur Hexafluoride
SIP	State Implementation Plan
SMUD	Sacramento Metropolitan Utilities District
SO_2	Sulfur Dioxide
SOx	Sulfur Oxides
SWRCB	State Water Resources Control Board
SWPPP	Stormwater pollution prevention plan
TAC	Toxic Air contaminant
TAG	Technical Advisory Group
TDS	total dissolved solids
TMDL	Total Maximum Daily Loads
UC	University of California
USC	United States Code
UST	Underground storage tanks
US EPA	U.S. Environmental Protection Agency
VOC	Volatile Organic Compounds
WDR	Waste Discharge Requirements
WWTP	Wastewater Treatment Plant

15.2 Glossary of Terms[1]

Alternative daily cover	Material other than soil used to cover the surface of active landfills at the end of each day to control diseases, fires, odors, etc.
Anaerobic digester	A dedicated unit process for controlling the anaerobic decomposition of organic material and producing a biogas (composed primarily of carbon dioxide, methane, water vapor and trace contaminants), and a digestate (generally composed of solids and non-fuel liquids). Some AD systems can be operated to yield small amounts of hydrogen with a reduced amount of methane. Typically consists of one or more enclosed, temperature controlled tanks with material handling equipment designed to prevent the introduction of oxygen from the atmosphere. ~~A dedicated unit process for controlling the anaerobic decomposition of organic material. Typically consists of one or more enclosed, temperature controlled tanks with material handling equipment designed to prevent the introduction of oxygen from the atmosphere.~~
Biomixer	A rotating drum often with a trommel screen used for size reduction and pretreatment of the organic fraction in mixed MSW for sorting. Can be aerated to encourage biological breakdown. Can be operated at retention times from several hours to several days.
Bioreactor-landfill	A landfill operated as a bioreactor using leachate recycling (or other management schemes) to increase the rate of organic decomposition and biogas production. Not to be confused with anaerobic digester.
Compost	Compost here refers to stabilized and screened organic material ready for horticultural or agricultural use. If anaerobically digested material is used as compost, it must be biologically stabilized, typically through aeration and maturation.
Compostable material	Any organic material that when accumulated will become active compost as defined in section 17852(a)(1).
Contaminated green material	Green material that includes inorganic material.
Continuously stirred tank reactor	A digester configuration in which the entire digester contents are mixed to create a homogeneous slurry.

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[1] Amended from: CIWMB, *Current Anaerobic Digestion Technologies Used for Treatment of Municipal Organic Solid Waste*. March 2008.

Food	For purposes of this Program EIR the food category is inclusive and not limited by current regulatory definitions or collection methods.
Green material	For purposes of this Program EIR the green material category is inclusive and not limited by current regulatory definitions or collection methods.
Hydraulic retention time	The average length of time liquids and soluble compounds remain in a reactor. Increasing the HRT allows more contact time between substrate and bacteria but requires slower feeding and/or larger reactor volume.
In-vessel	For the purposes of this Program EIR, in-vessel would generally be a structure used to contain the anaerobic digestion process. The structure could include tanks or sealed rooms. The sealed rooms would typically be in a building under negative pressure and more than likely the air from the rooms and building would go through a biofilter or other system to control odors.
Mechanically separated OFMSW	Organic material separated from the mixed waste stream by mechanical means (i.e., trommels, screens, shredders, magnets, density dependent mechanisms). Isolating the OFMSW from mixed waste is less effective using mechanical separation as compared with source separation.
Mixed Solid Waste	For the purpose of this Program EIR, mixed solid waste is non-hazardous solid waste usually collected from residential and commercial sources.
Municipal solid waste	MSW includes all of the solid wastes that are generated from residential (homes and apartments) sources, commercial and business establishments, institutional facilities, construction and demolition activities, municipal services, and treatment plant sites. Hazardous wastes are generally not considered MSW. Some regions or countries consider only residential solid waste as MSW.
Organic fraction of municipal solid waste	The biogenic fraction of MSW. OFMSW can be removed from the waste stream at the source (source-separation), or downstream by mechanical separation, picking lines a combination of the two. The wood and paper fraction is more recalcitrant to biological degradation and is therefore not desired for biochemical conversion feedstocks.
Plug flow digester	A digester in which materials enter at one end and push older materials toward the opposite end. Plug flow digesters do not

	usually have internal mixers, and the breakdown of organic matter naturally segregates itself along the length of the digester.
Pre-treatment	In reference to municipal solid waste, pre-treatment can refer to any process used to treat the raw MSW stream before disposal. This includes separation, drying, comminuting, hydrolysis, biological treatment, heating, pyrolysis, and others.
Solids retention time	The average length of time solid material remains in a reactor. SRT and HRT are equal for complete mix and plug flow reactors. Some two-stage reactor concepts and UASB reactors decouple HRT from the SRT allowing the solids to have longer contact time with microbes while maintaining smaller reactor volume and higher throughput.
Source-separated OFMSW	Organic solid waste separated at the source (i.e., not mixed in with the other solid wastes). Often comes from municipal curbside recycling programs in which yard waste and sometimes kitchen scraps are collected separately from the rest of the MSW stream. The precise composition of source-separated OFMSW can change significantly depending on the collection scheme used.
Total solids	The amount of solid material (or dry matter) remaining after removing moisture from a sample. Usually expressed as a percentage of the as-received or wet weight. Moisture content plus total solids (both expressed as percentage of wet weight) equals 100 percent.
Volatile solids	The amount of combustible material in a sample (the remainder is ash). The value is usually reported as a percentage of the total solids, but may occasionally be given as a fraction of the wet weight. Volatile solids is used as an indicator or proxy for the biodegradability of a material, though recalcitrant biomass (i.e., lignin) which is part of the volatile solids is less digestible. Because of the simplicity of the measurement procedure, it is commonly reported in the AD literature.

Appendix A
Notice of Preparation

Natural Resources Agency Arnold Schwarzenegger, Governor

CalRecycle

DEPARTMENT OF RESOURCES RECYCLING AND RECOVERY

801 K STREET, MS 19-01, SACRAMENTO, CALIFORNIA 95814• (916) 322-4027 • WWW.CALRECYCLE.CA.GOV

NOTICE OF PREPARATION

To: Interested Agencies and Individuals and the Office of Planning and Research

Subject: **Notice of Preparation of a Draft Statewide Program Environmental Impact Report for Anaerobic Digester Facilities for the Treatment of Municipal Organic Solid Waste**

The California Department of Resources Recycling and Recovery (CalRecycle) will be the lead agency for preparation of a Statewide Program Environmental Impact Report (Program EIR) for anaerobic digester facilities for the treatment of the organic fraction of Municipal Solid Waste (AD facilities) in accordance with the California Environmental Quality Act (CEQA). This Notice of Preparation (NOP) provides responsible and trustee agencies and the public with information describing the project and its potential environmental effects. Pursuant to CEQA Section 21080.4(a) and Section 15082 of the State CEQA Guidelines, responsible and trustee agencies and members of the public are asked to provide written comments regarding the scope and content of the Program EIR.

Public and Agency Comment: Public agencies may use the Program EIR prepared by CalRecycle when considering approval of individual projects for AD facilities within their jurisdictions. If you are a Responsible Agency or Trustee Agency, CalRecycle needs to know the views of your agency as to the scope and content of the environmental information which is germane to your agency's statutory responsibilities in connection with the proposed project. CalRecycle is also interested in the views of members of the public as to the desired scope and content of the environmental information in the Program EIR.

The preliminary project description and a list of environmental issues to be addressed in the Program EIR are contained in the attached materials. The NOP and attached materials will also be available on the CalRecycle web site (www.CalRecycle.ca.gov/SWFacilities) after the documents are published by the State Clearinghouse.

Due to the time limits mandated by State law, the response of Responsible Agencies and Trustee Agencies must be sent to CalRecycle at the earliest possible date **but not later than 30 days after receipt of this notice**. Responses should include a contact name at your agency and be sent to:

CalRecycle
Attn: Ken Decio
P.O. Box 4025
1001 I Street
Sacramento, CA 95812-4025

If you have any questions regarding this matter, please contact Ken Decio at (916) 341-6313.

Ken Decio, Senior Integrated Waste Management Specialist April 30, 2010

STATEWIDE PROGRAM EIR FOR ANAEROBIC DIGESTER FACILITIES

FOR THE TREATMENT OF MUNICIPAL ORGANIC SOLID WASTE

Introduction

Compostable organic materials comprise approximately 25 percent of the solid waste stream disposed in California landfills.[1] CalRecycle Strategic Directive 6.1 calls for a 50 percent reduction in the amount of organics being disposed in landfills by 2020. An additional 10-15 million tons of organics will need to be composted or recycled annually to achieve this goal, requiring the siting of new and expansion of existing organic diversion facilities.

Currently there are no commercial-scale anaerobic digester (AD) facilities processing organics in California; however, interest in developing AD facilities for organic processing is growing, and CalRecycle anticipates that AD facilities will be developed across the state to meet the increasing need to divert organic waste from landfills. CalRecycle is preparing this Statewide Program Environmental Impact Report (EIR) to assess the potential environmental effects that may result from the development of AD facilities in California. The results of the Program EIR will inform future policy considerations related to AD facilities and provide background information on AD technologies, potential impacts and mitigation measures. This information will also assist state and local agencies in preparing site-specific environmental documentation that may be required for AD facility applications and/or permits submitted to CalRecycle, regulatory agencies and local jurisdictions. In the event CalRecycle or other public agencies adopt regulations or ordinances relating to regulating or permitting AD facilities, the EIR will also provide useful information and can serve as the basis for analyzing the environmental effects of those projects.

The project has several objectives including the following:

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[1] CalRecycle, 2009. Organics Policy Roadmap and Schedule. Available online at: <http://www.ciwmb.ca.gov/Organics/RoadMap08/default.htm>. Accessed 04/07/10.

- Assist in meeting CalRecycle Strategic Directive 6.1: Reduce the amount of organics in the waste stream by 50 percent by 2020.

- Support Assembly Bill 32 (AB 32), the Global Warming Solutions Act of 2006, greenhouse gas reduction measures related to anaerobic digestion:

  > Measures E-3. Achieve a 33 percent renewable energy mix by 2020. (AD facilities produce biogas which is a renewable energy source.)
  >
  > RW-3. High Recycling/Zero Waste. (Anaerobic digestion is one of five subcategories listed under this measure.)

- Assist local governments and state agencies (both lead and responsible agencies) by providing program-level analyses that will identify potential environmental effects of AD facilities and discuss mitigation measures or best management practices that can reduce or eliminate the environmental effects.

Background

Anaerobic digestion is the biological decomposition of organic matter with little or no oxygen. The anaerobic digestion process occurs naturally in marshes and wetlands. There are a variety of controlled systems where anaerobic technology is currently utilized in the United States including wastewater treatment facilities and dairy manure digesters. In other countries (primarily Europe), anaerobic technology is utilized in municipal solid waste digesters to produce energy and to reduce the volume of solid waste that must be landfilled.

Anaerobic digester facilities that process solid waste produce biogas and digestate (liquids and solids). The biogas consists primarily of methane (CH_4), which can be used for energy, and carbon dioxide (CO_2), with small amounts of hydrogen sulfide (H_2S), and ammonia (NH_3). Typically, biogas is saturated with water vapor and may have trace amounts of hydrogen (H_2), nitrogen (N_2), oxygen (O_2), dust and siloxanes.[2] Residual products from anaerobic digestion are liquid and solid residuals (digestate).

Project Description

CalRecycle formed a Technical Advisory Group (TAG) to discuss the project description and environmental issues to be considered in the Program EIR. The TAG includes state and regional regulatory agencies, solid waste industry representatives, AD facility developer representatives, and local jurisdictions. The following project description incorporates input from the TAG regarding facilities and feedstocks which should be considered in the Program EIR.

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[2] Greer, Diane, 2010. *Fundamentals of Biogas Conditioning and Upgrading*. Biocycle Journal. February 2010.

Facilities and Feedstocks to be Analyzed in the Program EIR

The scope of the project description has been focused on the objective of reducing the organic content of the solid wastes that are disposed in municipal solid waste landfills.

> **AD Facilities included:** In-vessel digester facilities which are located at permitted solid waste facilities and within industrial areas.
>
> **AD Facilities not included:** Dairy digesters and wastewater treatment plant digesters and co-digesters. In-ground digester cell technology, though not included in the project, will be discussed and evaluated as an alternative to in-vessel digestion. An example of the in-ground digester cell is the landfill-based anaerobic digester-compost pilot project developed at the Yolo County Central Landfill.
>
> **Feedstock materials included:** Food waste, green material, and mixed solid waste. The food and green material categories are intended to be inclusive and not limited by current regulatory definitions or collection methods – so "food" includes cannery waste, meat, poultry, fish, cheese waste, food processing waste, etc., and "green material" includes urban, agricultural, crop residues, contaminated green materials, etc. Use of manure will be considered as a seed material for the purpose of increasing digester efficiency, but not as a primary waste stream to be evaluated.
>
> **Feedstock materials not included:** Biosolids, food waste co-digested at wastewater treatment plants or dairy digesters, and hazardous waste.

Technologies

There are several technology choices for commercial AD facilities. The EIR will allow for flexibility in technology choices at the local level. The project will analyze the environmental effects of different digestion technologies, including one-stage continuous, two-stage continuous and batch systems. The project will evaluate both wet (low solids) and dry (high solids) processes. Although there is no set standard, generally wet processes have less than 15% total solids concentration and dry processes have 15 to 40% total solids concentration. A good description of the range of these technologies that the Program EIR will evaluate is included in a March 2008 CIWMB report, *Current Anaerobic Digestion Technologies Used for Treatment of Municipal Organic Solid Waste*.

Processes

The technologies listed above share the following main processes which the Program EIR will evaluate: pre-processing, digestion and post-processing.

Pre-Processing. Pre-processing includes feedstock receiving, storage of feedstocks, all processing steps required to prepare the feedstock for the digester, and the process of feedstock delivery into the digester.

Digestion. Within the digester, decomposition occurs in four phases: hydroloysis, acidogenesis, acetogenesis, and methanogenesis.

Post Processing. The byproducts of the anaerobic digestion process are digestate and biogas. The digestate is a liquid which is further processed or dewatered resulting in separate liquid and solid byproducts. Options for handling the liquid byproduct depend on its quality and can include reuse in the digestion process, discharge to surface waters, percolation ponds, evaporation ponds, sanitary sewers, or beneficial use as irrigation water. The solid byproduct can be aerobically composted, used as feedstock for energy production facilities or disposed of in landfills. Biogas generated from the anaerobic digestion process can be used as a fuel for a cogeneration system, compressed or liquefied for use as a fuel commodity, or injected into a gas grid or combusted in a flare. For each gas use alternative, specific gas conditioning measures would be required.

Environmental Issues

This section discusses the environmental issue areas which will be evaluated at a program level within the Program EIR. The following lists incorporate input from the TAG which reviewed a preliminary summary of potential environmental impacts. The lists also incorporate a review of the analysis completed for the Notice of Preparation and Initial Study for the Central Valley Dairy Digester and Co-digester Facilities Program EIR, which was released March 2010 by the Central Valley Regional Water Quality Control Board.

The EIR will analyze the following environmental issues areas for which the project may have potentially significant impacts at the program level (specific areas of concern include, but are not limited to, the issues identified in parenthesis):

- Aesthetics (litter, light, glare)
- Air Quality (criteria pollutants, odors, fugitive emissions)
- Greenhouse Gas Emissions
- Hazards and Hazardous Materials (fuels, lubricants, spillage, contaminated feedstocks, equipment, explosions/fire, vector control, airport consistency)
- Hydrology and Water Quality (washwater, stormwater runoff, condensate, effluent disposal)
- Noise (traffic noise and equipment noise)
- Public Services and Utilities (water, wastewater, solid waste, energy use/creation, gas)
- Transportation and Traffic (level of service and roadway impacts from trucks)
- Cumulative Impacts

The following environmental issue areas will be discussed in much less detail as they are not anticipated to have potentially significant impacts at the program level, although they could require evaluation for individual projects due to the potential for local effects:

- Agricultural and Forest Resources
- Biological Resources
- Cultural Resources
- Geology, Soils and Seismicity
- Land Use and Land Use Planning
- Mineral Resources
- Population and Housing
- Recreation

Appendix B

Anaerobic Digester Facility Photographs

PHOTOGRAPH 1 – UC Davis Biogas Plant (CIWMB, 2008).

PHOTOGRAPH 2 – Wet AD Plant in Leubeck, Germany (Anaerobic-digestion.com, 2010).

- Commissioned 2002
- Design 25,000 tonnes per year SSO
- Current 40,000 + tonnes per year
- Area < 1 Ha
- Building < 2,200m²
- BTA technology
- City owned
- CCI-TBN Toronto Inc. operated

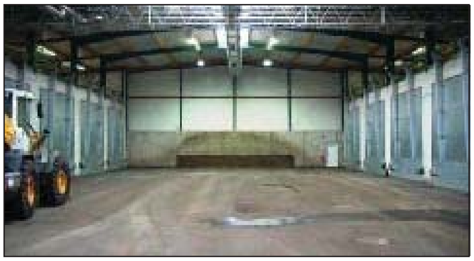
PHOTOGRAPH 3 – Dufferin Organics Processing Facility, Toronto, Canada (CCI-TBN Toronto Inc., 2009)

SOURCE: ESA, 2010

Figure B-1
Anaerobic Digester Facilities Photographs

PHOTOGRAPH 1. AD chambers, Munich, Germany.

PHOTOGRAPH 2. Fermenter Plant in Bennati, Italy.



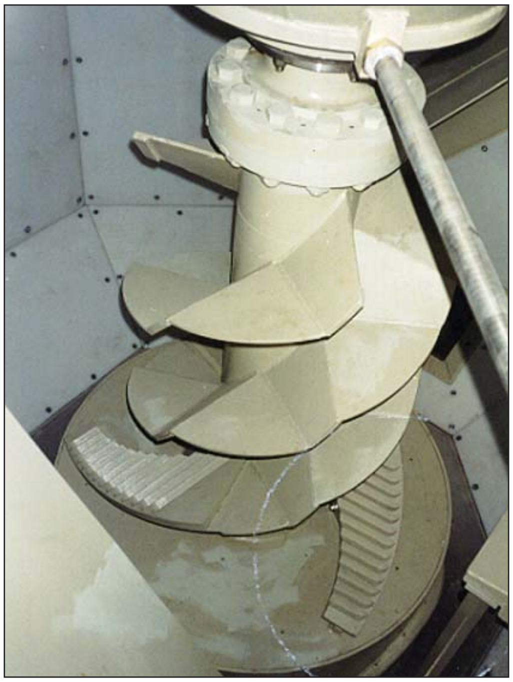
PHOTOGRAPH 3. Indoor AD facility, Munich, Germany.

SOURCE: ESA, 2010

CalRecycle Statewide AD Facilities Program EIR . 209134

Figure B-2
Anaerobic Digester Facilities Photographs

PHOTOGRAPH 1 – Pulper at Dufferin facility (City of Toronto, 2009).



PHOTOGRAPH 2 – Inside the pulper (City of Toronto, 2009).

PHOTOGRAPH 3 – Mixed solid waste.

SOURCE: ESA, 2010

Figure B-3
Anaerobic Digester Facilities Photographs

Comments and Responses Document

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Statewide Anaerobic Digester Facilities FPEIR Comments and Responses Document

List of Tables

COMMENTS AND RESPONSES DOCUMENT

C&R.1 Introduction

Purpose of the Comments and Responses Document

This document contains public comments received on the Draft Program EIR for Statewide Anaerobic Digester Facilities for the Treatment of Municipal Organic Solid Waste (SCH # 2010042100), and responses to those comments.

Environmental Review Process

On February 11, 2011, CalRecycle filed the Draft Program EIR on the project with the State Clearinghouse. The public review and comment period on the document extended from February 14, 2011 through April 4, 2011. During the 45-day public review period, CalRecycle received written comments (mail, hand-delivery, fax, or email). Verbal comments on the Draft Program EIR were received at public meetings on March 15, 2011 in Sacramento and March 30, 2011 in Lakewood.

Notice of this Comments and Response Document, including the comment letters and responses, will be distributed by email to the project mailing lists that will include the Technical Advisory Group (TAG) and other agencies that commented on the Draft Program EIR. This Comments and Responses Document and the revised Draft Program EIR together comprise the Final Program EIR for the project. This Final Program EIR contains a full version of the Draft Program EIR with revisions shown in underline for additions and ~~strikethrough~~ for deletions (**Chapter 1** through **Chapter 15 and Appendices**). The Final Program EIR must be certified by CalRecycle prior to consideration of the project for approval.

Section 15088.5 of the State CEQA Guidelines requires recirculation of an EIR when “significant new information” is added to the EIR after publication of the Draft EIR but before certification. The Guidelines state that information is “significant” if “the EIR is changed in a way that deprives the public of a meaningful opportunity to comment upon a substantial adverse environmental effect of the project or a feasible way to mitigate or avoid such an effect (including a feasible project alternative) that the project proponents have declined to implement.” Section 15088.5 further defines “significant new information” that triggers a requirement for recirculation as including, but not limited to, identification of a new significant impact, a substantial increase in the severity of an impact (unless mitigation is adopted to reduce the impact less-than-significant level), or identification of a new feasible alternative or mitigation measure that would lessen the environmental impacts of the project that the project sponsor is unwilling to adopt. Additionally, a determination that the Draft EIR was “so fundamentally and basically inadequate and conclusory in nature that meaningful public review and comment were precluded” would also constitute “significant new information.” Section 15088.5(d) states that recirculation is not required if “new information added to the EIR merely clarifies or amplifies or makes insignificant modifications in an adequate EIR.”

This Comments and Responses document does not provide “significant new information” as defined in CEQA Guidelines Section 15088.5, and recirculation of the EIR is therefore not required in advance of certification of the Final Program EIR as complete in accordance with CEQA, pursuant to Guidelines Section 15090.

Document Organization

Section C&R.2 contains a list of all persons and organizations who submitted written comments on the Draft Program EIR and who spoke at the public meetings on the Draft Program EIR held on March 15, 2011 and March 30, 2011.

Section C&R.3 contains copies of the written comments received on the Draft Program EIR. The written comments are shown with numbered brackets which correlate to CalRecycle’s responses immediately following each letter. Responses note where changes have been made in the text of the Draft Program EIR in underline/strikeout format. Revisions to the Draft Program EIR are shown in <u>underline</u> for additions and ~~strikethrough~~ for deletions.

Section C&R.4 contains a summary of the comments by each speaker at each of the meetings (in the order that the comments were received). Each oral comment is provided with a number which correlates to CalRecycle’s response that immediately follows each oral comment summary.

Section C&R.5 contains an index of the issues discussed in the comments and responses on the Draft Program EIR.

C&R.2 List of Persons Commenting

Written Comments

A list of persons that provided written comments is provided in **Table C&R-1** (listed in order of receipt).

Persons Commenting at the Public Meetings, March 15, 2011 and March 30, 2011

A list of persons who provided oral comments on the Draft Program EIR are provided below in **Table C&R-2** (listed in order of the speakers). Public meetings to receive comments on the Draft Program EIR were held in the CalEPA building in Sacramento, California on March 15 and in Lakewood, California on March 30, 2011.

TABLE C&R-1
LIST OF WRITTEN COMMENTERS ON DRAFT PROGRAM EIR

Letter ID	Agency/Company	Commenter
A	California Regional Water Quality Control Board, Central Valley Region	William Brattain, P.E. Water Resources Engineer
B	County of Fresno, Department of Public Health	Glenn Allen, R.E.H.S., M.S. Supervising Environmental Health Specialist
C	California Compost Coalition	Evan W.R. Edgar Engineer
D	Renergy, LLC	James McElvaney
E	Organic Energy Corporation, LLC	Larry T. Buckle, P.E. Chief Technology Officer
F	County of Yolo, Planning and Public Works Department, Division of Integrated Waste Management	Ramin Yazdani, Ph.D., P.E. Senior Civil Engineer
G	State Water Resources Control Board, Division of Water Quality	John Menke Staff Environmental Scientist
H	San Luis Obispo County Integrated Waste Management Authority	William A. Worrell, P.E.
I	Los Angeles County Solid Waste Management Committee/Integrated Waste Management Task Force	Margaret Clark Vice-Chair
J	County of San Diego Department of Planning and Land Use	Richard Haas Assistant Director
K	JDMT, Inc.	Michael Theroux Vice President
L	County of Santa Barbara Public Works Department	Mark Schleich Deputy Director
M	Inland Empire Disposal Association	Paul F. Ryan Executive Director
N	California Refuse Recycling Council	Evan W.R. Edgar Regulatory Advocate
O	Waste Management	Chuck White, P.E. Director of Regulatory Affairs/West Group
P	none	Joyce Dillard
Q	Harvest Power	Linda Novick Project Manager
R	County Sanitation Districts of Los Angeles County	Mario Iacoboni Supervising Engineer
S	City of San Jose, Environmental Services	Rob Williams, P.E. Consultant
T	State Clearinghouse	Scott Morgan Director

TABLE C&R-2
LIST OF ORAL COMMENTERS ON DRAFT PROGRAM EIR

Agency/Company	Commenter
March 15, 2011	
California Compost Coalition	Evan Edgar, Engineer
Harvest Power	Linda Novick, Project Manager
JDMT, Inc.	Michael Theroux, Vice President
City of San Jose Environmental Services	Michele Young, Organics Manager
San Luis Obispo County Integrated Waste Management Authority	John Cupps, Consultant
Integrated Waste Management Consulting, LLC (IWMC)	Matt Cotton
March 30, 2011	
Los Angeles County Sanitation District	Mike Mohajer
unidentified	unidentified commenter
Burrtec Waste Industries	Chuck Tobian
City of Los Angeles	Kim Tran

Letter A

California Regional Water Quality Control Board
Central Valley Region
Katherine Hart, Chair

Linda S. Adams
Acting Secretary for
Environmental Protection

11020 Sun Center Drive, #200, Rancho Cordova, California 95670-6114
(916) 464-3291 • FAX (916) 464-4645
http://www.waterboards.ca.gov/centralvalley

Edmund G. Brown Jr.
Governor

9 March 2011

Ken Decio
California Department of Resources Recycling and Recovery
1001 I Street
Sacramento, CA 95814

COMMENTS ON DRAFT STATEWIDE ANAEROBIC DIGESTER FACILITIES PROGRAM ENVIRONMENTAL IMPACT REPORT, SCH#2010042100

We have reviewed the draft *Statewide Anaerobic Digester Facilities Program Environmental Impact Report*. Our review focuses on the water quality aspects of the report. Based on our review, we have the following comments:

1) Section 3.7.3 of the report includes a section that discusses "digestate." We commented on this section of the report following our review of the administrative draft report in our 1 November 2010 letter. We note that an additional sentence has been added to this section that we have underlined in the following quotation: A-1

   The liquid can be discharged to surface waters, percolation ponds, sanitary sewers, or beneficially used as irrigation water for agricultural crops. Efforts are underway to convert the liquid digestate into value added fertilizer. However, chemical composition of the liquid effluent may restrict options. Some post-digestion aeration and/or filtration may be required prior to discharge to reduce the solids content, oxygen demand, ammonia concentrations, and/or salt concentration. The solid (or remaining digestate) can be aerobically composted, disposed of in landfills or beneficially used as a soil amendment for agricultural crops.

   We previously commented that this section should include the permits required for each of the discharges mentioned in the above statement. As written, the paragraph appears to imply that digestate can be discharged to surface waters or percolation ponds without permitting requirements from the appropriate regional water quality control board. These permits would prescribe requirements for each discharge. The following are the necessary permits for each discharge category: Discharge of the digestate to surface waters would require an individual National Pollutant Discharge Elimination (NPDES) permit; discharge of the digestate to percolation ponds would require individual waste discharge requirements (WDRs); reuse of the digestate as irrigation water for crops or reuse of the solids as a soil amendment would also require individual WDRs; and composting of the solids at the digester facility would require WDRs or coverage under a future general conditional waiver currently being developed by the State Water Resources Control Board.

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MAR 14 2011
MS/K.Decio

California Environmental Protection Agency

Recycled Paper

We also note that the new sentence, underlined above, states that "aeration and/or filtration may be required." Neither aeration nor filtration can remove salts or ammonia from water. We recommend that the word "treatment" be added to this sentence. A-1

2) Section 3.12 of the report includes *Table 3-1: Approvals Potentially Needed for Anaerobic Digester Facilities*. We commented on this section of the report following our review of the administrative draft report in our 1 November 2010 letter and requested that other required permits be added to the table. Two of these permits are still not listed in the table including: A-2

   a) An NPDES permit for discharges of treated digestate to surface waters.

   b) Coverage under the NPDES General Industrial Storm Water Permit for industrial sites that discharge storm water offsite or to waters of the State.

This concludes our comments on the draft *Statewide Anaerobic Digester Facilities Program Environmental Impact Report*. If you have any questions, please contact me at (916) 464-4622 or by email at bbrattain@waterboards.ca.gov.

WILLIAM BRATTAIN, P.E.
Water Resources Control Engineer
Title 27 Permitting and Mining

cc: State Clearinghouse, Sacramento
John Menke, State Water Resources Control Board, Sacramento
Paul Miller, ESA Land Management & Biological Resources, Sacramento

Response A-1

The sentence in the middle of the last paragraph on page 3-11 of the Draft Program EIR has been modified as shown below:

> "~~Some post-digestion aeration and/or filtration~~ Digestate may need to be treated ~~may be required prior to discharge~~ to reduce the solids content, oxygen demand, ammonia concentration, and/or salt concentration as prescribed by required permits."

Response A-2

The following row has been added to Table 3-1 on page 3-14 of the Draft Program EIR.

National Pollution Elimination Discharge Permits (NPDES)	Regional Water Board	NPDES permits for General Industrial Storm Water and for industrial sites that discharge storm water or treated digestate offsite or to waters of the State.

Letter B

1856

County of Fresno
Department of Public Health
Edward L. Moreno, M.D., M.P.H., Director-Health Officer

March 14, 2011

CalRecycle
Attn: Ken Decio
P.O. Box 4025
Sacramento, CA 95812-4025

Dear Mr. Decio:

PROJECT: Draft Statewide Program Environmental Impact Report for Anaerobic Digester Facilities for the Treatment of Municipal Organic Solid Waste

The Fresno County Department of Public Health, Environmental Health Division has reviewed the Draft Program EIR and concurs with the information contained within and has no further comments to offer at this time. However, we request that we be included in the routing of the Final Statewide Program Environmental Impact Report. B-1

If I can be of further assistance, please contact me at (559) 445-3271.

Sincerely,

Glenn Allen
Digitally signed by Glenn Allen
DN: cn=Glenn Allen, o=Environmental Health Division, ou=Public Health, email=glallen@co.fresno.ca.us, c=US
Date: 2011.03.14 16:55:54 -07'00'

R.E.H.S., M.S.
Supervising Environmental Health Specialist
Environmental Health Division

ga

CalRecycle DEIR AD Facilities

Response B-1

Comment noted.

Letter C

CALIFORNIA
COMPOST COALITION

Executive Committee
Will Bakx
Sonoma Compost

Bill Camarillo
Agromin, Inc.

Michael Gross
Z-Best Composting

Greg Kelley
Northern Recycling Compost

Neil S.R. Edgar
Executive Director

Legislative Advocates

Edgar & Associates, Inc.

Members
Agromin, Inc.
California Wood Recycling
Cold Canyon Compost
Napa Recycling Compost
Northern Recycling Compost
Quackenbush Mt. Composting
Rainbow Disposal
Sonoma Compost
Tracy Delta Compost
Upper Valley Recycling
Zanker
Z-Best Compost Facility

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March 14, 2011

Ken Decio, Project Manager
CalRecycle
1001 I Street
P.O. Box 2815
Sacramento, CA 95812-2815

RE: Comments regarding Draft Program Environmental Impact Report (EIR) – Statewide Anaerobic Digester Facilities for the Treatment of Municipal Organic Solid Waste

Dear Mr. Decio:

The California Compost Coalition (CCC) is a statewide non-profit trade association comprised of 11 compost companies involved in the processing and composting of green waste, food waste and agriculture by-products. The purpose of this correspondence is to provide our comments regarding explicit Title 14 permitting references for the Draft Program EIR.

CCC has a 10-year history of supporting the Title 14 regulations for the composting of organic wastes. The anaerobic digestion (AD) of organic waste is a type of technology that includes the transfer, processing and composting of organic wastes to which the current Title 14 regulations can easily be applied. There is no justification to suggest that a new regulatory package specific to AD facilities be recommended, but instead the explicit application of the current Title 14 regulations needs to occur. The Program EIR should assist local governments in the regulation and permitting of AD facilities, where there needs to be clarity and certainty to aid in the development of the emerging AD industry. C-1

CCC supports that AD facilities using organic wastes need to be permitted following the current Title 14-tiered permitting structure since the material is putrescible and fails the three-part test. On page 3-15 in section 3.13, the draft Program EIR uses the vernacular of “would” and “should” when discussing the regulation of AD facilities under Title 14, and reverts to a “case-by-case” determination. This type of language and case-by-case statements leave the applicant, the LEA, and the CEQA Lead Agency open to C-2

C-2 (cont.)

interpretation and uncertainty when permitting, where there should be certainty using current Title 14 regulations. The Program EIR should facilitate equitable permitting and not promote confusion and potential loopholes, and provide permitting equity with aerobic compost facilities. Whenever our compost facilities process food waste, we must meet the Title 14 permitting requirements. The emerging AD industry should also have that clarity and require the same type of permits that are being required today for our facilities.

C-3

The language in the Program EIR needs to be explicit and clear (See attached Figure 3-3, marked up to provide the explicit permitting of AD Facilities using current Title 14):

- The pre-processing of food waste AD feedstock anywhere at any time, including an operational area at a waste water treatment plant, “shall” be permitted using Title 14 transfer and processing regulations.
- AD facility technologies that do not reach 122 degrees F “shall” be permitted using Title 14 transfer and processing regulations.
- AD facility technologies that are 122 degrees F and above “shall” be permitted using Title 14 composting regulations.

C-4

Under the Alternatives section, CCC agrees that the Bioreactor Landfill Alternative not be further analyzed as an alternative since it is still a form of landfilling, and not diversion. The emissions control and capture efficiencies are debatable, and controversy would cloud the focus of the Program EIR. The Alternative selected for future consideration includes increasing the aerobic composting alternative. CCC agrees that this alternative and AD development complement each other as the digestate from the AD process needs further processing at a compost facility to produce a quality product.

C-5

The compost industry acknowledges the current aerobic windrow infrastructure has limitations in the acceptance of food waste. The compost industry has been embracing technology advances to meet emerging regulatory emissions standards, such as the development of covered aerated static pile (CASP) systems. CASP systems take less land than windrows, better control emissions and odors, and reduce contamination of storm water, but at an increased cost. Attached is the San Joaquin Valley APCD analysis on CASP systems for emissions controls and incremental cost increase. The compost industry already has operated many demonstration CASP projects and is poised to expand those systems throughout California. The *Impacts* part in this section should also recognize the development of CASP technology and that there will be capacity to accept and compost food waste using CASP technology. The Program EIR should provide the CASP technology as a means to increase aerobic food waste composting that will also decrease the impacts from the windrow aerobic composting.

C-6

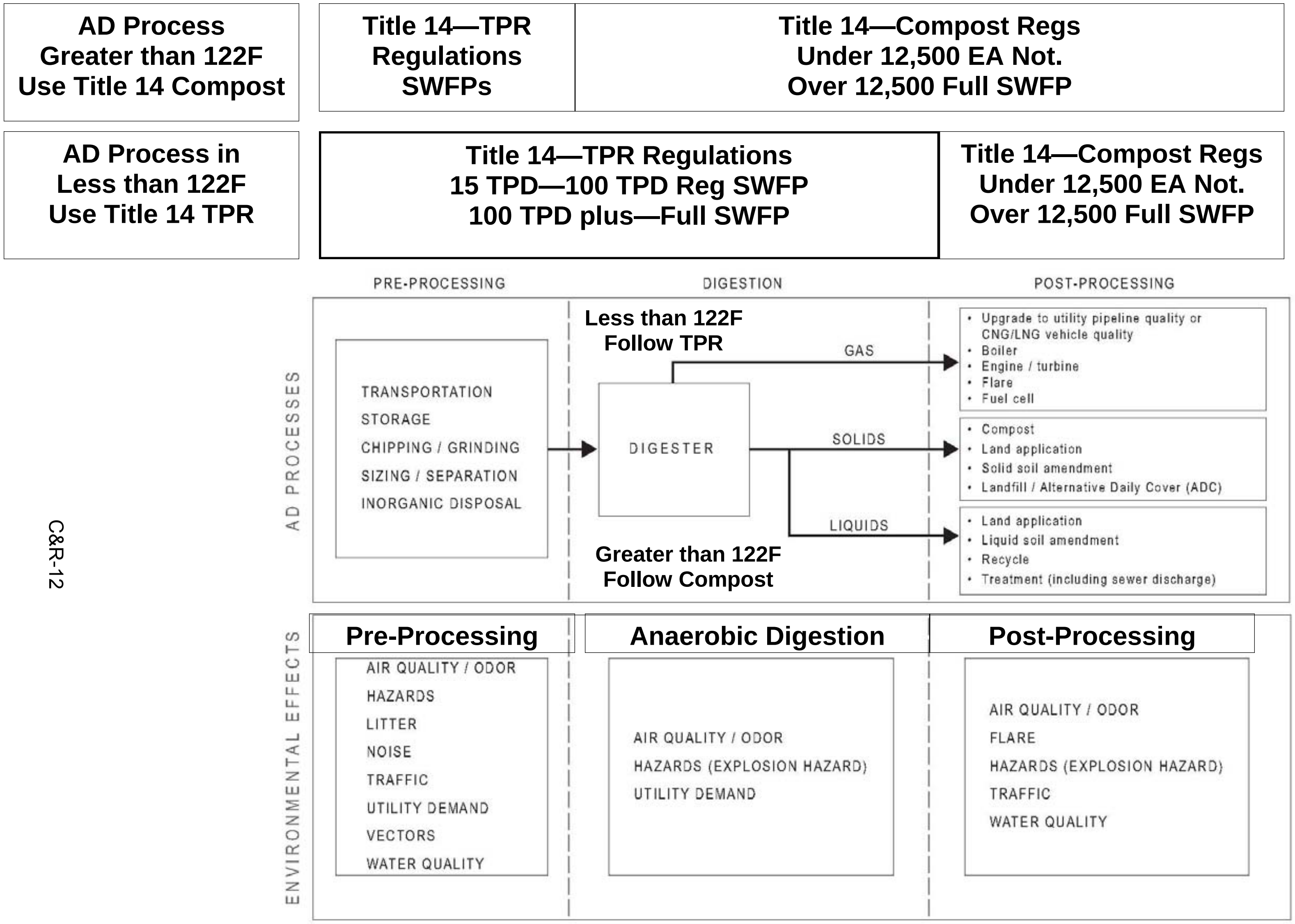
CCC recognizes and supports the clarity and certainty that the development and utilization of CASP systems will require a Full SWFP at composting facilities. CCC supports permit equity with clarity and certainty for food waste pre-processing facilities and food waste AD facilities that will recognize the same Title 14 regulations and require an appropriate Registration SWFP or Full SWFP. C-6 (cont.)

CCC appreciates the opportunity to comment on – and the significant work required to produce – the Draft Program EIR, which should facilitate the development of the AD industry using current Title 14 regulations.

Should you have any questions, please contact me at 916-739-1200.

Sincerely,

Evan W.R. Edgar
Engineer



SOURCE: ESA, 2010

CalRecycle Statewide AD Facilities Program EIR . 209134

Figure 3-3
Anaerobic Digestion Processes and
Potential Environmental Effects from
Operational Phases

Letter C

APPENDIX C

Draft New Rule 4566 (Composting and Related Operations)
Costs and Cost Effectiveness Analysis

September 22, 2010

I. SUMMARY

District staff has received cost information from stakeholders and vendors during the rule development process. Stakeholders and vendors are encouraged to continue to submit their compliance cost estimates to aid District staff with the cost effectiveness analysis. District staff will refine the cost effectiveness analysis to reflect any new information provided during the rulemaking process and at the focus group. Based on the cost-effectiveness of the control measures, the new draft rule requirements may be revised, as appropriate, to mitigate significant impacts to the operators.

Cost effectiveness is the estimated using the annualized cost of a control divided by the estimated emission reductions. It is not the actual cost paid by the operator but is a metric used to compare the relative cost between various control techniques and rules.

Draft Rule 4566 (Composting and Related Operations) would require operators who manage these materials to reduce VOC emissions through mitigation measures which are a combination of best management practices, emission reduction methods, and engineered emission controls systems. In the case of composting operations, small facilities, which have fewer resources and lower total emissions, would only be required to implement management practices. Larger facilities, that have greater resources and higher total emissions, would be required to implement best management practices and emission reduction methods or install and operate and engineered control system that achieves VOC reductions equivalent to the control methods.

II. REQUIREMENTS OF COST EFFECTIVENESS ANALYSIS

The California Health and Safety Code 40920.6(a) requires the San Joaquin Valley Unified Air Pollution Control District to conduct a cost effectiveness analysis of available emission control options before adopting each Best Available Retrofit Control Technology (BARCT) rule. The purpose of conducting a cost effectiveness analysis is to evaluate the economic reasonableness of the pollution control measure or rule. The analysis also serves as a guideline in developing the control requirements listed in a rule. Absolute cost effectiveness of a control option is the added annual compliance cost in dollars per year divided by the emission reduction achieved in tons VOC reduced per year. This report presents the District staff's analysis of the absolute cost effectiveness of Draft Rule 4566.

Incremental cost effectiveness is intended to measure the change in costs, in dollars per year, and emissions reductions, in tons of VOC reduced per year, between two progressively more effective control options or technologies. Incremental cost effectiveness examines the additional costs and emission reductions that can be achieved by adding a second control to the primary control. Because the incremental reductions from the controlled source operation are typically low, incremental cost effectiveness produces a much higher cost-to-reduction ratio than the primary control and should not be compared to the absolute cost effectiveness value.

For composting operations, the additional annual costs will be developed as follows:

$$\text{Additional Cost} = \text{Cost to Implement Control (\$/wet-ton)} \times \text{Throughput (wet-ton/year)} = \text{\$/year}$$

$$\text{Absolute Cost Effectiveness} = \frac{\text{Incremental Cost (\$/year)}}{\text{Reductions (ton-VOC/year)}} = \text{\$/ton-VOC}$$

Draft Rule 4566 would provide compost facility operators with the flexibility to comply with the VOC control requirements by choosing the listed controls or developing mitigation measures of their own not specified in the rule, provided they could demonstrate that such measures could achieve specified VOC emission reductions. Since operators have the flexibility to develop other equivalent methods of achieving the required reductions, operators will choose the option with the best cost effectiveness for their particular operation.

III. SOURCES OF COST DATA

Costs for composting facilities were taken from two general categories of source: actual composting operators in the San Joaquin Valley and vendors of composting emission control systems. The vendors who provided data are Engineered Compost Systems (ECS), W.L. Gore & Associates (GORE), and Managed Organic Recycling (MOR). The Valley operators who provided data are from Tulare County Compost and Biomass (Tulare), HWY 59 (Merced), Mt Vernon Composting & Recycling (Bakersfield), and Community Recycling (Lamont), and the City of Modesto.

The cost information that District staff has considered in the revised cost analysis are as follow:

- The Modesto Composting facility is a 200,000 wet-ton/yr windrow composting operation with an overall operating budget of $1.34 million per year. Tipping fees are $18.35 per ton for organic material.
- Stanislaus Resource Recovery Facility is a Waste-to-Energy plant that charges a tipping fee of $28 per ton for organic material.
- Landfill tip fees within the region currently range from $25 per ton to $30 per ton for organic material.

Finished Compost Cover Control Method

The industry operators have participated in the rule development process and submitted cost information to the District, most recently in 2010. Their cost estimates were based on their site-specific requirements. Since the costs provided are based on site-specific requirements, there is a wide range of cost estimates to implement the control method. For the finished compost cover control method, operators provided costs including possible additional front-end loaders, dump trucks, and conveyors. While some facilities may need the additional heavy equipment, other facilities may be able to use existing equipment for the control measures. It is assumed that the finished compost cover control method does result increased labor, fuel, equipment, maintenance, and decreased amount of available finished compost for all applicable facilities.

To mitigate the impact of the rule and allow operators time to adjust to the practices, the rule allows a three year phase in period to full implementation.

- The first year of implementation, 33% or throughput or every third active-phase windrow would need to be covered with finished compost after formation and after each turning event, during the active composting phase. Curing-phase compost is not required to be covered with finished compost.
- The second year of implementation, an additional 33% of the active-phase piles shall be covered with finished compost after formation and after each turning event. During this year, a total of 66% of the active-phase piles would be covered.
- The third year, the remaining 34% of the facility's active-phase piles shall be covered with finished compost after formation and after each turning event.

The amount of finished compost needed to implement the control method is estimated to be approximately 12% of the facility's finished compost production for years 1 through 3, and an average of 3.6% over 10 years (see the compost cover volume determination spreadsheet for the detailed calculation). To summarize, the volume calculation is based on the following primary assumptions:

- Compost piles are triangular in shape,
- 6 turning events during active-phase,
- Finished compost cover is 6" at the peak and 2" at the base,
- Green waste volumetric shrink factor is 70%,
- Facilities process 4.5 compost cycles per year,
- Phase in schedule is 33%, 66%, and 100% of total throughput for years 1 - 3, respectively.

Based on the field study results, the footprint of the active-phase pile and the finished compost pile is not expected to be negatively affected. As the material composts, moisture and carbon are lost so that the normal compost pile is reduced by 70% in volume and 40% in mass. In addition the windrow machines, used t turn the piles, produce a consistent pile footprint. The finished compost cap adds mass, so there will be more volume initially on the curing-phase piles due to the finished compost covers added to them. The finished compost piles will be larger due to the material added for the covers and would potentially serve as the storage areas for the materials for next round of compost covers. As the process is implemented, more finished compost cover materials will be blended with the composting material until eventually 12% of the facility's production during the first three years is stored on the piles.

Since the draft rule requires cover upon creating a new active-phase pile, the facility must have enough finished compost stored separately to cover the new material. Upon day 1 implementation, a new windrow created and turned requires approximately 27% of a finished compost windrow for one covering. Therefore, the facility begins "storing" the cover material within the active-phase piles. Upon completing the active-phase, 6 coverings in 22 days, this controlled windrow will have required 161% or 1.61 normal finished compost windrows to cover it. Cover is now being stored in the curing phase.

For example, a facility creates 100 yd^3 active-phase windrows and produces 30 yd^3 finished compost windrows. To cover a new windrow for the entire active-phase will take 48 yd^3, which is 1.61 normal finished windrows. When the controlled windrow completes the curing phase (day 60), the facility will have more than enough cover within that one controlled compost windrow to cover the next new one that enters the active-phase. In this example, when the controlled windrow finishes the curing phase, it will be 78 yd^3, which is based on a normal finished windrow volume (30 yd^3) plus the cover volume (48 yd^3). Therefore at day 60, any new windrow created requires only 62% of a finished windrow by volume, since the finished windrows will now contain more volume.

This volume of the minimum cover material needed is then kept onsite on an ongoing basis. As new windrows are created, the same volume is utilized for cover, allowing the facility to sell compost except for the finished compost cap volume, which is 12% of their throughput for the first 3 years. The 12% value hinges on the concept that once enough cover material is created, that cover material volume does not need to be created again. At full implementation, sellable material can come and go at the pre-implementation rates, while the cap volume remains constant and is "stored" on the composting and curing piles.

Below is an example of how the compost cover volume was determined. Table 1 lists the basic windrow information and assumptions.

Table 1: Compost Cover Volume Determination (Site Process Information)

Pile length	**600**	ft			
Peak height	**8**	ft			
Base width	**20**	ft			
Number of windrows	**20**				
Number of compost cycles	**4.5**	per year			
Density of feedstocks	**0.25**	ton/yd3			
Density of finished compost	**0.5**	ton/yd3			
Shrink factor (volume basis)	**70%**	average			
Pile slant height of compost pile	12.8	ft			
One compost pile surface area (includes pile ends)	15,770	ft^2			
One compost pile volume (includes pile ends)	48,837	ft^3	equivalent to	1,809	yd^3
One compost pile production (1 cycle)	543	yd^3	equivalent to	271	ton
Incoming feedstocks (1 cycle)	36,176	yd^3	equivalent to	9,044	ton
Finished compost production (1 cycle)	10,853	yd^3	equivalent to	5,426	ton
Shrink factor, mass basis (for info only)				40%	
Incoming feedstocks (all cycles)	162,791	yd^3/yr	equivalent to	40,698	ton/yr
Finished compost production per year (all cycles)	**48,837**	**yd^3/yr**	equivalent to	24,419	ton/yr

Table 2 details the finished compost cover details and assumptions.

Table 2: Compost Cover Volume Determination (Compost Cover Information)

Compost cover thickness at peak	**6**	in	equivalent to	0.50	ft
Compost cover thickness at base	**2**	in	equivalent to	0.167	ft
Number of active-phase cover applications	**6**	per windrow			
Peak height	8.5	ft			
Base width	20.33	ft			
Slant height of covered pile	13.3	ft			
One pile surface area with cover	16,325	ft^2			
One pile volume with cover	52,770	ft^3	equivalent to	1,954	yd^3
One pile cover volume	146	yd^3	per cover		
One pile cover volume	874	yd^3	per active-phase		

Table 3 details the required finished compost amounts as the rule is implemented over a three-year phase-in period.

Table 3: Compost Cover Volume Determination
(Compost Cover Volume based on Draft Rule Requirements)

Day 1: Initial cover after formation	27%	of a finished windrow can cover a new windrow once after initial formation			
Day 22: After active-phase	161%	of an uncontrolled finished windrow can cover a new windrow six times after turning in the active-phase			
Day 60: After active and curing phases	62%	of a controlled finished windrow can cover a new windrow six times after turning in the active-phase, due to the additional mass of the cover material during the controlled active phase			
End of year 1, 33% of total throughput controlled	5,767	yd^3	equivalent to	2,884	ton
	12%	of facility's finished compost from 1st year			
End of year 2, 66% of total throughput controlled	5,767	yd^3	equivalent to	2,884	tons
	12%	of facility's finished compost from 2nd year			
End of year 3, 100% of total throughput controlled	5,942	yd^3	equivalent to	2,971	tons
	12%	of facility's finished compost from 3rd year			
Full rule implementation (Years 1 thru 3 total)	17,477	yd^3	equivalent to	8,738	tons
	12%	of facility's finished compost over 3 years			
	3.6%	of facility's finished compost over 10 years			

The loss of production revenue, 12% per year for 3 years, has been factored into the cost analysis as well, assuming product sales at $6/yd^3 ($12/ton) and lost interest revenue at 10% per year. The process should not require additional material storage or diversion after the third year, but District cost analysis policy annualizes capital expenses at 10% over 10 years so the 3.6% average over ten years figure is included.

Additional Irrigation

The industry operators have participated in the rule development process and submitted cost information to the District. Their cost estimates are based on their site-specific requirements. Operators provided costs of additional equipment and infrastructure necessary, such as sprinkler piping, water pumping equipment, power/fuel, and water. Since the costs reflect on site-specific conditions, there is a wide range of cost estimates to implement the control method. For example, one facility may have rights to water, while another would need to purchase the water needed for this control method. It is assumed that the additional irrigation would result increased labor, fuel, equipment, and maintenance.

Minimize Stockpile/Tipping Pile Storage Time

The District currently does not have an estimated cost to require the stockpile storage time does not exceed 3 days for larger facilities. As such, there are no costs factored into the VOC reductions claimed for this control method. This information will be updated later in the rule development process as cost data becomes available.

Engineered Control Vendors

ECS has participated in the rule development process and submitted cost information to the District, most recently in 2010. The cost estimates were for the AC Composter™ and CompDog™ (inflatable form) cover systems (negative ASPs vented to biofilter). The key assumptions are as follows:

- Capital costs of equipment, construction and start-up of control system (annualized over 10 years at 10%).
- Annual cost also includes operation and maintenance (O&M) of all equipment, labor, electrical power, and fuel.
- Paved surface for the AC Composter™ system to be built, unpaved for the CompDog™ cover system.
- Concrete pushwalls for both AC Composter™ and CompDog™ cover systems.
- Aeration vented to biofilter for both AC Composter™ and CompDog™ cover systems.
- Water management control system for separation of leachate and storm water to be built.
- Covered bunker or enclosed reception area to be built
- Water and Electricity in place

GORE has participated in the rule development process and submitted cost information to the District, most recently in 2010. The cost estimates were for a the GORE™ Cover System technology (positive ASPs with cover). The key assumptions are as follows:

- Annualized capital costs of equipment, construction and start-up of control system over 10 years at 10%,
- Annual cost also includes operation and maintenance (O&M) of all equipment, labor, electrical power, and fuel,
- Paved surface for the GORE™ Cover System to be built,
- Water management control system for separation of leachate and storm water to be built,
- Paved tipping area to be built,
- Water and Electricity in place

MOR has participated in the rule development process and submitted cost information to the District, most recently in 2010. The cost estimates were for a positive ASP with cover system. The key assumptions are as follows:

- Annualized capital costs of equipment, construction and start-up of control system over 10 years at 10%,
- Annual cost also includes operation and maintenance (O&M) of all equipment, labor, electrical power, and fuel,
- Paved surface for the covered system to be built,
- Water management control system for separation of leachate and storm water to be built,
- Paved tipping area to be built,
- Water and electricity in place

According to the vendors, the cost estimates are highly variable depending upon site specific requirements. For the purpose of this analysis, the cost estimates associated with the capture and control systems assume a flat and buildable site with all utilities in place. The District staff obtained as much data as available to establish the range of costs to implement an “engineered control system”. The collected cost estimations are for the purposes of the District’s cost effectiveness analysis during this rule project only.

The budgetary pricing from the mentioned vendors are the most current and best available information obtained at the time. Inclusion of these vendors in this report does not imply or serve as an endorsement of any vendor or product by the District.

IV. COSTS AND COST EFFECTIVENESS ESTIMATES

Proposed VOC control requirements would require operators to implement various mitigation measures, based on the operation type and facility size. All operators would be required to adopt management practices to reduce VOC emissions.

Management practices have been shown to promote efficient composting and still result in VOC reductions. No additional cost is associated with implementing these practices, since they are considered to be inherent in good composting practice at a well-managed facility.

Large facilities, defined as those with at least 25,000 wet tons per year throughput, would also be required to implement the finished compost cover control method, or an equally effective method at reducing VOC emissions. The finished compost cover method achieves VOC reductions of 53% over the active and curing phases. Therefore, if the finished compost method is not employed, another method or system shall meet a minimum of 53% overall VOC for the active and curing phases. Engineered controls, such as in-vessel systems, have demonstrated control efficiencies at or above 80% overall control. As such, these types of controls would be welcome to satisfy the rule.

The tables below summarize the District's cost findings, based on the information received from operators and vendors.

Finished Compost Cover Costs

Table 4 summarizes the cost information received from operators for site-specific costs to implement the requirement for a finished compost cover. These costs reflect the limited resources of the smaller facilities and a necessity to purchase additional equipment, resulting in a higher, per-ton implementation cost. Larger facilities may have greater equipment inventories and could possibly implement the rule requirements without additional equipment purchases.

Table 4: Finished Compost Cover Costs

Site	Feedstock Throughput (wet ton/yr)	Cost to Implement ($/wet ton)
1	25,000	5.65
2	100,000	3.48
3	150,000	0.59
4	200,000	0.60
5	1,300,000	1.93
	Average	**2.45**

If the resulting data was applied to a large facility, the total annualized costs for the finished compost cover method would range from $776,000/year to $7.43 million/year. Based on 1,789 tons per year of VOC emission reductions, the cost effectiveness for these largest compost facilities ranges from about $433 to $4,151/ton of VOC reduced.

Additional Irrigation Costs

Table 5 summarizes the cost information received from operators for site-specific costs to implement the requirement for additional irrigation before turning. These costs reflect the limited resources of the smaller facilities and a necessity to purchase equipment and water for the irrigation, resulting in a higher, per-ton implementation cost. One facility had access to water so costs included equipment and operating expenses but not water costs.

Table 5: Additional Irrigation Costs		
Site	**Feedstock Throughput (wet ton/yr)**	**Cost to Implement ($/wet ton)**
1	100,000	2.29
2	150,000	1.66
3	1,300,000	0.26
	Average	**1.4**

The rule would require medium facilities to implement the additional irrigation control. If the resulting cost data was applied to a medium facility, the total annualized costs for this control to medium sized facilities would range from $15 thousand per year to $132 thousand per year, depending on water availability. Based on 36 tons per year of VOC emission reductions, the cost effectiveness for these medium-sized compost facilities ranges from about $418 to $3,677 per ton VOC reduced.

Engineered Controls Costs

Table 6 summarizes the cost information received from vendors for hypothetical site-specific costs to install their specific control system. These costs reflect possible factors that could influence the installation and operation of the control system. In general, the cost per ton is lower for larger facilities since common equipment costs, like fans and ducting can be spread over a greater throughput.

It is important to note that the rule would not require any facility to install an engineered control system. An operator may consider installing such a system in lieu of using a finished compost cover, provided that it is demonstrated to achieve the same or better control efficiency as the finished compost cover. Because of the cost to install and run these systems, it is unlikely that even the largest facilities would find them to be cost-effective.

Table 6: Engineered Controls Costs

Hypothetical Site	Feedstock Throughput (wet ton/yr)	Cost to Implement ($/wet ton)	Cost Averages by Throughput ($/wet ton)
1	25,000	6.79	7.44
2	25,000	6.79	
3	25,000	9.08	
4	25,000	9.91	
5	50,000	5.67	6.04
6	50,000	6.40	
7	100,000	3.24	4.33
8	100,000	3.48	
9	100,000	4.49	
10	100,000	5.20	
11	100,000	5.24	
12	200,000	2.57	3.48
13	200,000	3.10	
14	200,000	4.76	
15	500,000	2.78	3.78
16	500,000	3.80	
17	500,000	4.75	
18	1,000,000	3.09	3.80
19	1,000,000	3.21	
20	1,000,000	5.11	
	Average	**4.97**	

Staff only applied the cost data to large facilities given the lower cost of these controls relative to smaller facilities. For in-vessel engineered controls on these large facilities range, costs are estimated from $3.378 million per year to $13.026 million per year. Based on 3,001 tons per year of VOC emission reductions, the cost effectiveness for these largest compost facilities ranges from about $1,126 to $4,341 per ton VOC reduced.

Table 7 summarizes the Cost Effectiveness information based on draft rule requirements. The low - high range reflects the information received to date from stakeholders on possible implementation costs. Costs for covering the stockpiles after three days will be included in later staff reports and the cost data is available.

Table 7: Cost Effectiveness Summary (based on Rule Control Requirements)

Facility Receiving Volume	Actual Material Received (wet-ton/year)	Control Method	Emission Reductions (tons of VOC/year)	Cost ($/year) (Low - High Range)		Cost Effectiveness ($/ton-VOC Red) (Low - High Range)	
Large Facilities (Receives ≥ 25,000 tons/year)	1,314,451	Active+Curing Windrow (Finished Compost Cover on Active - 53% overall control)	1,988	775,526	7,426,648	390	3,736
		Active+Curing Windrow (Engineered Controls - 80% overall control)	3,001	3,378,139	13,026,209	1,126	4,341
		Stockpile (3-Day Max)	1,471	TBD	TBD	TBD	TBD
Medium Facilities (Receives < 25,000 and ≥ 10,000 tons/year)	57,808	Active Phase Windrow (Irrigation)	36	15,030	132,380	418	3,677
		Curing Phase Windrow (No Control)	0	0	0	0	0
		Stockpile (3-Day Max)	86	TBD	TBD	TBD	TBD
Small Facilities (Receives < 10,000 tons/year)	21,318	Active Phase Windrow (No Control)	0	0	0	0	0
		Curing Phase Windrow (No Control)	0	0	0	0	0
		Stockpile (No Control)	0	0	0	0	0

V. REFERENCES

1. City of Modesto. Public Comment Letter dated January 4, 2008.
2. SJVAPCD Draft Rule 4566 and staff report.
3. O'Neill, Tim - President & Engineer for Engineered Compost Systems (ECS), e-mail correspondence and ECS website at www.compostsystems.com.
4. Fuchs, Brian E. - Representative for W.L. Gore & Associates, Inc. for GORE™ Cover Systems - North America, e-mail correspondence and websites at www.gore.com and www.gorecover.com.
5. CIWMB. Public Comment Letter dated January 22, 2008.
6. Mt. Vernon Composting & Recycling (Bakersfield)
7. Tulare County Composting and Biomass
8. Community Recycling (Lamont)
9. HWY 59 (Merced)
10. Bouey, John, P.E. - President Managed Organic Recycling (MOR), e-mail correspondence and MOR website at http://www.odorfreecompost.com

Response C-1

Comment noted.

Response C-2

The discussion of CalRecycle permitting in Section 3.13 (pages 3-15 through 3-17) has been revised as follows:

"3.13 CalRecycle Permitting/Regulatory Framework

The proposed AD facilities shall ~~could~~ be regulated under CalRecycle's existing composting or~~and~~ transfer/processing regulations, as contained in the CCR, Title 14, Chapter 3, which sets minimum standards for solid waste handling and disposal. ~~The application of permitting requirements must be applied on a case-by-case basis.~~ The determination ~~as to the type~~ of facility type under the existing regulations would be based on the nature of the feedstock and the temperature of on-site processes. If the feedstock reach a temperature of at least 50 degrees Celsius/122 degrees Fahrenheit (50°C/122°F) on site, then the facility shall ~~could~~ be regulated as a compostable material handling facility under the Title 14 composting requirements (sections 17850-17870). If the feedstock does not reach the temperature of 50°C/122°F on site, then the facility shall ~~could~~ be regulated as a transfer/processing facility. Transfer and processing operations and facilities are regulated under Chapter 3, Article 6.0 of Title 14 (sections 17400-17405.0). Both sets of regulations include exemptions and exclusions. This permitting discussion does not address potential on-site disposal of solid byproducts from AD facilities.

3.13.1 Compostable Materials Handling Facility

Composting is defined broadly as "the controlled or uncontrolled biological decomposition of organic wastes" (California Public Resources Code [PRC] Section 40116.1). Anaerobic digestion fits within this statutory definition. Thus, AD facilities ~~could~~ shall be regulated under CalRecycle's compostable material handling regulations, located at Title 14 California Code of Regulations (CCR) Section 17850 et seq., if the feedstocks and processes meet the definitions within the implementing regulations.

[…]

The determination of whether or not feedstocks meet the definition of compostable materials would be based on project operation and the Title 14 requirements. ~~made on a case-by-case basis.~~ ~~Additionally~~ ~~i~~If feedstocks do not reach a temperature of 50°C/122°F on site, then they are precluded from becoming active compost and the compostable material handling regulations do ~~would~~ not apply. The temperature could be reached during pre-processing,

> within the digester, or if aerobic composting of digestate occurs during post-processing on site.
>
> ~~Thus it is foreseeable that a~~An AD facility ~~could~~ shall be regulated as a compostable materials handling facility if feedstocks are organic wastes and the feedstock reaches a temperature of 50°C/122°F on site (pre-processing, in the digester, or during post-processing)[1]. If the AD facility does not meet these two requirements, then it ~~could~~ shall be regulated as a transfer/processing facility as discussed below. The determination of whether the facility requires a permit, EA notification, or is excluded would be made by the LEA; the tier regulatory placement is shown in **Table 3-2**.
>
> ## 3.13.2 Transfer Processing Operations and Facilities
>
> ~~It is anticipated that~~ AD projects which do not qualify as compostable materials handling facilities ~~could~~ shall be regulated as transfer processing operations and facilities."

Page 8-2 has been revised as follows:

> "As discussed more extensively in Section 3.13, the proposed AD facilities shall~~could~~ be regulated under CalRecycle's existing composting or~~and~~ transfer/processing regulations."

Response C-3

See response to Comment C-2.

Response C-4

Comment noted.

Response C-5

Covered aerated static piles (ASPs) are a form of aerobic composting. It should be noted that ASPs may be covered or uncovered. Chapter 13 includes a discussion of the Increased Aerobic Composting Alternative. This discussion focuses on windrow technology which accounts for 90% of composting technology. ASP systems are very similar to windrow systems with respect to environmental impacts. The following discussion of ASP technology has been added to Chapter 13 (to the end of the second paragraph on page 13-11 of the Draft Program EIR) under the Increased Aerobic Composting Alternative:

---

[1] It should also be noted that if the digestate fails the standards set for metals or pathogens set in Title 14 CCR Sections 17868.2 and 17868.3, the end product would require additional processing or disposal.

> "Another form of aerobic composting is aerated state piles (ASPs). ASPs are closely managed piles that are either outside in the open or covered by a structure. They may be covered or uncovered. The static piles are aerated by a pump that pushes or pulls air through the piles."

The following text has been added to page 13-11 of the Draft Program EIR:

> "ASP and windrow technology have similar impacts. The main environmental differences are (1) that with ASPs air can be collected for odor control and control of other air contaminants and (2) that ASPs require less land to handle the same amount of feedstock as windrow composting. The technologies are similar enough however to be jointly analyzed in comparison to AD."

Response C-6

Comment noted.

Letter D

comment for public meeting

from James McElvaney Renergy LLC

While the use of existing digesters at wastewater treatment facilities, is not the preferred option for development of food waste digesters D-1

how doe Cal recycle view the option for public private development of independent digestion systems on existing waste water treatment facilities under lease agreements and shared power usage.

Response D-1

The comment does not address environmental effects of the project. No response required (CEQA Guidelines §15204). The scope of the Draft Program EIR did not include AD systems at WWTP facilities.

ORGANIC ENERGY
CORPORATION

March 15, 2010

Paul Miller
Senior Project Manager
ESA | Central Valley/Sierra Region
2600 Capitol Avenue
Suite 200
Sacramento, CA 95816

Subject: Comments Draft Program Environmental Impact Report for the Statewide Anaerobic Digestion Facilities for the Treatment of Municipal Organic Solid Waste SCH No. 2010042100

Dear Mr. Miller:

Thank you for the opportunity to serve on the TAG for the **Draft Program Environmental Impact Report** for the **Statewide Anaerobic Digestion Facilities for the Treatment of Municipal Organic Solid Waste**. Relative to this document I have the following comments:

E-1

Page 3-8 states: Feedstock materials included in the scope: Food waste, green material and *mixed solid waste*.

The Glossary needs to have a definition for the term "*mixed solid waste*".

E-2

Page 13-11 Increased Aerobic Composting Alternative states:

Aerobic composting takes more land than AD, but the digestate from AD is typically either land applied or composted, so the total area needed may be very similar. Because at least some of the composting infrastructure is already developed, the amount of "new" area required could be substantially less, assuming that existing facilities can take in organics other than green material, without expanding their permitted footprint.

Agricultural or other beneficial use of digestate through land application should not be considered a "land use" of AD projects. At that point the digestate is a commodity with a positive value, not a waste looking for a disposal site. Also digestate from an AD system will be substantially mature not requiring the retention time of raw aerobically composted materials. The result of this again is reduced land requirement/use. Therefore to imply the land use of AD is generically similar to aerobic composting is simply incorrect.

TABLE 13-1 PROJECT ALTERNATIVES: COMPARISON OF SIGNIFICANT EFFECTS

E-3

There was a rational approach to the development of this table and its resulting conclusions. However, other and additional considerations need to be addressed which potentially would draw a different conclusion. These include net energy balance, net potential GHG impacts, land use, and net water consumption. When these substantial issues are included in the analysis, different conclusions could result.

Thank you for your consideration

Larry T. Buckle, PE
Chief Technology Officer
Organic Energy Corporation, Inc.

CC: Mr. Ken Decio, Cal Recycle 1001 I Street Sacramento, CA 95814

Response E-1

For the purposes of this Draft Program EIR, a working definition of Mixed Solid Waste has been added to page 15-6 of Chapter 15, as shown below.

"Mixed Solid Waste	For the purpose of this Program EIR, mixed solid waste is non-hazardous solid waste usually collected from residential and commercial sources."

Response E-2

Comment noted. The commenter is correct in identifying the beneficial uses of digestate. The commenter is also correct in noting that reduced land requirements of AD facilities in comparison to aerobic compost facilities. The text on page 13-11 of the Draft Program EIR has been revised to read:

> "Aerobic composting takes more land than AD, but the digestate from AD is typically ~~either land applied or~~ composted, so the total area needed may be very similar. Because at least some of the composting infrastructure is already developed, the amount of "new" area required for the Increased Aerobic Composting Alternative could be substantially less than siting new compost facilities, assuming that existing facilities can take in organics other than green material, without expanding their permitted footprint."

Response E-3

Comment noted. The evaluation of alternatives used the project objectives, as well as the potentially significant impacts that were identified in the Draft Program EIR.

email

date Wednesday, March 16, 2011 12:07 PM

to Decio, Ken

from Ramin Yazdani [mailto:Ramin.Yazdani@yolocounty.org]

subject Draft Program EIR-Statewide Anaerobic Digester Facilities for the Treatment of MSW

Hello Ken,

F-1 Please accept this as my written comments to Draft Program EIR. Unfortunately I am on vacation this week and unable to attend today's meeting in Sacramento at 1:00 PM. My main comment is that the project alternatives discussion and comparison in Table 13-1 should provide more detail justification as to why some projects are listed as potentially greater impact than other projects. For example, under Impact 5.1 and 5.2 the co-digestion at dairy manure digesters alternative and landfill-in ground digestion cell alternative are both listed as PG and E, respectively. What rational was used to make this determination? Both dairy manure digester and landfill in-ground digester cell alternatives are completely covered with a liner. How can they have more odor than co-digestion at WWTP or an anaerobic digester as indicated in this table? Throughout this table similar determinations are made without proper justification as to how this was concluded. Justification should be provided so one could easily follow the rational for the reasoning behind the comparison and determination.

F-2 On page 13-12, last paragraph states the following "In-ground digester cells are still experimental and much is still unknown about viable feedstocks,

environmental performance, and economic feasibility. Digester cells may be able to play a role in diverting a portion of the organics stream from landfill disposal, but given the lack of demonstration on food waste, it is unclear whether these cells will be able to achieve the same levels of efficiency and environmental performance as in-vessel digesters." Please note that an entire section of the final report for this project was dedicated to economic feasibility and was shown to be economically. It's interesting that the following page shows a picture of the digester cell project in Solon, OH but there is no mention of this project. This project was in fact a demonstration of food waste and was successfully completed by Waste Management. There is substantial data collected from both Yolo County project and project at Solon, Ohio project by Waste Management to determine the level of efficiency and environmental performance as in-vessel digesters. What is the justification for not including this as part of analysis for the draft EIR? Yolo County constructed this as a demonstration project at a scale that could be commercially viable for both green waste or food waste. The construction of a similar size cell would be viable and more profitable with food waste because it would increase the amount of gas production and yield more methane and carbon credit as discussed in the economics section of the final report.

Please let me know if you need further information or clarification.

Ramin Yazdani, Ph.D., P.E.
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Bioreactor web site: http://www.yolocounty.org/Index.aspx?page=438

Response F-1

Comment noted. Many factors were considered in making the assessments of each impact for each alternative. With regard to odors (Impact 5-2), the “E” means the odor impact from Dairy Manure Co-digestion facilities and Landfill In-ground Digester Cells are considered equal to the project. The “LS” determination for co-digestion at WWTPs reflects the fact that this alternative focuses only on projects at existing WWTPs while the Dairy Manure Co-digestion facilities and Landfill In-ground Digester Cells would likely be at new locations without existing digester facilities.

Response F-2

Two of the primary reasons for not including in-ground digester cells as part of the project in the Program EIR are (1) the limited funding for the EIR (see Draft Program EIR page 3-1) and (2) consultation from the Technical Advisory Group (TAG) that this technology is substantially different than other technologies that have been in use worldwide for a number of years. With regard to the first item, with fixed funds, an increase in the number of “different options” considered would limit the level of analysis for each. With regard to the second item, the TAG discussion related to this topic was lengthy. The TAG considered the in-ground digester cells fundamentally different from the other systems being considered. This was after the presentation of in-ground digester demonstrations projects at a TAG meeting by the commenter and by Waste Management. Although not part of the project, it was however decided to include analysis of the in-ground digester cells in the Alternatives Chapter of the Draft Program EIR.

With regard to food waste as feedstock for in-ground digester cells, the concern on page 13-12 is consistent with the concerns about high moisture waste, such as food waste, identified in the Executive Summary of the report that you authored in April 2010 “Landfill-Based Anaerobic Digester-Compost Pilot Project at Yolo County Central Landfill”. The Executive Summary of that report under Conclusions and Recommendations on page 5 reads:

> “a) Given the success of this pilot-scale project, additional pilot-scale projects should be studied to overcome the technical challenges of high moisture waste, such as food waste. The addition of food waste to a green waste digester can increase the total methane production three to four times per unit dry food solids when compared to a green waste-only digester. The addition of food waste will also create other challenges that need further study. For example, food waste is very high in moisture content and is readily degradable so it must be handled different than green waste. The waste-filling phase of a food digester must be short compared to a green waste digester to avoid odors and undesirable emissions of valuable methane. Design and construction of a food waste digester must take into account these factors.”

The Draft Program EIR text on page 13-12 is revised to read:

"Digester cells may be able to play a role in diverting a portion of the organics stream from landfill disposal, but given the lack of existing systems in operation and the need for more study relative to high moisture waste such as food waste (as indicated in the Yolo County Central Landfill report discussed above), digester cells were not included in the scope of this Program EIR. ~~of demonstration on food waste, it is unclear whether these cells will be able to achieve the same levels of efficiency and environmental performance as in-vessel digesters.~~ "

Letter G

State Water Resources Control Board

Division of Water Quality

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Linda S. Adams
Acting Secretary for
Environmental Protection

Edmund G. Brown Jr.
Governor

March 24, 2011

Mr. Ken Decio
California Department of Resources Recycling and Recovery
1001 I Street
Sacramento, CA 95814

Dear Mr. Decio:

COMMENTS ON CALIFORNIA DEPARTMENT OF RESOURCES RECYCLING AND RECOVERY'S DRAFT STATEWIDE ANAEROBIC DIGESTER FACILITIES PROGRAM ENVIRONMENTAL IMPACT REPORT, SCH#2010042100

In February 2011, the California Department of Resources Recycling and Recovery (CalRecycle) released a draft Program Environmental Impact Report (PEIR) titled "*Statewide Anaerobic Digester Facilities for the Treatment of Municipal Organic Solid Waste*" that was prepared by ESA Associates. The enclosed document, "Excerpts and Comments on Draft PEIR.doc" provides excerpts from the draft PEIR and my related comments. A summary of my comments is provided below along with specific recommendations.

General Comments on Water Quality Issues

1. Landfills are designed to protect the environment by isolating wastes that could adversely affect water quality. If organic wastes are diverted from landfills and used in an anaerobic digester (AD), the solid and liquid residuals ("digestate") must be managed to protect water quality. G-1

2. Digestate solids have potential for beneficial use as a soil amendment; however, such usage must be done using best management practices. Such practices can be established in Waste Discharge Requirements (WDRs) that apply to the AD and to the subsequent use of digestate, or in WDRs that specifically apply to the application of digestate to land. G-2

3. Digestate liquids will contain most of the salts and nutrients originally present in the organic wastes, or present in any water used to promote digestion, will be in the G-3

G-3 (cont.)

digestate liquid phase. There are several options for managing liquid digestate, but all of them have drawbacks. Some of those options are discussed below:

- Digestate liquids may be disposed in a landfill; however, the liquid content must be reduced to an acceptable level before such disposal. Because significant water must be added for anaerobic digestion, such management will be difficult and expensive.

- Digestate liquids may be treated by reverse osmosis or distillation to produce reclaimed water and a concentrated brine or solid residual that can in turn be landfilled. Such treatment is very expensive due to the cost of energy used in the process and the cost to dispose of the brine. If the energy is supplied in part by the AD that produces the waste and if the reclaimed water can be sold, overall costs may be acceptable. It is not expected that solar evaporation alone could be used to isolate the salts.

- Digestate liquids may be discharged to a wastewater treatment plant (WTP). However, such discharge could significantly increase the levels of specific constituents in the effluent from the WTP. An assessment of the effect of the discharge to the WTP must be made through a pre-treatment program or in consultation with the plant operators.

- Digestate liquids may be discharged to cropland to utilize nutrients in the digestate. However, such discharge results in potential movement of residual salts and nutrients to groundwater. The characteristics of both the digestate and the land must be carefully considered so that the practice does not affect beneficial uses, if any, of the underlying groundwater. In situations where the assimilative capacity of the land or groundwater is low, such discharge may be unacceptable.

Specific Recommendations

The following recommendations are based on the water quality issues discussed above and on other issues identified during review of the draft PEIR:

G-4

1. The “Mitigation Measure” Section on Page 6-16 should have an introductory paragraph stating: “*Based on the Report of Waste Discharge prepared for an individual digester facility, the appropriate Regional Water Board will issue Waste Discharge Requirements (WDRs) to protect water quality through implementation of mitigation measures such as those listed below. Specific requirements in the WDRs*

will be based on the technical report describing the digester facility design and operational practices. The WDRs will address materials storage and handling activities as well as waste management practices." G-4 (cont.)

2. Mitigation Measure 6.2a. identifies best management practices (BMPs) that can potentially be used to protect surface water and groundwater. CalRecycle should develop a BMP Manual for AD projects developed pursuant to the final PEIR. G-5

3. The PEIR must clearly state that for any proposed discharge of digestate to waste disposal facilities including landfills or WTPs, the discharges must be evaluated in advance to ensure that they are acceptable relative to WDRs issued for those facilities and to applicable Total Maximum Daily Loads (TMDLs). G-6

4. The PEIR must clearly state that the discharge of digestate to land must be made pursuant to WDRs established for the wastes and site(s) involved. It is unlikely that existing WDRs adequately address nutrient application to cropland, and so new WDRs will need to be developed specifically for the digestate and the particular land application areas involved. In some limited cases a formal conditional waiver of WDRs may be utilized. G-7

5. The AD will need to be enrolled under the General Industrial Stormwater Permit if not located at a facility that is already enrolled. In addition, a Construction General Stormwater permit must be obtained if appropriate for an AD project. The discussion of Construction Stormwater permits on Page 6-9 of the draft PEIR should be modified to include the following reference: http://www.waterboards.ca.gov/water_issues/programs/stormwater/construction.shtml. G-8

6. Potential annual water need for a "typical" AD for diverted organics is calculated at 24 million gallons, based on diluting 50,000 tons of municipal solid waste from 30% solids to 10% solids. Such usage could impact communities with limited water supply. Prior to approving a specific AD project, an evaluation must be made of the effect on available water supplies and on the potential to use wastewater in the AD. Speculative water supply allocations do not provide a sufficient basis for decision-making under CEQA. G-9

7. The potential for NOx emissions from AD facilities that utilize biogas in internal combustion engines should be discussed relative to air emission standards in non-attainment air districts. If the technology does not exist to implement Mitigation Measure 5.1a, then the effect on project viability should be discussed. G-10

8. The impact and mitigation of nuisance odors at AD facilities and digestate use sites are not sufficiently discussed. G-11

9. In discussions of feedstocks the report identifies "contaminated green materials." Clarification needs to be provided on the characteristics of that material. G-12

10. The report identifies on option for biogas as "inject biomethane into the utility gas pipeline system." The PEIR should note that some utility districts may only allow such injection into high pressure lines, resulting in additional design and operational constraints. G-13

Sincerely,

John Menke
Staff Environmental Scientist
Division of Water Quality

Enclosure

Letter G

John Menke's Excerpts and Comments for the February 2011 draft Statewide Anaerobic Digester Facilities PEIR prepared for CalRecycle

Page	Statement	Comment	
1-7 – 1-16	**Table 1-1 Environmental Impacts and Mitigation Measures**:	When the table indicates that no mitigation is required, it is necessary to go to the appropriate section for details.	G-14
3-4	One of the primary goals of this project is to divert organic waste from landfill disposal.	Landfills are designed for containment; as a result, the inorganic and organic materials disposed at landfills are much less likely to impact water quality than if the materials are diverted for digestion with the digestate subsequently discharged to land or water.	G-15
3-5	**Figure 3-1** Anaerobic Digestion of Municipal Organic Solid Waste *[shows post-digestion solids and liquids being used for "Fertilizer/Soil Amendment" or being applied to land]*.	The figure should indicate that such use must be pursuant to WDRs or a formal waiver of WDRs.	G-16
3-7	**Figure 3-3** Anaerobic Digestion Processes and Potential Environmental Effects from Operational Phases *[shows post-digestion solids and liquids being used for "Fertilizer/Soil Amendment" or being applied to land]*.	See comment for Figure 3-1.	G-17
3-9	**3.7.1 Pre-Processing** Pre-processing involves the activities necessary to prepare the feedstocks for delivery into the AD vessel. Pre-processing activities include feedstock receiving, storage of feedstock, all processing steps required to prepare the feedstock for the digester (such as sorting, screening, grinding and wetting),	Should note that "wetting" to adjust liquid percentage to allow digestion results in the need to manage liquid digestate and thus may require additional storage facilities.	G-18
3-8	**3.5 Proposed Facilities** … AD Facilities included in the scope: In-vessel AD facilities which are located at existing or new permitted solid waste facilities or stand-alone AD facilities in areas zoned for industrial or solid waste handling activities.	The statement implies that digesters will only impact land zoned for industrial use or for solid waste handling. That is not true when liquid and solid digestate is applied on land that is not so zoned.	G-19
	3.6 Feedstocks Feedstock materials included in the scope: Food waste, green material and mixed solid waste… "food" includes cannery waste, meat, poultry, fish, cheese waste, food processing waste, fats, oils and greases (FOG), etc., and "green material" includes urban, agricultural, crop residues, contaminated green materials, etc	Since CalRecycle considers anaerobic digestion to be "composting," there should be discussion on the prohibition against composting of mammalian tissue.	G-20
3-11	**Digestate** Through the AD process… nutrients are concentrated in the remaining effluent [which consists] of liquids, remaining biomass, and inorganic solids… The liquid can be discharged to surface waters, percolation ponds, sanitary sewers, or beneficially used as irrigation water for agricultural crops. Efforts are underway to convert the liquid digestate into value added liquid fertilizer. Some post-digestion aeration and/or filtration may be required prior to discharge to reduce the solids content, oxygen demand, ammonia concentration, and/or salt concentration. The solid (or remaining digestate) can be aerobically composted, disposed of in landfills or beneficially used as a soil amendment for agricultural crops.	Liquid effluent may contain dissolved or suspended organics in addition to salts. Any discharge of liquid or solid digestate to surface water or land (including use as a fertilizer or soil amendment) must occur pursuant to WDRs that consider all constituents that could adversely affect water quality.	G-21
3-13	**3.8 Construction** Construction of AD facilities would require site preparation and earthwork, consisting of stripping the area of vegetation (or demolition of structures if the site were previously developed) and either removing or storing the materials for later use in the finished grading phase. Rough earthwork would consist of cutting or filling the site to produce overall site gradients as specified by each project.	A construction Stormwater permit must be obtained if appropriate for the project.	G-22

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John Menke's Excerpts and Comments for the February 2011 draft Statewide Anaerobic Digester Facilities PEIR prepared for CalRecycle

Page	Statement	Comment	
3-14	**Table 3-1** Approvals Potentially Needed For Anaerobic Digester Facilities.	The heading should be modified to state "Approvals or Permits"	G-23
3-15	**3.13.1 Compostable Materials Handling Facility** Composting is defined broadly as "the controlled or uncontrolled biological decomposition of organic wastes" (California Public Resources Code [PRC] Section 40116.1). Anaerobic digestion fits within this statutory definition. Thus, AD facilities could be regulated under CalRecycle's compostable material handling regulations.	From a scientific perspective, aerobic digestion is not composting. The PRC should be modified as appropriate to avoid inappropriate regulation.	G-24
3-17	**3.13.2 Transfer Processing Operations and Facilities** It is anticipated that projects which do not qualify as compostable materials handling facilities could be regulated as transfer processing operations and facilities.	From the discussion in this section and the preceding section, it is not apparent what permitting is appropriate for various facilities covered under the EIR. Clarification should be provided.	G-25
3-9	**3.7.2 Digestion** Typically, organic wastes contain 20 - 40% solids on a mass basis as received, although the initial solids concentration of the waste stream depends heavily on its composition (e.g. green and paper wastes tend to have higher initial solids concentrations than food wastes). Some systems dilute the waste with water to facilitate sorting, pumping and microbial contact within the reactor…	Should note that the need to dilute feedstock from 20 - 40% solids to 10% solids requires significant water and results in the need to store and manage liquid digestate. Potential annual water need for a "typical" digester should be calculated based on diluting 50,000 tons of MSW from 30% solids to 10% solids.[1] Water sources/availability including recycling should then be discussed.	G-26
3-10	… commercial digesters include single-stage systems with waste diluted to less than 10% solids-mass fraction; single-stage systems that process undiluted wastes; two-stage systems in which diluted wastes are loaded into the first stage; and two-stage systems with undiluted waste (i.e., high solids AD facilities) loaded in batches into the first-stage reactors and leachate loaded continuously into the second-stage reactor. The potential exists for other configurations to be utilized as well. For example, some reactors may be aerated, solids may be separated and re-circulated, and other design innovations could be envisioned.		
4-1	**Chapter 4: Approach to Environmental Analysis**	This section should include discussion of the management (use) of digestate	G-27
	4.2 Anaerobic Digester (AD) Facilities For the purpose of this Program EIR, AD facility development is expected to consist of in-vessel digesters to be located at permitted solid waste facilities and within industrially zoned areas.	Noted	
4-4	**4.4 Environmental Setting and Baseline** The environmental baseline is that condition against which the future "with-project" condition is compared to determine the amount of impact. Normally, the environmental baseline is the same as existing conditions, as is the case for this Program EIR. Figure 4-1 and Table 4-1 show the existing composition of the disposed waste stream in California.	Noted	
4-7	**4.5 Cumulative Impacts** … While the Program EIR resource sections analyze the impacts of AD facility development located at permitted solid waste facilities and within industrially zoned areas, the cumulative analysis also considers the impacts from other closely related past, present, and reasonably foreseeable probable future projects throughout California	Need to discuss the application of solid and liquid digestate at locations other than the site where the AD is located.	G-28
4-8	For the cumulative analysis in this Program EIR, it was assumed that 70 AD facilities (each assumed to process 50,000 tons of MSW) could be developed statewide by 2020.	Noted	

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[1] 50,000 tons MSW @ 30% solids = 15,000 tons solids = 150,000 tons diluted feedstock @ 10% solids
Water addition is 100,000 tons @240 gallons/ton = 24 million gallons, but some of the water can be recycled, so the "new" water need is lower.

Letter G

John Menke's Excerpts and Comments for the February 2011 draft Statewide Anaerobic Digester Facilities PEIR prepared for CalRecycle

Page	Statement	Comment	
5-1	**Chapter 5: Air Quality and Greenhouse Gas** **Air Quality Pollutants of Concern** **Criteria Air Pollutants**	See following excerpts from Chapter 5	
5-3	**Nitrogen Dioxide (NO_2).** NO_2 is a reddish brown gas that is a by-product of combustion processes. Automobiles and industrial operations are the main sources of NO_2. NO_2 may be visible as a coloring component of a brown cloud on high pollution days, especially in conjunction with high ozone levels. NO_2 is an air quality concern because it acts as a respiratory irritant and is a precursor of ozone. NO_2 is a major component of the group of gaseous nitrogen compounds commonly referred to as nitrogen oxides (NOx). Nitrogen oxides are produced by fuel combustion in motor vehicles, industrial stationary sources (such as industrial activities), ships, aircraft, and rail transit. Typically, nitrogen oxides emitted from fuel combustion are in the form of nitric oxide (NO) and nitrogen dioxide (NO_2). NO is often converted to NO_2 when it reacts with ozone or undergoes photochemical reactions in the atmosphere. Therefore, emissions of NO_2 from combustion sources are typically evaluated based on the amount of NOx emitted from the source.	NOx emissions from facilities that utilize biogas from anaerobic digestion in internal combustion engines that power a generator are a concern for some Air Quality Management Districts and have resulted in closure of some facilities because they could not meet air emission standards. The potential for this to occur at project sites should be discussed.	G-29
5-17	**5.2 Impacts and Mitigation Measures / Approach and Methods / Criteria Pollutants** Construction and operations of AD facilities would result in criteria pollutant emissions… for the operation of anaerobic digesters, additional sources and emissions would include any diesel equipment on-site for pre-processing, increased traffic on the local and regional roadway network, and the post processing of the biogas.	Need to identify the use of biogas in an ICE as a source of emissions (see Measure 5.1b on Page 5-20).	G-30
	Odors Due to the collection, transport, storage, and pre-processing activities of the potentially odiferous organic substrates for digestion and resultant digestates, the siting of these AD facilities could lead to objectionable odors at off-site receptors in the vicinity of an AD facility. This impact is discussed and mitigation measures are identified below in Impact 5.2.	The impact and mitigation of nuisance odors are not sufficiently discussed	G-31
5-18	**Impact Analysis** **Impact 5.1**: Construction and operations of AD facilities within California would result in emissions of criteria air pollutants at levels that could substantially contribute to a potential violation of applicable air quality standards or to nonattainment conditions. (Significant)	Noted	
	Operations Emissions associated with digester operations would depend on several factors… and the post processing of the biogas (e.g., flaring of excess biogas, combusting for electricity, or cleaning up biogas for use as a transportation fuel or injection to utility transmission lines)	Noted	
5-20	**Mitigation Measures** **Measure 5.1a**: Applicants shall… submit an Air Quality Technical Report… for the development of future AD facilities on a specific project-by-project basis. The technical report shall include an analysis of potential air quality impacts … Preparation of the technical report should be coordinated with the appropriate air district and shall identify compliance with all applicable New Source Review and Best Available Control Technology (BACT) requirements. The technical report shall identify all project emissions from permitted (stationary) and non-permitted (mobile and area) sources and mitigation measures (as appropriate) designed to reduce significant emissions to below the applicable air district thresholds of significance, and if these thresholds cannot be met with mitigation, then the individual AD facility project could require additional CEQA review or additional mitigation measures.	Noted	

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John Menke's Excerpts and Comments for the February 2011 draft Statewide Anaerobic Digester Facilities PEIR prepared for CalRecycle

Page	Statement	Comment	
5-20 – 5-21	**Measure 5.1b**: Applicants shall require construction contractors and system operators to implement the following Best Management Practices (BMPs) as applicable during construction and operations:… Where feasible as an alternative to internal combustion engines, which generate nitrogen oxides (NOx) emissions, use biogas from AD facilities as a transportation fuel (compressed biomethane), in fuel cells to generate clean electricity, or inject biomethane into the utility gas pipeline system. If there are other low NOx technologies available at the time of AD facility development, these should be considered as well during the facility design process. Impact Significance After Mitigation: Less than Significant Implementation of Mitigation Measures 5.1a and 5.1b would ensure that BMPs are followed during construction and operational activities and that emissions associated with AD facilities to be built under this Program EIR would be reduced to a less–than-significant level.	Need to discuss constraints relative to the statement "where feasible." New emissions of criteria air pollutants are not allowed in non-attainment basins. Construction of AD facilities should not proceed if it is not anticipated that emission requirements can be met by the operating facility.	G-32
5-21	**Impact 5.2:** Operation of AD facilities in California could create objectionable odors affecting a substantial number of people. (Significant) Anaerobic digestion is the biological decomposition of organic matter in the absence of molecular oxygen… odorous compounds, such as ammonia and H_2S, are generated and could be released into the environment… the digestion process occurs in a closed system… and exhaust is generally processed in a more controlled environment. However, the collection transport, storage, and pre-processing activities of the potentially odiferous organic substrates for digestion and the resultant digestate could produce nuisance odors at AD facilities… the siting of these digester facilities could lead to objectionable odors at off-site receptors in the vicinity. Mitigation measures shall be implemented in order to ensure the potential nuisance impact associated with odors would not affect a substantial number of people.	The discussion of nuisance odors should also address sites where digestate is applied to land for use as a fertilizer / soil amendment.	G-33
	Mitigation Measures Measure 5.2a: Applicants for the development of AD facilities shall comply with appropriate local land use plans, policies, and regulations, including applicable setbacks and buffer areas from sensitive land uses for potentially odoriferous processes.	It might not be possible to meet the setback and buffer requirement at existing transfer station locations.	G-34
	Measure 5.2b: If an AD facility handles compostable material and is classified as a compostable material handling facility, the facility must develop an Odor Impact Minimization Plan (OIMP) pursuant to 14 CCR 17863.4. Otherwise, applicants shall develop and implement an Odor Management Plan (OMP) that incorporates equivalent odor reduction controls for digester operations. Odor control strategies that can be incorporated into these plans include, but are not limited to, the following:… • Require substrate haulage to the AD facility within sealed containers • Establish time limit for on-site retention of undigested substrates… • Provide enclosed, negative pressure buildings for indoor receiving and preprocessing • Treat collected foul air in a biofilter or air scrubbing system • Manage delivery schedule to facilitate prompt handling of odorous substrates Handle digestate within enclosed building and/or directly pump to sealed containers for transportation.	The OMP should also address sites where digestate is applied to land for use as a fertilizer / soil amendment.	G-35
5-27	**Mitigation Measure** **Measure 5.5**: Implement Mitigation Measures 5.1a and 5.1b. Impact Significance After Mitigation: Less than Significant Implementation of Mitigation Measure 5.5 would ensure that BMPs are followed during operational activities at all AD facilities to be developed under this Program EIR. In addition, because the jurisdictionally appropriate SIPs and AQMPs describe the measures that would be used to reduce emissions (from vehicular and non-vehicular sources) and to attain the ambient standards, cumulative development under this Program would be considered less than significant.	Should note that it may not be possible to implement BMPs at all potential AD sites, and in those situations the mitigation measure would be that the AD facilities would not be constructed.	G-36

John Menke's Excerpts and Comments for the February 2011 draft Statewide Anaerobic Digester Facilities PEIR prepared for CalRecycle

Page	Statement	Comment	
6-1	**Chapter 6 Hydrology and Water Quality**	A draft of this Chapter was reviewed by State Water Board staff – the current version addresses staff edits/comments	G-37
6-5	**Impact 6.5**: AD facilities could require additional water supplies resulting in depletion of groundwater. (Less than Significant) The volume of water required to operate AD facilities, including pre-processing, digestion, and post-processing, is expected to vary widely depending upon the anaerobic digester and digester feedstock's characteristics. Generally speaking, the digestion process is enabled by substantial water content during digestion. The amount of water that would need to be added in order to support digestion activities would, however, vary primarily as a function of the type of feedstock used. For instance, very wet feedstocks, such as liquid food processing wastes, may not require any additional water to support digestion. However, drier feedstocks, such as greenwaste, may require more substantial addition of water to support digestion.	The EIR should discuss the project effect on all water supplies, not just supplies from groundwater. The EIR should also discuss the effects of importing "very wet feedstocks." If such materials are not currently disposed at the site, management/disposal of the additional liquid must be addressed.	G-38
	As discussed in Chapter 3, Project Description, most AD facilities are anticipated to be co-located with permitted solid waste facilities or located in areas zoned for industrial or solid waste handling activities, which would have existing water uses on site. The volume of water required for digester operation is expected to be minor in comparison to the total volume of water required for the indicated waste handling facilities or that should be available in industrial zoned areas… it is assumed that digesters implemented under this Program EIR would rely on municipal water supplies, or water available onsite from sources such as wastewater produced onsite, stormwater, high-moisture feedstocks, or water made available through increased water use efficiency. Therefore, it is anticipated that AD facilities operated under this Program EIR would not require new or additional water supplies that would be sourced from groundwater. In the unlikely event that a digester implemented under this Program EIR would require the use of new or additional groundwater supplies, including the installation of new wells or increases in production of existing wells, the potential effects on groundwater levels must be evaluated separately, under subsequent environmental review. Therefore, this impact is considered less than significant.	The assumption that the volume of water required for digester operation will be comparatively minor or be available in industrial zones should be supported by an analysis. Availability of potable water is limited in some areas of California, and the potential to use recycled municipal or industrial wastewater should be discussed. The statement that separate evaluation of effects reduces potential effects to "less than significant" is illogical.	G-39
6-13	**Impact 6.2**: The operation of AD facilities could adversely affect surface and groundwater quality.	.Noted	
6-16	**Measure 6.2a**: During pre-processing, all water that contacts digester feedstock, including stormwater from feedstock handling and storage facilities and water from equipment washdown and feedstock wetting, shall be contained until appropriately disposed or utilized… All discharges of stormwater are prohibited unless covered under the [GISP], other NPDES permit, or are exempted... The [GISP] … requires the development of a storm water pollution prevention plan (SWPPP) and a monitoring plan, in compliance with permit requirements. Other liquid and solid wastes may only be discharged pursuant to an NPDES permit… or WDR order.	The statement implies that wastewater will be "disposed or utilized" pursuant to an NPDES permit or WDR Orders. Therefore, <u>all utilization</u> (e.g., use of digestate as a fertilizer or soil amendment) should be so regulated	G-40
	Measure 6.2b: [addresses fugitive trash or feedstock] … the project applicant shall ensure that (1) drainage from all feedstock loading, unloading, and storage areas is contained onsite or treated to remove trash and stray feedstock, and sediment prior to release…	Removing solids (e.g., feedstocks and trash) does not address soluble material; "release" should only occur as permitted	G-41
6-17	**Measure 6.2c**: In order to minimize water quality degradation associated with accidental spills… the Program EIR shall require project proponents to complete and adhere to the requirements of a (SPCC) Plan… Additionally, the project applicant shall adhere to the requirements and recommendations of WDRs…	Noted	
	Measure 6.2d: Any proposed discharge to a pond… would require the project applicant to acquire WDRs from the appropriate regional board. If appropriate, the WDRs would impose requirements for Class II surface impoundments. Compliance with WDRs may require the installation of facilities such as tanks and	Noted	

John Menke's Excerpts and Comments for the February 2011 draft Statewide Anaerobic Digester Facilities PEIR prepared for CalRecycle

Page	Statement	Comment	
	containers to store and process the digestate… and implementation of other water quality protection practices.		
6-17	**Measure 6.2e**: This measure would reduce potential for the movement of nutrients and other pollutants to groundwater and surface water for individual projects that would employ land application for liquid digestate or residual solids. The operators of individual projects implemented under this Program EIR shall ensure that land application of liquid digestate and/or residual solids adheres to all requirements of applicable WDRs. WDR requirements include but are not limited to, groundwater monitoring, completion of an anti-degradation analysis, and in some cases best practicable treatment and control to achieve salinity reduction in materials prior to discharge to land…	Application of digestate to cropland is not covered under existing WDRs. New individual WDRs will be required for application to cropland, landscaping. or rights-of way. Salinity control is best achieved by avoiding the use of salty feedstocks.	G-42
	Measure 6.2f: This measure would reduce the potential for water quality degradation from projects that include discharge of liquid digestate to surface waters. The applicant for individual projects implemented under this Program EIR shall ensure that the discharge of liquid digestate to surface waters adheres to all NPDES permitting recommendations and requirements, as established by the appropriate regional board. Specific measures may include, but are not limited to, limitations on discharge volumes, seasonal discharge restrictions, limitations on loading rates and/or concentrations of specific constituents, and other facility-specific water quality control measures designed to protect receiving water quality and preserve beneficial uses identified in Basin Plans.	Liquid digestate is likely to contain substances that could adversely impact water quality. Therefore, approval for discharge of digestate to surface water is expected to be very limited.	G-43
6-20	… most AD facilities are anticipated to be co-located with permitted solid waste facilities or located in areas zoned for industrial or solid waste handling activities, which would have existing water uses on site. The volume of water required for digester operation is expected to be minor in comparison to the total volume of water required for the indicated waste handling facilities or that should be available in industrial zoned areas.	See comments for Pages 3-9 and 3-10.and provide an assessment to substantiate that the volume of water required is minor.	G-44
6-21	**Impact 6.7**: AD facilities could contribute to cumulative impacts to water quality.	Noted	
6-23	**Measure 6.7**: Implement Mitigation Measures 6.2 (a-f) and 6.3 [*flood protection*].	Noted	
8-1	**Chapter 8 Public Services and Utilities**	Noted	
8-6	**Impact 8.2**: The project could potentially exceed wastewater treatment requirements of the Regional Water Quality Control Board (RWQCB). (Significant) There are various options for reuse or disposal of the digestate by-product from operation of the proposed facilities. One option is to send a portion or all of the digestate by-product to a wastewater treatment plant via trucks or sewer line… The digestate may require pre-treatment…	Noted	
8-6	**Mitigation Measures** **Measure 8.2a**: Implement Mitigation Measure 8.3b if the operator does not have an existing agreement, such as for co-located facilities. **Measure 8.2b**: In addition to an agreement for service, coordination with the wastewater treatment provider would be needed to determine if pre-treatment would be required to meet the RWQCB requirements for the existing wastewater treatment facility. Impact Significance After Mitigation: Less than Significant	Should note that it may not be possible to implement Mitigation Measure 8.3b at all potential AD sites, and in those situations the mitigation measure would be that the AD facilities would not be constructed.	G-45
8-7	**Impact 8.3:** The project could result in significant environmental effects from the construction and operation of new water and wastewater treatment facilities or expansion of existing facilities. Development of AD facilities co-located with existing permitted solid waste facilities would not increase water or wastewater treatment demands substantially above those levels already needed for the existing facilities. Potential new sources of water and wastewater treatment demands include the following: • Water for Feedstock – Due to the high liquid content of organics, it is unlikely that a significant amount of	Co-located AD facilities will likely have additional water supply needs (primarily to dilute wastes prior to digestion) and additional production of wastewater (liquid digestate) relative to a similar facility that does not utilize digestion.. Thus the impact	G-46

John Menke's Excerpts and Comments for the February 2011 draft Statewide Anaerobic Digester Facilities PEIR prepared for CalRecycle

Page	Statement	Comment	
	water would be needed for pre-processing or during the AD process. Non-potable or recycled water could also be used, for example from liquid produced after dewatering digestate in the post-processing phase	on water supply and wastewater treatment must be mitigated.	G-46 (cont.)
8-8	**Measure 8.3b**: If the project proposes to obtain wastewater service from a wastewater treatment provider (municipal or other public entity), the developer would enter into an agreement for service with the provider.	Any necessary pretreatment will need to be included in such an agreement.	G-47
8-9	**Impact 8.6**: The project could result in exceeding the capacity of a wastewater treatment provider. (Significant) As discussed in Impact 8.3, use of a wastewater treatment provider is an option for digestate disposal in addition to demands from domestic uses… the developer would need to ensure that adequate wastewater conveyance and treatment capacity is available, this impact is potentially significant. **Mitigation Measure** **Measure 8.6**: If the project proposes to obtain wastewater service from a wastewater treatment provider (municipal or other public entity), implement Mitigation Measure 8.3b. Impact Significance After Mitigation: Less than Significant	Should note that it may not be possible to ensure that adequate wastewater conveyance and treatment capacity is available at all potential AD sites. In those situations the mitigation measure would be that the AD facilities would not be constructed.	G-48
11-1	**Chapter 11** **Hazards and Hazardous Materials**	In discussions of feedstocks the report identifies "contaminated green materials." Clarification needs to be provided on the characteristics of that material.	G-49
11-4	**Anaerobic Digester and Biogas Hazards**… The risk of fire hazard is generally low because anaerobic digestion (AD) facilities and biogas transmission lines operate with very low pressures, similar to residential natural gas distribution lines.	The report identifies on option for biogas as "inject biomethane into the utility gas pipeline system." Some utility districts may only allow such injection into high-pressure lines.	G-50
11-5	**Pathogens and Vectors** Pathogens are disease-causing organisms, such as certain bacteria, viruses and parasites.	Pathogens and vectors need to be addressed at sites where digestate is utilized. Unless solid digestate is properly composted it should not be used on crops for human consumption, and liquid digestate should never be so used.	G-51

Response G-1

Impact 6.2 in Chapter 6 (Hydrology and Water Quality) of the Draft Program EIR, discusses how the digestate would be managed, and provides mitigation that could render the impact less than significant.

Response G-2

Impact 6.2 in Chapter 6 (Hydrology and Water Quality) of the Draft Program EIR, discusses the use of Best Management Practices (BMPs) and requirements and recommendations of Waste Discharge Requirements (WDRs), which would be provided for projects by applicable regional boards.

Response G-3

The commenter identifies potential drawbacks of various methods for managing liquid digestate. Impact 6.2 in Chapter 6 (Hydrology and Water Quality) of the Draft Program EIR, discusses options for liquid digestate management and potential impacts and identifies some potential mitigation measures.

Response G-4

Comment noted. The mitigation measures included would be subject to the WDR process described by the commenter.

Response G-5

The commenter states that CalRecycle should develop a BMP Manual for AD projects developed pursuant to the Final Program EIR. This request is consistent with the AD Initiative described beginning on page 3-2 of the Draft Program EIR. Two of the action items identify the development of guidance publications.

Response G-6

The commenter states that the Program EIR must clearly state that discharges to waste disposal facilities must be evaluated in advance to ensure they are acceptable relative to WDRs. Additional text has been added indicating that, per relevant state and federal law, any project proposed under this programmatic EIR, that would result in the discharge of digestate to a landfill or a wastewater treatment plant, would be required to meet applicable WDRs, total maximum daily loads (TMDLs), and other relevant and legally applicable waste management requirements, as relevant. Page 6-16 of the Draft Program EIR has been updated as follows:

> "Discharge of liquid digestate to surface waters can only occur pursuant to an NPDES permit promulgated by a regional board or by the State Water Board. Adherence to the permitting requirements for such a permit would be expected to reduce or minimize the concentration of water quality pollutants discharged to surface waters. Therefore, implementation of Mitigation Measure 6.2f would be required for all projects that would include a discharge to surface water. Additionally, in compliance with state and federal law, for each individual project implemented under this Program EIR that would result in the discharge of digestate to waste disposal facilities including landfills or wastewater treatment plants, the project would be required to comply with landfill and wastewater discharge requirements, including but not limited to relevant waste discharge requirements (WDRs) and total maximum daily loads (TMDLs), as applicable."

Response G-7

Mitigation Measure 6.2e states that operators of individual projects implemented under this Program EIR shall ensure that land application of liquid digestate and/or residual solids adheres to all requirements of applicable WDRs.

Response G-8

The text on page 6-9 of the Draft Program EIR is modified as shown below:

> "…Effective July 1, 2010 all dischargers are required to obtain coverage under the updated Construction General Permit Order 2009-0009-DWQ (the Construction General Permit), adopted on September 2, 2009. Construction activities include clearing, grading, excavation, stockpiling, and reconstruction of existing facilities (removal or replacement). For updated information see:
>
> http://www.waterboards.ca.gov/water_issues/programs/stormwater/construction.shtml"

Response G-9

Impact 6.5 in Chapter 6 (Hydrology and Water Quality) of the Draft Program EIR states that most AD facilities are anticipated to be co-located with permitted solid waste facilities or located in areas zoned for industrial or solid waste handling activities, which would have existing water uses on site. The volume of water required for digester operation is expected to be within normal ranges of water requirements for other industrial activities or solid waste handling activities. However, if more substantial volumes of water would be required for operation of an individual AD facility proposed under this Program EIR, additional project level environmental documentation, permitting, and compliance could be required at the project level. Under the legal requirements of SB 610, proposed industrial water uses that require over 40 acres or that use an amount of water equivalent to or greater than the demand of a 500-unit residential project in the relevant jurisdiction would be required to complete a water supply assessment (WSA). The WSA would be required in order to illustrate that sufficient water supply is available to serve the project, including during normal, dry, and multiple dry years. Compliance with SB 610 would thereby ensure that sufficient water supplies would be available to support the project.

Additional detailed, project by project discussion of potential water supply effects of individual projects to be implemented under this programmatic EIR is considered outside the scope of this document, because sufficient project level and site specific data to provide such analysis are not currently available.

On page 6-10 of the Draft Program EIR immediately after Table 6-1, the following text has been added:

> ### *"California Water Code Section 10910 through 10915 (SB 610 and Water Supply Assessment Requirements)*
>
> Senate Bills 610 and 221 (Chapters 643 and 642, respectively, Statutes of 2001) amended state law, effective January 1, 2002, to improve the link between information on water supply availability and certain land use decisions made by cities and counties. The bills were meant to promote more collaborative planning between local water suppliers and cities and counties, by requiring detailed information regarding water availability to be provided to the city and county decision-makers prior to approval of certain projects. SB 221 applies to residential subdivisions, and is not further relevant to this Program EIR. Under SB 610, a water supply assessment (WSA) must be furnished to local governments for inclusion in any environmental documentation for certain projects subject to CEQA, where "project" is defined in Water Code §10912 [a] as follows:
>
> (a) ''Project'' means any of the following:
>
>> (1) A proposed residential development of more than 500 dwelling units.
>>
>> (2) A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space.
>>
>> (3) A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space.
>>
>> (4) A proposed hotel or motel, or both, having more than 500 rooms.
>>
>> (5) A proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area.
>>
>> (6) A mixed-use project that includes one or more of the projects specified in this subdivision.

> > (7) A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project.
>
> (b) If a public water system has fewer than 5,000 service connections, then ‘‘project’’ means any proposed residential, business, commercial, hotel or motel, or industrial development that would account for an increase of 10 percent or more in the number of the public water system’s existing service connections, or a mixed-use project that would demand an amount of water equivalent to, or greater than, the amount of water required by residential development that would represent an increase of 10 percent or more in the number of the public water system’s existing service connections.
>
> The definitions provided above are currently undergoing legal challenges and scrutiny within the court system, wherein the definition of project may become more inclusive for some project categories.”

In response to this comment, recycled water has been added as a potential source of water in support of individual projects that would be operated under this Program EIR. The following text updates were made on page 6-20 of the Draft Program EIR:

> “As discussed in Chapter 3, Project Description, most AD facilities are anticipated to be co-located with permitted solid waste facilities or located in areas zoned for industrial or solid waste handling activities, which would have existing water uses on site. The volume of water required for digester operation is expected to be minor in comparison to the total volume of water required for the indicated waste handling facilities or that should be available in industrial zoned areas. Therefore, it is assumed that digesters implemented under this Program EIR would rely on municipal water supplies, or water available onsite from sources such as wastewater produced onsite, stormwater, high-moisture feedstocks, recycled wastewater, or water made available through increased water use efficiency. ~~Therefore, i~~It is anticipated that AD facilities operated under this Program EIR would not require new or additional water supplies that would be sourced from new or additional direct surface or groundwater withdrawals. In the unlikely event that a digester implemented under this Program EIR would require the use of new or additional direct surface or groundwater withdrawals~~supplies~~, including the installation of new wells or surface diversions, or increases in production of existing wells or surface diversions, the potential effects on groundwater levels or surface water flows must be evaluated separately, under subsequent environmental review.
>
> Additionally, larger projects that would be over 40 acres in area, that would result in the use of water at rates equivalent to or exceeding the volume used by a residential development of 500 units, or that would otherwise trigger regulation under SB 610, would be required to undergo a formal Water Supply Assessment (WSA). The WSA would evaluate proposed water supplies in order to ensure that sufficient water supply is available, during normal, dry, and multiple dry years, to enable the operation of individual AD projects. In the event that identified water supply sources are insufficient for the project, pursuant to SB 610, other sources of water supply would be identified or the individual AD facility would be

> modified to operate consistent with available water supply. Therefore, compliance with SB 610 for facilities with relatively large water use, as required by state law, would minimize potential for depletion of water supplies, and ~~Therefore,~~ this impact is considered less than significant."

See also response to comment J-19.

Response G-10

Beginning on page 5-18 of the Draft Program EIR, Impact 5.1 identifies the potential for AD facilities to contribute to violations of applicable air quality standards or to nonattainment conditions. Both construction and operations are discussed. In order to clarify potential challenges in meeting local air district standards associated with NOx emissions from biogas usage in internal combustion engines, text on page 5-19 of the Draft Program EIR was revised as follows:

> "However, quantification of operational emissions is too speculative on this statewide programmatic level since there are too many unknown localized variables and operational considerations. For instance, if AD facilities use biogas in internal combustion engines to generate electricity, the process also emits NOx, which is a precursor of ozone. As shown in Table 5-3, many air basins are non-attainment of the state and/or federal ozone ambient air quality standards, and the potential NOx emissions from these internal combustion engines could be a challenge for AD facilities in meeting local AQMD or APCD standards. Project-by-project analysis will be able to obtain specific information, such as landfill and AD facility distances to the applicable solid waste centroid (for VMT), operating information for the landfill that organics are being diverted from (i.e., equipment operations, methane capture rate and end use of the biogas), as well as individual AD facility operating characteristics (i.e., organics throughput, equipment, biogas usage), which will be evaluated to develop an informative emissions inventory."

The project-by-project analysis mentioned above is required through Mitigation Measure 5.1a in the Draft Program EIR. Measure 5.1a states that a technical report shall be prepared in coordination with the appropriate air district that would assess project emissions, identify compliance with all applicable New Source Review and Best Available Control Technology (BACT) requirements, and develop mitigation measures (as appropriate) to reduce significant emissions to below the applicable air district thresholds of significance. If thresholds cannot be met with mitigation, then the individual AD facility project could require additional CEQA review or additional mitigation measures. Thus, internal combustion engines to generate electricity from biogas may be more difficult to permit in air basins that are non-attainment for ozone due to the potential NOx emissions, but it would be possible based on compliance with BACT and local air district requirements, which would be determined on a project-by-project basis.

Response G-11

Impact 5.2 identifies the potential for AD facilities to produce nuisance odors and recommends Mitigation Measures 5.2a and 5.2b to ensure odors would not affect a substantial number of people (see page 5-21 of the Draft Program EIR).

Response G-12

The text related to contaminated green material in Section 3.6 on page 3-8 of the Draft Program EIR has been revised as follows:

> "…agricultural, crop residues, contaminated green materials (containing inorganic material), etc."

Response G-13

The Biogas description on page 3-11 of the Draft Program EIR has been revised as follows:

> ### "Biogas
>
> Biogas generated through the AD process is captured and can be combusted in a flare, used directly in boilers or in reciprocating or gas turbine engines to produce electricity and heat, or the biogas can be upgraded to biomethane through the removal of hydrogen sulfide, carbon dioxide (CO_2), and moisture. Biomethane is a product almost equivalent to natural gas, which typically contains more than 95 percent methane (CH_4). Biomethane can be used in place of natural gas for various processes, and can be used onsite, piped to neighboring facilities, or by utility companies. Biomethane can be upgraded to utility standards and injected ~~pumped~~ into a natural gas supply pipelines, as well as for electrical generation, heating, cooling, and for natural gas-fueled vehicles. For each biogas optional use specific gas conditioning measures would be required. Although there are methodological variations in how the biogas can be conditioned, **Figure 3-4** below depicts the general processes considered in this Draft Program EIR. Some projects in California have injected or have rights to inject biomethane into utility pipeline systems (typically into high pressure lines), these systems require substantial additional design and require continuous monitoring to assure the quality of the injected biomethane."

Response G-14

More information on all impacts can be found in their corresponding Chapters of the Draft Program EIR.

Response G-15

Comment noted. As identified on page 3-2 of the Draft Program EIR, CalRecycle seeks to reduce by 50 percent the amount of organic waste disposed in the state's landfills by 2020. Many of the Mitigation Measures in the document are recommended to prevent impacts to water quality.

Response G-16

Figure 3-1 is intended to show how AD facilities for municipal organic waste would generally operate. Chapter 6 (Hydrology and Water Quality) of the Draft Program EIR discusses the need for WDRs or a conditional waiver of WDRs.

Response G-17

Figure 3-3 is intended to show the linkage between AD processes (by phase) and the general environmental effects. Chapter 6 (Hydrology and Water Quality) of the Draft Program EIR discusses the need for WDRs or a conditional waiver of WDRs.

Response G-18

Section 3.7.1 on page 3-9 of the Draft Program EIR has been revised as follows:

> "…would depend on the type of feedstock and digester technology. Wetting to adjust liquid percentage results in the need to manage liquid digestate and thus may require additional storage facilities. Some anaerobic digestion technologies are designed to remove inert solids in the pre-processing stage, while others are designed to remove inert solids after digestion during post-processing."

Response G-19

Section 3.5 refers to the actual location of AD facility buildings and equipment that are covered in the Draft Program EIR.

Response G-20

Unprocessed mammalian tissue cannot be received at a compost facility unless authorized to do so as a research project. Meat that may be included in waste collected from restaurants or residences can be received at compost facilities.

The following text has been added to the end of Section 3.6 on page 3-8 of the Draft Program EIR:

> "…Unprocessed mammalian tissue (i.e., dead cows, carcasses, etc.) is also not included in the scope of this Program EIR."

Response G-21

See responses to Comments G-2, G-4, G-6, G-7, G-40 and G-42.

Response G-22

The commenter states correctly that a construction stormwater permit must be obtained if appropriate for the project. Chapter 6 Hydrology and Water Quality of the Draft Program EIR discusses the need of construction stormwater permits. See response to Comment G-8.

Response G-23

Comment noted. Permits are a form of approval.

Response G-24

Changes to state law are not part of the scope of the Program EIR, however, changes to the regulations that would apply to AD facilities are potential actions of the AD Initiative, as discussed beginning on page 3-2 of the Draft Program EIR.

Response G-25

See response to Comment C-2.

Response G-26

As discussed on page 3-10 of the Draft Programmatic EIR, digestion technologies that would be included in specific projects implemented under the Program EIR could include systems that rely on diluted or undiluted wastes. Potential environmental impacts of handling of liquid digestate are discussed on page 6-15 of the Draft Programmatic EIR. For a discussion of potential impacts related to water use, please see response to Comment G-9.

Response G-27

Chapter 4 presents the general approach to analyses that was used to evaluate the impacts of the project. Information on potential uses of digestate is discussed on page 3-11 of the Draft Program EIR.

Response G-28

Impact 6.2 in the Draft Program EIR (beginning on page 6-13) identifies potential impacts of residual solids and liquid digestate. Mitigation measure 6.2 includes potential mitigation measures (i.e, Measures 6.2e and 6.2f) for liquid digestate at locations other than the site where the AD is located.

Response G-29

See response to Comment G-10.

Response G-30

Page 5-17 of the Draft Program EIR already notes that criteria air pollutant emissions operational sources would include post processing of biogas. Internal combustion engines (ICEs) are one of the biogas post processing options.

Response G-31

See response to Comment G-11.

Response G-32

Commenter is mistaken in the assertion that new emissions of criteria air pollutants are not allowed in non-attainment air basins. Internal combustion engines to generate electricity from biogas may be more difficult to permit in air basins that are non-attainment for ozone due to the potential NOx emissions, but it would be possible based on compliance with BACT and local air district requirements, which would be determined on a project-by-project basis. Please see response to Comment G-10 as well.

Response G-33

The commenter states that Impact 5.2 in Chapter 5 Air Quality should address odors from where digestate is applied to land for use as a fertilizer/soil amendment. However, for this land application it is assumed that the digestate would be used instead of another fertilizer or other soil amendment such as manure, which would be similarly odoriferous. This would be the choice of the receiving property owner, who would be the primary recipient of any potential odors. Thus, land application of digestate is not anticipated to create objectionable odors affecting a substantial number of people.

Response G-34

Existing transfer stations should already meet local setback and buffer requirements. Adding AD activities would be within the transfer facility boundary.

Response G-35

See response to Comment G-33.

Response G-36

If BMPs cannot be implemented the CEQA review could identify odors as a Significant and Unavoidable impact of the project. In such cases a project could still be approved if the Lead Agency prepares a Statement of Overriding Considerations. Or the Lead Agency could deny project approval.

Response G-37

The commenter states that a draft of Chapter 6 Hydrology and Water Quality was reviewed by State Water Board Staff and that the current version addresses staff edits and comments.

Response G-38

In regards to water related impacts and water supply issues, see response to Comment G-9.

In regards to the comment about very wet feedstocks, the commenter should note that this discussion is framed in the context of digester requirements for adding water to dry feedstocks, or to feedstocks that do not have sufficient water content for digestion. For such feedstocks, additional water would need to be added, depending on digester design, in order to maintain minimum required moisture content for digestion/processing. Very wet feedstocks, as described for Impact 6.5 of the Draft Programmatic EIR, would contain sufficient water such that addition of supplemental water would not be required, but would not contain excess water. If excess water were contained in the feedstock, conditions for digestion would not be optimal, and either (1) the feedstock would not be used for digestion in the first place, or (2) additional dry or low moisture feedstock would be added in order to support optimal moisture content/digestion conditions under an efficient/economically viable process. Therefore, additional wastewater would not be generated as a result of use of very wet feedstocks, and additional wastewater treatment would not be required.

Response G-39

See response to Comment G-9.

Response G-40

Measure 6.2e regulates digestate by stating that the operators of individual projects implemented under this Program EIR shall ensure that land application of liquid digestate and/or residual solids adheres to all requirements of applicable WDRs. Due to various on-site or off-site post processing options for digestate, some products (i.e., fertilizer or soil amendments) could be developed that would not require WDR orders for off-site use. Final uses would be subject to regional water board regulations.

Response G-41

Mitigation Measure 6.2b is revised on page 6-16 of the Draft Program EIR as shown below:

> “**Measure 6.2b**: In order to minimize the amount of fugitive trash or feedstock released to surface waters, the following measures shall be implemented. When feasible, the project proponent shall preferentially select feedstocks that contain minimal amounts of trash that could become entrained in surface water, either via direct contact with stormwater flows or via other accidental release, such as due to wind. Processing of such feedstocks may, however, be unavoidable, such as in support of an AD facility that processes MSW. Therefore, the project applicant shall ensure that (1) drainage from all feedstock loading, unloading, and storage areas is contained onsite or treated to remove trash and stray feedstock, and sediment prior to release <u>as permitted</u>; (2) in all feedstock loading and unloading areas, and all areas where feedstock is moved by front loaders or other uncovered or uncontained transport machinery, the applicant shall ensure that mechanical sweeping and/or equivalent trash control operational procedures are performed at least daily, during operations; and (3) the facility operator shall train all employees involved in feedstock handling so as to discourage, avoid, and minimize the release of feedstock or trash during operations.”

Response G-42

Mitigation Measure 6.2e indicates that the operators of individual projects implemented under this Program EIR shall ensure that land application of liquid digestate and/or residual solids adheres to all requirements of applicable WDRs. Mitigation Measure 6.2e further states that WDRs would be issued by the appropriate regional board, and would consider site-specific conditions and waste characteristics, in order to determine applicable control measures and procedures that protect water quality.

Response G-43

Comment noted. As indicated by the comment, approvals by regional water boards for the discharge of liquid digestate to surface waters are expected to be very limited. Mitigation measure 6.2f addresses likely conditions for discharges to surface waters.

Response G-44

See response to Comment G-9.

Response G-45

If Mitigation Measures 8.2a or 8.2b cannot be implemented, the option of sending a portion or all of the digestate by-product to a wastewater treatment plant would not be viable. Other post treatment options would need to be developed.

Response G-46

Impact 8.3 relates to impacts of developing new or expanded water and wastewater treatment facilities. It is assumed that proposed AD would be sited in areas with adequate existing water and wastewater treatment capacity, primarily because of the infrastructure assumed at locations considered in the scope of the Program EIR (see Section 3.5 of the Program EIR). Any projects requiring the development of new or expanded water plants or wastewater treatment facilities would need to conduct project-level review of the potential impacts from constructing new or expanded facilities. Water recycling should be incorporated into project to minimize project effects (see responses to Comments J-19 and S-18).

Response G-47

Comment noted.

Response G-48

See response to Comment G-46.

Response G-49

See response to comment G-12.

Response G-50

See response to Comment G-13. Commenter is correct; AD facilities that do utility system pipeline injection probably would be required to pressurize the biomethane prior to infection into the utility gas system pipeline. Projects would have to coordinate closely with the utility in such situations.

Response G-51

The commenter states that pathogens and vectors need to be addressed at sites where digestate is utilized. Impact 11.6 in Chapter 11 Hazards and Hazardous Material addresses pathogens and vectors and insures proper composting so that digestate can be utilized.

Letter H

San Luis Obispo County
Integrated Waste Management Authority

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March 28, 2011

CalRecycle
Attn: Ken Decio
PO Box 4025, MS 10-A
Sacramento, CA 95812

Subject: **Comments on the Draft Program Environmental Impact Report on Statewide Anaerobic Digester Facilities for the Treatment of Municipal Organic Solid Waste (SCH #2010042100)**

Dear Mr. Decio:

The San Luis Obispo County Integrated Waste Management Authority appreciates the opportunity to offer comments on the Draft Program Environmental Impact Report on Statewide Anaerobic Digester Facilities for the Treatment of Municipal Organic Solid Waste (SCH #2010042100).

A. General Comments

We certainly appreciate the inherent challenges in assessing the potential environmental impacts and identifying appropriate mitigation measures for the development AD facilities at a programmatic level. We are, nonetheless, concerned that some of the proposed mitigation measures are overly prescriptive and may not reflect what is necessary or appropriate based upon specific feedstocks, technologies, facility design and operational parameters. That concern is compounded by the fact that the proposed mitigation measures may become de facto state minimum standards or 'Best Management Practices." We respectfully submit that a more flexible specification of mitigation measures would be appropriate. H-1

B. MEASURE 5.1b.

H-2

Measure 5.1b states: Facilities shall require substrate unloading and pre-processing activities to occur indoors within enclosed, negative pressure buildings.

While this restriction would be appropriate for food waste and MSW, it is excessive for green material. For example, some AD facilities may only process green material and it may not be necessary to receive green material in an enclosed building. Thus we would recommend the following change:

Facilities shall require substrate, **which contains food waste and/or MSW,** unloading and pre-processing activities to occur indoors within enclosed, negative pressure buildings.

C. MEASURE 5.2b.

H-3

We would like to provide our perspective and comments on the proposed odor mitigation measures (Table 1-1, Measure 5.2b, page 1-8). This draft EIR is addressing a range of AD technologies (wet and dry) and a range of feedstocks (green material, food waste, MSW). Figure 3-1 illustrates some of the various AD facility options. For example on Figure 3-1, it states "Pre-processing (May be open or enclosed). This is inconsistent with the listed criteria which requires pre-processing in an enclosed building. If the AD facility is only processing green material it may not be necessary to pre-process the material in an enclosed facility. On the other hand, if food waste and MSW are included, then pre-processing in an enclosed facility would be necessary. Other examples of where the specific criteria may not be applicable are as follows:

H-4

Require substrate haulage to the AD facility within sealed containers.

We would respectfully submit that the use of the term 'sealed container" potentially implies that the container would be air tight. We do not believe that this is necessary or appropriate. Current regulations/franchise agreements already adequately govern how material is transported to solid waste facilities. For example it would be unreasonable to require a gardener or tree trimming company to haul their green material in sealed containers. Food waste and MSW is currently hauled in garbage trucks and this method of hauling would be appropriate whether the material is going to a landfill or AD facility. Thus no mitigation measure related to hauling is needed since the hauling of various feedstocks are already regulated. Instead a statement requiring an appropriate container should be included.

H-5

Establish time limit for on-site retention of undigested substrates (i.e., substrates must be put into the digester within 24 hours of receipt).

We would respectfully submit that the proposed measure to require that substrates be put into the digester within 24 hours of receipt would be infeasible for plug flow digester designs because they must be fed on a regular basis and waste is typically only collected five days a week. Furthermore, an appropriate time limit should consider what other mitigation measures are being implemented, such as the provision of enclosed negative pressure buildings for indoor receiving and preprocessing with a biofilter or air scrubbing system.

H-6

Handle digestate within enclosed building and/or directly pump to sealed containers for transport.
The solid portion of the digestate needs to be converted from an anaerobic to aerobic condition. Once that occurs the solid digestate is now compost. At that point the material no longer needs to be within an enclosed building. This is consistent with Figure 3-1. which states, compost (May be open or enclosed).

H-7

Thus, the 4th bullet under Measure 5.2b should be modified as follows:

A list of odor control technologies and management practices that could be implemented to minimize odor releases. These management practices ~~shall~~ may, as necessary and appropriate, include ~~the establishment of~~ the following ~~criteria~~:
- Require substrate haulage to the AD facility within ~~sealed~~ appropriate containers.
- Establish time limit for on-site retention of undigested substrates ~~(i.e., substrates must be put into the digester within 24 hours of receipt).~~
- Provide enclosed, negative pressure buildings for indoor receiving and preprocessing food waste and MSW feedstocks. Treat collected foul air in a biofilter or air scrubbing system.
- Establish contingency plans for operating downtime (e.g., equipment malfunction, power outage).
- Manage delivery schedule to facilitate prompt handling of odorous substrates.
- Handle digestate within enclosed building until it reaches an aerobic state and/or directly pump to sealed containers for transportation.
- Protocol for monitoring and recording odor events.
- Protocol for reporting and responding to odor events.

C. ALTERNATIVE ANALYSIS

H-8

We are concerned about the lack of any definitive conclusions about the relative environmental merits of the proposed project to the alternatives. In particular, we note the following statement on page 13-19:

"Therefore, compared to the alternatives analyzed in this chapter, the Aerobic Composting Alternative is the environmentally superior alternative because it is most likely to result in substantial reductions in organics in the waste stream by 2020. However, it should be noted that the proposed project (the AD Initiative) could substantially achieve all the project objectives and could be implemented with mitigation measures that would reduce most of the project impacts to a level that would be less than significant."

We have no disagreement with the conclusion that the Aerobic Composting Alternative is the environmentally superior alternative among the alternatives considered. We would, however, respectfully submit that it is not environmentally superior to the proposed project. In particular, we note per Table 13-1 that the Aerobic Composting Alternative has potentially equal or greater impacts in terms of air quality, odor and noise (5.1, 5.2 and 7.3). We would also note that it only achieves Objective 2 –Support of AB 32 to a limited degree.

H-8 (cont.)

We would respectfully submit that the EIR needs to definitively state that none of the alternatives considered are environmentally superior to the proposed project and therefore propose the addition of the following sentence to the end of the above paragraph:

"None of the alternatives considered are environmentally superior to the proposed project."

D. OTHER COMMENTS

H-9

At this point in time, we would reserve judgment on whether it is necessary or desirable to pursue a new regulatory package to establish specific requirements for the permitting of AD facilities, although some modest changes to the existing Title 14 regulation may be warranted to accommodate the permitting of AD facilities.

H-10

We fully support the idea of preparing a guidance document on how local government lead agencies and LEAs may use the Program EIR to facilitate the siting and permitting of AD facilities.

Sincerely,

William A. Worrell, P.E.

Response H-1

The Draft Program EIR identifies mitigation measures that, if implemented, would reduce impacts to less than significant in most cases. However, for some AD facilities, not all of the mitigation would be needed. For other AD facilities, modified or additional mitigations would be required. A lead agency will need to determine the specific mitigations for each facility, utilizing the measures in the Draft Program EIR as a resource and guide.

Response H-2

See response to comment H-1. Depending on feedstock and operating conditions not all facilities would need unloading and pre-processing to occur indoors within enclosed, negative pressure buildings.

Response H-3

See responses to comments H-1, H-2, and J-7.

Response H-4

See response to Comment J-7.

Response H-5

See response to comment J-7.

Response H-6

See response to comment J-7.

Response H-7

See response to comment J-7.

Response H-8

Comment noted. In regards to environmental superiority, the alternatives were only evaluated relative to each other. The statement on page 13-19 was provided to show that the proposed project does substantially achieve all the project objectives with minimal environmental impacts. The Draft Program EIR has been revised on pages 1-6 and 13-19 as follows:

> "However, it should be noted that the proposed project (the AD Initiative) could substantially achieve all the project objectives and could be implemented with mitigation measures that would reduce ~~most of~~ the project impacts to a level that would be less than significant. None of the alternatives considered are environmentally superior to the proposed project in that they do not meet project objectives."

Response H-9

Comment noted.

Response H-10

Comment noted.

Letter I

LOS ANGELES COUNTY
SOLID WASTE MANAGEMENT COMMITTEE/
INTEGRATED WASTE MANAGEMENT TASK FORCE
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GAIL FARBER, CHAIR
MARGARET CLARK,

March 31, 2011

Mr. Ken Decio, Contract Manager
California Department of Resources Recycling and Recovery
P.O. Box 4025, MS 10-A
Sacramento, CA 95812

Dear Mr. Decio:

COMMENTS REGARDING STATEWIDE ANAEROBIC DIGESTER FACILITIES
FOR THE TREATMENT OF MUNICIPAL ORGANIC SOLID WASTE
DRAFT PROGRAM ENVIRONMENTAL IMPACT REPORT
RELEASED FOR PUBLIC COMMENT FEBRUARY, 14, 2011

The Los Angeles County Integrated Waste Management Task Force (Task Force) is fully supportive of efforts by the State of California to promote the development of alternatives to landfills. As you know, the Task Force has been a consistent supporter of conversion technologies as a way to manage post-recycled residual solid waste. We appreciate the resources the California Department of Resources Recycling and Recovery (CalRecycle) has developed for local governments and potential project developers over the last few years. This draft Program Environmental Impact Report (PEIR) is another tool that can be used by local and regional decision makers who are considering anaerobic digestion (AD) projects. The draft PEIR provides analysis of AD facilities as a starting point for local jurisdictions in preparing California Environmental Quality Act compliance for local AD projects.

Pursuant to Chapter 3.67 of the Los Angeles County Code and the California Integrated Waste Management Act of 1989 (AB 939, as amended), the Task Force is responsible for coordinating the development of all major solid waste planning documents prepared by the County and the 88 cities in the County of Los Angeles. Consistent with these responsibilities and to ensure a coordinated, cost-effective, and environmentally sound solid waste management system in the County of Los Angeles, the Task Force also addresses issues impacting the solid waste management system on a countywide basis. The Task Force membership includes representatives of the League of California Cities (Los Angeles County Division), the County of Los Angeles Board of Supervisors, the City of Los Angeles, the waste management industry, environmental groups, the public, and a number of other governmental agencies.

The Task Force is supportive of the draft PEIR as a whole; however, we would like to offer the following comments for the record:

- A primary objective identified for this PEIR is to "support CalRecycle Strategic Directive 6.1: to reduce the amount of organics in the waste stream by 50 percent by 2020." The Task Force would like to note for the record that Strategic Directive 6.1 is not a legislative or regulatory mandate, but rather a goal adopted by CalRecycle. I-1

Letter I

- We are concerned that the mitigation measures identified in the PEIR and summarized in Table 1.1 may be too rigid and for some projects, unnecessary, and costly resulting in new barriers to certain projects wishing to make use of the PEIR. Therefore, we request the PEIR be amended to clearly note that not all projects would result in significant impacts in all the categories identified, and that although the impacts may be mitigated by the measures suggested in the table, there are alternative mitigation measures available, but ultimately the local permitting requirements should take precedence. I-2

- The draft PEIR briefly discusses thermal conversion including non-combustion thermal conversion technologies as an alternative for organics diversion. At this point in time and based on the narrowly defined objectives identified for the project in question, anaerobic digestion was identified as the preferred alternative. However, other technologies are highly capable of diverting solid waste and organics from landfill disposal in an environmentally safe and economically viable manner. As acknowledged in the PEIR, “conversion technologies are part of the longer-term strategy for organics diversion.” Therefore, we urge CalRecycle to expedite the development of additional PEIRs for various types of conversion technologies including non-combustion thermal processes. Several jurisdictions throughout California including the County of Los Angeles, Salinas Valley Solid Waste Authority, City and County of Santa Barbara among others are considering various types of conversion technologies other than anaerobic digestion for solid waste management and diversion of organics from landfill disposal and would potentially benefit from such a resource. I-3

We appreciate CalRecycle’s efforts in developing the draft PEIR. Specifically, we would like to thank Mr. Mark de Bie and Mr. Ken Decio for their informative presentation to our Alternative Technology Advisory Subcommittee on March 17, 2011. We look forward to the timely certification of this document, so that it can be used by local governments and potential project developers. If you have any questions regarding our comments, please contact Mr. Mike Mohajer of the Task Force at (909) 592-1147 or mikemohajer@yahoo.com.

Sincerely,

Margaret Clark

Margaret Clark, Vice-Chair
Los Angeles County Solid Waste Management Committee/
Integrated Waste Management Task Force
Council Member, City of Rosemead

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cc: Mark Leary, Acting Director, CalRecycle
CalRecycle, (Howard Levenson, Elliot Block, Mark de Bie, Cara Morgan)
Each Member of the Los Angeles County Integrated Waste Management Task Force
Each Member of the Alternative Technology Advisory Subcommittee

Response I-1

Comment Noted.

Response I-2

See response to comment H-1.

Response I-3

AD was not the preferred alternative, it was the project, and the included alternatives were found not to meet all of the project objectives. It is agreed that other technologies and methods are also required to divert organics from landfills.

Letter J

ERIC GIBSON
DIRECTOR

County of San Diego

DEPARTMENT OF PLANNING AND LAND USE

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March 29, 2011

Ken Decio
Waste Compliance and Mitigation Program
California Department of Resources Recycling and Recovery (CalRecycle)
Via e-mail: ken.decio@calrecycle.ca.gov

RE: DRAFT PROGRAM ENVIRONMENTAL IMPACT REPORT FOR STATEWIDE ANAEROBIC DIGESTER FACILITIES (SCH No. 2010042100)

The County of San Diego has received and reviewed the Draft Program Environmental Impact Report (EIR) for Anaerobic Digester (AD) Facilities and appreciates the opportunity to comment. County Department of Planning and Land Use (DPLU) staff has completed its review and has the following comments on the Draft Program Environmental Impact Report:

GENERAL COMMENTS

1. To be of most use to lead agencies, each mitigation measure in the EIR must be written in a precise enough way so that it can be carried out and monitored. Also, when a mitigation measure is intended to be left to the lead agency's discretion as to how it will be carried out and monitored (i.e. for measures that are general and/or suggestive in nature), the EIR should state that the measure is guidance for the lead agency to develop the specific requirements of the measure. This would help accomplish the objective to assist lead and responsible agencies (see comment 7 for an example of a measure to which this comment applies). J-1

2. To best address the objectives to reduce GHGs, divert organics from the municipal waste stream and increase use of renewable energy sources, it is strongly recommended that AD facilities be required to assign a beneficial use of at least two of the three fractions of digestate (biogas, liquid and solid). The gas fraction can be collected, refined and used as fuel, the liquid fraction could be reused in the digester or applied to agricultural or horticultural fields, and the solid fraction could be use as Alternate Daily Cover at a landfill or composted and used as a soil amendment. Each AD facility can be given the option to process the digestate fractions on-site or ship to an off-site facility. J-2

3. To be of most use to as many lead agencies and projects as possible and to meet the objective that this project assist lead and responsible agencies, the EIR should include worst case scenario discussions. In order to fully disclose potential impacts, it is important that the EIR include discussions on the worst case scenario, and not just the typical case or best case scenarios (refer to comments 17 and 21 for examples). J-3

4. Due to the intent of this EIR to cover AD facilities in all of California, certain impact discussions are not appropriate at the level of this document. Many subject areas are very site specific and should be left to the lead agency for specific AD facility projects. Although the EIR does defer certain subjects to the lead agency, it also attempts to address other subjects that are not appropriately addressed at the scale of this project (refer to comment 12 for an example). J-4

PROJECT DESCRIPTION

5. Section 3.7.3 Post Processing: Digestate. The project description states the chemical composition of the liquid effluent may restrict discharge options and post-digestion treatment to reduce solids, oxygen demanding substances, ammonia and/or salt concentration prior to discharge is needed. What other types of chemical constituents would restrict discharge? Has the potential for the concentration of other chemicals in a system that would receive the discharge been considered? Digestate may contain undesirable chemicals that could build up in a system when recycling debris from the system. For example: If agricultural wastes containing pesticides that don't break down or otherwise become denatured by anaerobic digestion are processed at an AD facility and then if the liquid or solid fraction of the digestate is applied to agricultural fields, could this result in an accumulation of pesticides in the agricultural field? What about accumulation in surface waters or other potential discharge locations? Each probable constituent of AD digestate should be listed and discussed in the project description and in the sections of the EIR that cover the subject areas that each probable constituent may impact. J-5

AIR QUALITY AND GREENHOUSE GASES

6. Impact 6.3 describes evaporation of liquid digestate in an outdoor pond. If an operator reduces liquid digestate in an evaporation pond, could this result in air quality impacts by the release of VOCs or TACs or other toxic contaminants that could be released by evaporation? Is there a potential that salts or other constituents of the precipitate would be picked up and moved by the wind? Impact 5.1 should discuss this potential and Mitigation Measure 5.1.a should include a statement that the Air Quality Technical Report must include all steps / stages of processing, from pre-processing to end use / disposal methods, if these are done on the same site as the AD facility and covered by the same permits. J-6

7. Section 5.2, Mitigation Measure 5.2.b. This measure provides a list of what is referred to as odor control strategies, but the first three items are instructions on the preparation of an inventory of odor sources. The fourth item has sub-bullet points that are referred to as "criteria." The criteria are only suggestions on what should be considered by the lead agency when developing conditions/mitigation measures for AD facilities. Because they are presented in a way to suggest that they are guidelines to use to develop mitigation measures (ex: establish time limit for on-site retention of undigested substrates), a lead agency would have to complete a full new environmental review for every AD facility project. Could the EIR provide more specific guidelines (ex: on-site retention of any batch of undigested substrates shall not exceed 24 hours)? J-7

8. Mitigation Measure 5.3.c requires removal of H_2S from biogas prior to emission to the air. Biogas also contains CH_4 (a GHG with strong odor) and NH_3 (a TAC with strong odor), neither of which are included in the measure. Also, two of the objectives of the project are to achieve a greater reliance on renewable energy sources and GHG reduction. The EIR should require beneficial use of each biogas constituent as practical. That is, the measure should require the refinement / conversion / treatment of the biogas product so that it can be used as an alternate renewable energy source either on-site or at another facility. J-8

9. The Impact 5.4 discussion states that development of AD facilities would have no impact on the reduction of GHG emissions, but mitigation measures are proposed. Also, with implementation of measure 5.4 (5.1.a preparation of an Air Quality Technical Report), the EIR states the impact would be less than significant. Further, the Impact 5.4 discussion describes potential sources of GHGs generated by the operation of AD facilities. This means that unless an Air Quality Technical Report is prepared for a specific proposed facility at a defined location, it cannot be determined whether the impacts would be null, less than significant or less than significant with mitigation, etc. The EIR should clarify the level of impact for this item or adjust the discussion as appropriate. J-9

10. The second paragraph of the Impact 5.5 discussion, regarding AD facilities co-located at solid waste facilities, contains a parenthetical statement that co-located ADs with solid waste facilities would not result in increased traffic on the road network. This statement is far too general and the discussion doesn't take into account that even co-located facilities could result in substantial additional traffic on a road network. Either enhance the discussion or allow lead agencies to have full discretion on this subject. J-10

HYDROLOGY AND WATER QUALITY

11. The water quality discussion in section 6.1 (5th paragraph) states that "pathogens include total coliforms and fecal coliforms." However, water borne pathogens include bacteria, viruses, protozoans and small animals such as parasitic worms. Because the discussion is incomplete and misleading, it should be expanded to cover all relevant pathogens or clarified to state that coliform bacteria are the commonly tested class of pathogenic organisms found in water. J-11

12. The Thresholds of Significance listed in Section 6.2 includes "no impact" discussions for three subject areas: failure of levee or dam, exposure of people or structures to flooding, and placement of housing within a 100-year flood zone. These should not be concluded with the statement that no potential impact would occur. These are site specific subjects that cannot be analyzed in this level of an EIR and to say that no impact would occur is incorrect and misleading. The discussions would better reflect the project if they simply state that because these subject areas are site specific, it is the responsibility of the lead agency to determine if a proposed AD facility would result in impacts. J-12

13. Mitigation Measure 6.3.c does not contain enough specificity for a lead agency to generate a condition. Who should be the responsible party for review and acceptance of the SPCC, the lead agency, Local Enforcement Agency, Regional Water Quality Control Board or some other agency? A mitigation measure should contain enough specificity for a lead agency to rely on it or should state the measure is guidance and the lead agency is to develop the actual measure. J-13

14. The discussion for Impact 6.3 states that one method of liquid digestate reduction could be by evaporation in an evaporation pond, but does not go on to describe post-evaporation handling / disposal / use. Would these be solids or sludge sent to a landfill? Include a discussion on the final disposition of remaining solids. J-14

15. The discussion for Impact 6.5 contains an assumption that all AD facilities covered by this project would be located in areas with existing water uses on-site and, therefore, the impact to groundwater is stated to be less than significant. However, in certain jurisdictions (San Diego County for example) Sanitary Landfills and Green Materials Processing Facilities could potentially be located in non-industrial zones, such as agricultural or commercial zones. In many areas of San Diego County, these zones are in groundwater dependent areas. For this reason, the impact should be considered significant unless mitigated and the mitigation could be one of the following: use non-potable water source, use purple-pipe (recycled) water, or re-use water from liquid fraction of digestate if one of these options is feasible. Recycling / reusing water would reduce GHGs because many regions in California rely on public water that is pumped / moved from other regions. J-15

NOISE

16. The EIR states Impact 7.1 would be mitigated to less than significant by Mitigation Measures 7.1.a through d. Although limiting hours of construction, muffling construction equipment, et cetera would certainly reduce noise impacts to surrounding uses; there is no evidence provided in the discussion to support the conclusion that these measures would in fact reduce the impact to less than significant. As explained in comment 15, in the County of San Diego, these facilities could potentially be cited in agricultural zones where residential uses and other sensitive receptors may be located. As such, each project may need a site-specific Acoustical Technical Report prepared that describes the noise J-16

sources and their locations relative to the property lines and nearby sensitive receptors. The report would incorporate noise dampening characteristics of the site, such as hard versus soft ground surfaces, topography, vegetation, and any proposed noise attenuation barriers. Measure 7.1.d should include a statement similar to "... or other measures deemed necessary by the lead agency and described in the project's Acoustical Technical Report." J-16 (cont.)

17. The discussion on stormwater discharge in Section 8.1 states that in urban areas, stormwater is typically collected and treated by the local jurisdiction. In most areas of the County of San Diego, this is not the case – the stormwater system drains directly to the ocean without treatment. In order to fully disclose potential impacts, it is important that the EIR include a discussion on other means of stormwater disposal, such as direct discharge to surface waters. Also see comment 3 above. J-17

PUBLIC SERVICES AND UTILITIES

18. Impact 8.1 concludes the impact on fire protection services would be less than significant because the facilities would need to comply with building and fire code requirements and would not result in additional response from fire service providers. The County of San Diego Consolidated Fire Code requires that facilities which store and/or process wood chips, fines, compost and/or green waste and recycling facilities provide a financial assurance (security bond, irrevocable letter of credit or other form of assurance) in a minimum amount of $25,000.00 to reimburse the fire department for expenses incurred in emergency or enforcement responses. This requirement is not imposed on other types of operations. This means, that the County Fire Code assumes that such facilities are expensive to fire districts in terms of emergency fire responses. It is not clear that the EIR's statement that AD facilities would in fact require similar fire protection services as other businesses or that these facilities would not require a substantial need for additional response from fire service providers. Furthermore, the fire hazards discussion in Section 11.1 states that biogas is explosive when mixed with air and Impact 11.4 states that risk of fire hazard is a significant impact. Based on the above, it is reasonable to assume that the workload of fire service providers would be increased by an AD facility. The less than significant impact finding should be substantiated or the impact should be considered significant and mitigation measures included. Otherwise, the EIR should defer this subject area to the lead agency, who would analyze the project based on site-specific conditions and input from the local fire service provider. J-18

19. In the discussion for Impact 8.3, the EIR contains the assumption that because co-located AD facilities could use non-potable or recycled water that no significant impact from the construction and operation of new water facilities would occur. The EIR should approach this more directly by including a measure that requires the use of such alternate / recycled water source(s) if they are available or practical. J-19

20. Mitigation Measures 8.3.a and 8.3.b require an AD facility operator to enter an agreement with the appropriate service provider(s) (water and/or wastewater), but the EIR does not substantiate how this measure would reduce the significant impact to less than significant. The EIR should show how this measure would be effective in reducing the impact to less than significant. J-20

21. The discussion for Impact 8.5 includes the assumption that co-located AD facilities would be located in industrial areas, but the project description (Section 3.5) states that the Program EIR includes "in-vessel AD facilities which are located at existing or new permitted solid waste facilities or stand-alone AD facilities in areas zoned for industrial or solid waste handling activities. As explained in comment 16 above, in the County of San Diego, such facilities could be located in agricultural zones. These zones are not limited to urban areas and often rely on groundwater for water supply. Also, as stated in comment 3 above, it is important to not only discuss the typical scenario, but the full range of scenarios in order to disclose potential significant impacts and to be of most use to lead agencies. J-21

22. Mitigation Measure 8.6, refer to comment 19 regarding Measures 8.3.a and b. J-22

23. The discussion for Impact 8.7 includes the assumption that biogas produced at AD facilities would supplement energy production. Since energy production from a renewable source is a goal of the project and this potential of AD facilities is used as an assumption in the EIR, it should be required that AD facilities either process biogas on-site or ship it to an off-site location to be converted to a usable energy source. Digestate can potentially be used as an alternative fuel but that does not mean it would be. J-23

24. The County requests that CalRecycle develop a list of requirements that apply to all AD facilities that would be a part of this project. Following are examples of potential requirements: some minimum percentage of the materials processed must be diverted from the waste stream, at least 2 of the 3 fractions of digestate be processed as needed for beneficial use; AD facilities must be located within a reasonable distance of the waste production sources; et cetera. J-24

HAZARDS AND HAZARDOUS MATERIALS

25. The discussion in Section 11.1 does not contain any detail regarding specific pathogen and vector issues associated with AD facilities. The EIR should include at least a brief discussion or list of pathogens and vectors expected to be attracted by such a facility. J-25

26. The discussion for Impact 11.3 states that the potential for harmful exposure of the public or environment is less than significant. This conflicts with other discussions in the EIR. For example: Transportation Impact 9.3 states that hazardous materials spills on roadways would be a potentially significant impact; Air Quality and Greenhouse Gas Chapter 5 states that the biogas fraction of digestate would contain hazardous materials including H2S, NH3, CH4, etc.; and J-26

Hydrology and Water Quality Chapter 6 states that the liquid and solid fractions of digestate may contain heavy metals and pathogens. Based on information contained elsewhere in the EIR, it is unclear that the potential for harmful exposure is in fact less the significant. It seems that this is a potentially significant impact that should be mitigated. J-26 (cont.)

27. The discussion for Impact 11.6 states that impacts from generation of vectors would be less than significant because regulations for composting operations require pathogen reduction and that all activities at composting facilities be conducted in a manner that minimizes vectors, odors, litter, hazards, nuisances, and noise impacts. The discussion goes on to describe BMPs for the vector population control. Other sections of the EIR use BMPs and regulatory programs to mitigate significant impacts (Measure 6.2.a for example), but in this section the BMPs and regulatory programs cause the impact to be less than significant without mitigation. This means that the standard for analysis is not consistent throughout the document. BMPs and regulatory programs should either be considered mitigation measures or not. J-27

28. For Impact 11.6, to mitigate potential impacts from vectors, AD facilities should be required to prepare Vector Control Plans as is typically done for other solid waste / green waste handling facilities as mitigation and that the impact be considered significant prior to mitigation. J-28

The County of San Diego appreciates the opportunity to comment on the DEIR. If you have any questions regarding these comments, please contact Amber Griffith at Amber.Griffith@sdcounty.ca.gov or by phone at (858) 694-2423.

Sincerely,

Richard Haas

RICHARD HAAS, Assistant Director
Department of Planning and Land Use

Email cc: LeAnn Carmichael, IJN Coordinator, DPLU
Pricilla Jaszkowiak, Administrative Secretary, DPLU

Response J-1

See response to Comment H-1.

Response J-2

The potential uses of the gas, liquid, and solid portions of the AD process are described in the Draft Program EIR, and the potential impacts and mitigations are addressed for each. Waste volume reduction of the solid portion as a result of the AD process will be a benefit realized from all AD facilities. It is anticipated that for an AD facility to be economically feasible, one or more beneficial uses will need to be included as an aspect of the facility.

Response J-3

The project included Technical Advisory Group (TAG) meetings to help define the most typical cases, given the limited funds available for the Program EIR. The approach taken for the Draft Program EIR was to identify and describe the typical case given the scope of the review. Projects that require additional review because they have more elements than what is included in the Draft Program EIR will need to address those particular aspects. This has been noted in the Draft Program EIR, Executive Summary (page 1-1), when describing the purpose of the Draft Program EIR, to "inform future policy considerations related to AD facilities and assist state and local agencies in preparing site-specific environmental documentation that may be required for AD facility applications and/or permits submitted to CalRecycle, regulatory agencies and local jurisdictions." However, it is hoped that projects will share a common set of parameters that have been described and addressed in the Draft Program EIR

Response J-4

The intent of the Draft Program EIR is to provide a starting point for lead agencies for specific projects. A lead agency may choose to use all or some of the elements in the Draft Program EIR and to substitute or supplement portions to fit the needs of a specific project.

Response J-5

Chemical constituents in the digestate will vary based on the type and ratio of feedstock. As indicated in the Hydrology section (Chapter 6 of the Draft Program EIR), the discharge of solids or liquids to land or water would require site specific Waste Discharge Requirements (WDRs) and/or coverage under an appropriate general or individual NPDES permit. The WDRs and NPDES permits, if required based on post-processing steps, would address issues associated with potential chemical constituent accumulation.

Response J-6

The commenter notes that liquid digestate reduction in evaporation ponds may release air pollutants that were not identified in the Draft Program EIR, including residual VOCs and precipitated salts. Wind blown precipitated salts is an issue that would be identified by the monthly inspection of the Local Enforcement Agency (LEA) for any facilities with evaporation ponds. Toxic air contaminant emissions, including any toxic VOCs, would be considered in the analysis of Mitigation Measure 5.1a. However, page 5-19 of the Draft Program EIR has been revised as follows:

> "In addition, non-methane VOCs released from pre-digested substrate materials during the receipt and pre-processing activities, as well as potential residual VOC release if the liquid digestate is reduced via evaporation pond during post-processing at AD facilities would not be a regional change but could result in increased localized emissions."

Mitigation Measure 5.1a has also revised page 5-20 of the Draft Program EIR as follows:

> "The technical report shall include an analysis of potential air quality impacts for all steps of the project (including a screening level analysis to determine if construction and operation [for all on-site processes, including any end-use and disposal methods] related criteria air pollutant emissions would exceed applicable air district thresholds, as well as greenhouse gas (GHG) emissions and any health risk associated with toxic air contaminants (TACs) from all AD facility sources) and reduction measures."

Response J-7

The commenter notes that not all of the bullet points under Measure 5.2b are odor control strategies and requested revision of the odor mitigation measure. Additional revisions to different pieces of the measure were suggested in several other comment letters and have all been considered and consolidated below, where appropriate. The revised mitigation does not include specific guidelines for time requirements as there would be some flexibility for time limits based on details of each project. See response to Comment H-1. As such, the Draft Program EIR has been revised on pages 5-21 and 5-22, as follows:

> "**Measure 5.2b:** If an AD facility handles compostable material and is classified as a compostable material handling facility, the facility must develop an Odor Impact Minimization Plan (OIMP) pursuant to 14 CCR 17863.4. Otherwise, applicants shall develop and implement an Odor Management Plan (OMP) that incorporates equivalent odor reduction controls for digester operations and is consistent with local air district odor management requirements. These plans shall identify and describe potential odor sources, as well as identify the potential, intensity, and frequency of odor from these likely sources. In addition, the plans will specify odor control technologies and management practices that if implemented, would mitigate odors associated with the majority of facilities to less than significant. However, less or more control measures may be required for individual projects. Odor control strategies and management practices that can be incorporated into these plans include, but are not limited to, the following:
>
> - ~~A list of potential odor sources.~~

- ~~Identification and description of the most likely sources of odor.~~
- ~~Identification of potential, intensity, and frequency of odor from likely sources.~~
- ~~A list of odor control technologies and management practices that could be implemented to minimize odor releases. These management practices shall include the establishment of the following criteria:~~
- Require substrate haulage to the AD facility within covered, liquid leak-proof~~sealed~~ containers.
- Establish time limit for on-site retention of undigested substrates (i.e., feedstocks should be processed and placed into the portion of the system where liquid discharge and air emissions can be controlled within 24 or 48 hours~~substrates must be put into the digester within 24 hours~~ of receipt).
- Provide enclosed, negative pressure buildings for indoor receiving and pre-processing. Treat collected foul air in a biofilter or air scrubbing system.
- Establish contingency plans for operating downtime (e.g., equipment malfunction, power outage).
- Manage delivery schedule to facilitate prompt handling of odorous substrates.
- Handle fresh unstable digestate within enclosed building, or mix with greenwaste and incorporate into a composting operation within the same business day, and/or directly pump to covered, liquid leak-proof~~sealed~~ containers for transportation.
- Protocol for monitoring and recording odor events.
- Protocol for reporting and responding to odor events."

Response J-8

Methane (CH_4) is an odorless greenhouse that can be used as an energy source. Potential ammonia (NH_3) emissions are expected to be in trace amounts. Although ammonia scrubbing technology was not found in the literature review, Mitigation Measure 5.1a would identify potential air impacts on a project by project basis. In regards to using biogas for beneficial uses, that is an underlying foundational objective of the Anaerobic Digestion Initiative, as described in the Project Description on page 3-2 of the Draft Program EIR.

Response J-9

The commenter identified a discrepancy between the level of significance denoted in the Draft Program EIR impact statement to the final conclusion of less than significant with mitigation. As such, the Draft Program EIR on page 5-24 has been clarified as follows:

> "**Impact 5.4: Development of AD facilities in California ~~w~~could increase~~reduce~~ GHG emissions. (No Impact)**"

Also, the Draft Program EIR on page 5-27 (after the first complete paragraph) has been revised to add the following paragraph:

> “Although not required, to further reduce the magnitude of this issue that has no impact, Mitigation Measure 5.4 recommends projects implement Mitigation Measure 5.1a, which includes a project level review of GHG emissions.”

Response J-10

The general statement regarding traffic associated with AD facilities co-located at solid waste facilities (Draft Program EIR, page 5-27) was revised in order to clarify and reduce any potential confusion as follows:

> “Additional sources of criteria pollutant emissions associated with AD facility operations would include any additional diesel equipment on-site for pre-processing, increased traffic on the local roadway network (though for AD facilities co-located at a solid waste facility, there would usually be no substantial net increase in traffic as the organics would be transported there already), and the post processing of the biogas.”

Response J-11

Examples of water-borne pathogens were expanded in the Draft Program EIR on page 6-3 as follows:

> “Pathogens include total coliforms and fecal coliforms, as well as viruses, protozoa, and other microorganisms.”

Response J-12

In order to allow for site specific considerations on a project by project basis for the impact criteria identified by the commenter, the Draft Program EIR (pages 6-11 and 6-12) has been revised as follows:

> “Based on the scope of the project and its geographical location, the project ~~would not~~ is not expected to result in impacts related to the following criteria. Although local considerations may need to be addressed on a project by project basis, ~~N~~no impact discussion is provided in this Program EIR for these topics for the following reasons:
>
>> *Failure of Levee or Dam.* AD facilities that would be installed under the Program EIR would not require the construction of a levee or dam, and are not anticipated to result in alteration of existing levees or dams. Therefore, no increase in potential levee or dam failure is expected to~~would~~ occur.
>>
>> *Exposure of People or Structures to Flooding.* AD facilities proposed for implementation under the Program EIR are not expected to be installed within existing flood zones. In the event that an AD facility were proposed for installation within a flood zone, the facility would be required to adhere to state and

> local building requirements and regulations regarding construction in flood zones, including applicable building and design restrictions, and worker safety and evacuation measures. Therefore, although some facilities may be constructed in a potential inundation area, it is expected that there would be no potential impact of loss, death or injury.
>
> *Placement of Housing within a 100-Year Flood Zone.* Implementation of the project would not include or result in the construction of any housing. Therefore, the project would not include or result in the construction of housing within a 100-year flood zone. No impact ~~would~~ is expected to occur."

Response J-13

Mitigation Measure 6.2c, page 6-17 of the Draft Program EIR, has been revised to as follows:

> "**Measure 6.2c**: In order to minimize water quality degradation associated with accidental spills at AD facilities, the applicant for individual projects that would be implemented under the Program EIR shall require project proponents to complete and adhere to the requirements of a Spill Prevention, Control, and Countermeasure (SPCC) Plan ~~(SPCC)~~, which is based on the federal SPCC rule. Notification of the SPCC Plan shall be provided to the local Certified Unified Program Agency (CUPA). The SPCC Plan shall contain measures to prevent, contain, and otherwise minimize potential spills of pollutants during facility operation, in accordance with ~~federal, state, and local~~U.S. EPA requirements. For individual projects that would utilize wet digestion systems, in which processing and holding tanks would contain the (aqueous) digestion reaction and liquid digestate containing fats and oils, the SPCC Plan shall provide for installation and monitoring of secondary containment and/or leak detection systems to ensure that AD liquids are not accidentally discharged to navigable waters or adjoining shorelines. Monitoring of these systems shall be in accordance with SPCC Plan requirements.
>
> Additionally, the project applicant shall adhere to the requirements and recommendations of WDRs, which would be provided for the project by the applicable regional board. Requirements under WDRs include implementation of measures to minimize water quality degradation, including but not limited to restrictions on the concentration of water quality pollutants discharged from a proposed facility, and maximum acceptable flow volumes for a given facility."

Response J-14

Post-processing options for digestate are discussed in the Draft Program EIR, Chapter 3 (Project Description), on page 3-11.

Response J-15

See responses to comment G-9 and J-19.

Response J-16

Proposed facility options are described in the Draft Program EIR on page 3-8 as follows: "**AD Facilities included in the scope:** In-vessel AD facilities which are located at existing or new permitted solid waste facilities or stand-alone AD facilities in areas zoned for industrial or solid waste handling activities." For any AD facilities Mitigation Measure 7.1c would mitigate construction noise for nearby sensitive receptors and Mitigation Measure 7.2 would require a site specific noise study if AD facilities would be located within 2,000 feet of a sensitive receptor.

Measure 7.1d on page 7-11 of the Draft Program EIR is revised as follows:

> "**Measure 7.1d**: Construction contractors shall comply with all local noise ordinances and regulations and other measures deemed necessary by the Lead Agency."

Response J-17

If stormwater is not going to be treated before discharge, then the applicable Regional Water Quality Control Board (RWQCB) requirements under the National Pollutant Discharge Elimination System (NPDES) would be followed.

Response J-18

Impact 8.1 of the Draft Program EIR has been revised to emphasize coordination with the local fire enforcement agency to develop a Fire Safety Plan (Mitigation Measure 11.4a) in order to reduce potential demand on fire protection services. Revisions on pages 8-5 and 8-6 are as follows:

> **"Impact 8.1: The project ~~w~~ could ~~not~~ substantially increase demands on fire protection services. (~~Less than~~ Significant)**
>
> Construction and operation of AD facilities would need to adhere to the building code and the fire code adopted by the relevant local jurisdiction. Building and fire inspections would be conducted during construction of AD facilities to ensure code compliance and thereby reduce the risk of fire/explosion hazards associated with new facilities. Hazardous issues associated with biogas production and distribution are addressed in Chapter 11, Hazards and Hazardous Materials.
>
> The project would require similar fire protection services as other businesses. Fire protection services are funded though local impact/mitigation fees and property taxes, to which the project would contribute. The on-site flare periodically required for burning excess gas may be visible at night from off-site areas leading to increased calls to the local fire district/department from concern of a potential fire; however, no physical response would be required. With implementation of Mitigation Measure 11.4a, which addresses development of a Fire Safety Plan in coordination with the local fire enforcement agency, individual~~Because the~~ projects are~~is~~ not likely to require a substantial need for additional

> response from local fire service providers~~, this impact is considered less than significant~~. However, calls to local fire agencies can be reduced through implementation of Mitigation Measures 10.1b and 10.3c as discussed below.

~~**Mitigation:** None required.~~

Mitigation Measure

Measure 8.1: Implement Mitigation Measures 10.1b, 10.3c, and 11.4a.

> ~~While no mitigation is required,~~ Mitigation Measures 10.1b and 10.3c recommend the use of berms or landscaping to minimize views of the facility and the enclosure of flares, which would reduce the likelihood of calls from the general public related to the flare. Mitigation Measure 11.4a would ensure coordination with the local fire enforcement agency on a project by project basis. After implementation of these mitigation measures, this would be~~remain~~ a less-than-significant impact.

Response J-19

Use of alternate sources of water has been specified on page 8-8 in an additional mitigation measure as follows:

> "**Measure 8.3c:** Alternate water sources, such as non-potable and recycled water, shall be used during the pre-processing and AD process phases where needed and as available."

Response J-20

As described under Impact 8.3 on page 8-7 of the Draft Program EIR, "Private water and wastewater facilities (such as an on-site groundwater wells or septic systems) would need to be evaluated at the project level. It is assumed these types of facilities would be part of a project plan submitted for local site plan review and would be constructed to the standards of the applicable local jurisdiction which would reduce impacts to a less-than-significant level. For service from a municipal system, the developer would need to ensure that service is available with adequate treatment capacity and thus this impact is potentially significant." Thus, local considerations would be analyzed on a project by project basis. For applicable projects, coordination with local water and wastewater providers as specified in Mitigation Measures 8.3a and 8.3b would be part of this process. See also response to Comment G-9 and G-46. Water recycling should be incorporated into project to minimize project effects (see responses to Comments J-19 and S-18).

Response J-21

Please see response to Comment J-16 regarding scope of land use zoning analyzed in the Draft Program EIR. If AD facilities are proposed to be co-located at a solid waste facility within an agricultural land use, then additional analysis of local conditions may be required. Please see also responses to Comments J-3 and J-4 for additional information regarding typical facility scope and local considerations, respectively.

Response J-22

Please see response to Comment J-19.

Response J-23

It is not expected that digestate would be used for energy. The expectation of beneficial biogas use has been noted more explicitly on page 8-9 of the Draft Program EIR as follows:

> "The project could facilitate the construction of new energy supplies within the project area through the production of biogas as part of the AD process. The energy created from biogas at AD facilities is considered renewable. As there is currently a demand for renewable energy in California, there is a beneficial effect to providing energy from renewable resources<u>, and it is expected that the biogas from AD facilities would be used as such for this beneficial purpose</u>."

Response J-24

The Program EIR suggested mitigations that are listed in the table of impacts and mitigations (Table 1-1) of the Draft Program EIR. The requirements listed in the comment could unnecessarily restrict development of beneficial AD facilities, and that is not a goal of the project.

Response J-25

A short list is included on page 11-5 of the Draft Program EIR, however, the actual potential pathogens and vectors would be site and feedstock specific. The methods to handle the material would be adequate to address issues with most expected pathogens and vectors.

Response J-26

The transportation impact discussed is one of traffic safety and not harmful exposure to hazardous materials. Potential impacts from toxic air contaminants would be mitigated by Measure 5.1a and potential impacts from water contaminants would be mitigated by Measures 6.2a-f.. Also, as noted, individual projects must comply with the "numerous laws and regulations [that] govern the transport, use, storage, handling and disposal of hazardous materials to reduce the potential hazards associated with these activities" (Draft Program EIR, page 11-15).

Impact 11.3 has been revised to incorporate the air and water mitigation measures identified above, as follows:

Draft Program EIR, page 11-14:

> "**Impact 11.3: Transportation, use, disposal or accidental spill of hazardous materials during the operation and maintenance of AD facilities would not result in potential harmful exposures of the public or the environment to hazardous materials. (~~Less than~~ Significant)**"

Draft Program EIR, page 11-15:

> "Because numerous laws and regulations govern the transport, use, storage, handling and disposal of hazardous materials to reduce the potential hazards associated with these activities, this impact would be less than significant in most cases. However, impacts from toxic air contaminants and water contaminants would be potentially significant without mitigation.
>
> ~~**Mitigation:** None required.~~
>
> **Mitigation Measure**
>
> > **Mitigation Measure 11.3:** Implement Mitigation Measures 5.1a and 6.2a-f.
> >
> > **Impact Significance After Mitigation:** Less than Significant"

Response J-27

Impact 11.6 relies upon existing regulations that will regulate AD facilities under either a Compostable Material Handling Permit or Transfer/Processing facility permit. As identified on page 11-18 of the Draft Program EIR, "These articles give the LEA and CalRecycle broad discretion to ensure that AD facilities do not provide a suitable environment to promote the generation of vectors. In addition, local pest management agencies (i.e., mosquito abatement districts, environmental health departments) have the authority to inspect facilities and enforce compliance with vector control."

Because LEA's have monthly inspections, these regulations are very familiar to the waste management facility operators. It is acknowledged to some other regulations and BMPs are included in mitigation measures. Inclusion of the regulations in some other areas was to highlight the regulations and BMPs to assure they are complied with by individual project. CalRecycle's existing LEA program assures that vectors will be controlled.

Response J-28

Vector Control Plans are not required by CalRecycle for facilities. However, vector control would be ensured by the compliance with regulations described on page 11-18 of the Draft Program EIR.

Letter K

JDMT, Inc

April 2, 2011

Ken Decio, Senior Integrated Waste Management Specialist
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California Department of Resources Recycling and Recovery (CalRecycle)
PO Box 4025, MS 10-A
Sacramento, CA 95812
via email: Ken.Decio@CalRecycle.ca.gov

SUBJECT: ***Submission of Written Comments –***
Draft Statewide Program Environmental Impact Report for Anaerobic Digester Facilities for the Treatment of Municipal Organic Solid Waste

The California Department of Resources Recycling and Recovery (CalRecycle) released a Draft Program Environmental Impact Report (PEIR) for Statewide Anaerobic Digester Facilities for the Treatment of Municipal Organic Solid Waste (SCH No. 2010042100). The Draft PEIR addresses potential impacts from the development of anaerobic digestion (AD) facilities in California, and is available online. We are pleased to submit our written comments to CalRecycle on the draft AD PEIR.

We recognize that a Program or “Programmatic” Environmental Impact Report under the California Environmental Quality Act (CEQA) becomes an over-arching guidebook for subsequent environmental assessments as a new project’s CEQA compliance can “tier” off of the existing document. A PEIR is therefore intended to provide a comprehensive review of pertinent regulations, policies and social and environmental background conditions. Identification and sensitivity of “receptors” (those living in any area that might be directly impacted by a project) is addressed. A PEIR tacitly becomes a documentation of Best Management Practices (BMPs), suggesting methods for reducing or eliminating negative impacts associated the Project as defined. The test of effectiveness of any PEIR thus is whether it provides a reliable platform for subsequent project development.

This efficacy test hinges upon the clarity of the description and thoroughness of exploration of the identified “Project”, in this case, a state-wide program termed the AD Initiative designed to encourage and facilitate the development and broad deployment of in-vessel anaerobic digestion systems for the conversion of the organic, biodegradable portion of mixed municipal solid waste (MSW). AD facility development is a targeted effort for CalRecycle under the Assembly Bill 32 (AB 32) Climate Change Scoping Plan. The Plan estimated methane emissions from landfills that could be avoided by sending the putrescible organics through the alternative processing pathway of AD. CalRecycle has developed a comprehensive program to foster the development of AD facilities.

This CEQA Project is therefore the AD Initiative as a policy outline combined with a series of discrete actions to implement the policy. This outline and its attendant actions are presented in the PEIR.

Comments:

(1) As a general comment, we feel that more attention should be paid to clearly defining the Project at the start of the CEQA document, given the importance of that definition to the understanding, function and effectiveness of the CEQA document. K-1

(2) Once more clarity is provided for the Project definition, a re-examination of the Alternatives seems appropriate. The analysis of Alternatives as presented in the Draft exhibits circular logic: the Objectives in part specify anaerobic digestion; therefore any other option that does not utilize AD does not meet those Objectives. If the Project is an Outline and a set of proposed AD promotion and implementation measures, an Alternative might describe a different outline that requires an altogether different approach to implementation, with consideration as to whether the alternative approach meets defined Objectives better or worse than the Project as defined. As an example, an alternative Outline might consider what *type* of anaerobic digestion is best suited for what suite of feedstock types, and for production of what desire products. The comparison then would need to focus on whether a “one size fits all” approach to promoting AD, as is the Project approach, is better than proposing a closer match between technology and feedstock. K-2

(3) Conversely, if the Draft appropriately recognizes as Alternatives a suite of technologic approaches that *do not* involve anaerobic digestion, perhaps the Project definition must also be more inclusive, asking instead what type of technologic process might best be promoted for the conversion of the types of feedstock identified as CalRecyle’s target. The need for similar, parallel, and equally weighted Projects could be identified by assessing other potential forms of Waste Conversion for Resource Recovery, while the focus of this Draft could then by definition be restricted to only an examination of forms of anaerobic digestion. Given the burgeoning diversity of Conversion Technologies, an emphasis could then be developed addressing the need for additional PEIRs assessing other pathways. K-3

(4) Similarly, Objectives that address broader needs should become metrics for comparison of this AD Initiative project against an entirely different suite of Alternatives that are not restricted to anaerobic digestion. CalRecycle Strategic Directive 6.1: Reduce the amount of organics in the waste stream by 50 percent by 2020 certainly is not restrictive to any one technologic approach, and the final PEIR should be very clear in stating just which sub-set of this Objective is being specifically addressed. K-4

(5) The staff recommendation (discussed March 15, 2011) for a local agency guidance document as a follow-up to the PEIR is excellent, but should be presented as one stage in implementing the Project, the AD Initiative, if approved. Recognizing in the final PEIR document that additional implementation stages are needed would strengthen the overall stance and utility as a CEQA tiering mechanism. K-5

(6) Another future element that the PEIR should identify as an implementation mechanism for the AD Initiative is development of a Best Practices Manual for AD in California. The PIER already describes many BMPs; place these in a separate Appendix or document to facilitate future updating. Every technology, certainly every integrated waste management program, can be designed and run well, or poorly. Matching technology type to feedstock is a critical and difficult decision, becoming more bewildering as the diversity of available tools increases. The AD Initiative could, and should, become a resource for tracking and understanding the available options, the appropriate selection criteria, and how to operate the chosen system cleanly and efficiently. K-6

Letter K

We thank you for the opportunity to comment on the proposed 2011 Bioenergy Action Plan, and on the proposed actions by state agencies. We are available for further discussion should staff find this useful. Please contact me at (530) 823-7300 or (530) 613-1712 (mobile) if you have any questions.

Sincerely,

JDMT, Inc

Michael Theroux

Michael Theroux
Vice President

cc: Sarah Michael – CEC
Howard Levenson – Cal Recycle

Response K-1

As described in the Draft Program EIR, page 3-1: “Throughout the document, the adoption of the AD Initiative and subsequent development of AD facilities in California will be referred to as the ‘project’”. The AD Initiative is then discussed further on page 3-2. Finally, the Draft Program EIR includes a program level description of the feedstocks, locations, and AD technologies analyzed in the Program EIR (page 3-8 of the Draft Program EIR).

Response K-2

Alternatives were developed per CEQA guidance, as described on pages 13-1 and 13-2. In addition, comparisons between the project versus alternatives regarding significance and ability to meet objectives are provided in Tables 13-1 and 13-2. Please see response to Comment K-1 regarding definition of the project as well. The project should not be viewed as “one size fits all” as the Program EIR allows for various AD technologies, feedstocks, and post-processing (pages 3-8 through 3-11 of the Draft Program EIR)

Response K-3

The suite of alternatives included were ones that could meet many, if not all, of the project objectives. However, this does not change the definition of the project itself.

Response K-4

The project had a policy to encourage the development of AD facilities in California as an alternative to the landfill disposal of organic solid waste (page 3-2 of the Draft Program EIR). As shown in Table 13-2, none of the alternatives could achieve this objective.

Response K-5

Comment noted.

Response K-6

We note the recommendation for development of a Best Management Practices Manual for AD in California. At a minimum, the guidance document for use of the Program EIR by local jurisdictions should identify potential BMP that are identified in several areas of the Program EIR.

Letter L

COUNTY OF SANTA BARBARA
PUBLIC WORKS DEPARTMENT
123 East Anapamu Street
Santa Barbara, California 93101
805\568-3000 FAX 805\568-3019

Scott McGolpin
Director

March 29, 2011

CalRecycle
Attn: Ken Decio
PO Box 4025, MS 10-A
Sacramento, CA 95812

Dear Mr. Decio:

Thank you for the opportunity to comment on the **Draft Program Environmental Impact Report for the Statewide Anaerobic Digester Facilities for the Treatment of Municipal Organic Solid Waste**. The County of Santa Barbara Public Works Department Resource Recovery & Waste Management Division (RRWMD) operates the Tajiguas Landfill, a Class III municipal solid waste facility serving half of the County's population (210,000 people). The RRWMD is also responsible for administering the County's materials management, green waste and recycling programs. With these programs in place, our community has been successful in diverting over 73% of our waste away from our landfill.

This draft EIR is of special interest to the County of Santa Barbara, as we are currently in the process of evaluating several conversion technology proposals for managing our community's waste. One of the proposals being evaluated is the installation of an in-vessel Anaerobic Digester (AD) facility co-located at the existing Tajiguas Landfill site. RRWMD supports CalRecycle's efforts to promote and facilitate the development of environmentally superior waste management alternatives such as in-vessel AD.

RRWMD has reviewed the EIR and offers the following comments:

General Comments on the Initiative

Air Quality

RRWMD would recommend that as a part of the AD Initiative, CalRecycle works directly with the State Air Board, and local air pollution control districts, to foster an understanding of the air quality benefits of AD facilities as compared to landfill disposal of organic waste (especially regarding greenhouse gas production) and develop a consistent and streamlined permitting approach for the construction and operation of these facilities. RRWMD anticipates that acquisition of air permits (particularly for biogas L-1

AA/EEO Employer

Thomas D. Fayram, Deputy Director
Mark Paul, Deputy Director

Scott D. McGolpin, Deputy Director
Dace B. Morgan, Deputy Director
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Mark A. Schleich, Deputy Director
Michael B. Emmons, Deputy Director

used in gas turbine engines to produce electricity) to be a major impediment in the development of the facilities. L-1 (cont.)

Permitting

The EIR indicates that AD facilities could either be permitted as a Compostable Material Handling Facility or as a Transfer Processing Operation or Facility. It would seem less confusing and more efficient to develop a separate permit for AD facilities and to establish the simplest permitting tier and requirements for projects proposed at existing permitted solid waste facilities. L-2

Impact Analysis and Mitigation Measures

Air Quality

As currently defined by this draft EIR, preprocessing includes transportation, storage, chipping/grinding, sizing/separation, and inorganic disposal (Figure 3-3). To address air quality impacts, mitigations measure 5.1b (second bullet) would require “substrate unloading and pre-processing activities to occur indoors within enclosed, negative pressure buildings” and “collected foul air (including volatile organic compounds (VOCs) off-gassed from undigested substrates) should be treated via biofilter or air scrubbing system.” It would be extremely difficult and expensive for these activities (especially transportation) to be performed in an enclosed negative air pressure facility, particularly where the AD facility feedstock is proposed to be MSW. Current landfill operations, and most composting operations, unload and process outdoors, so it does not seem necessary or practical to require these activities to be conducted indoors according to mitigation measure 5.1b. Since AD facilities are expected to be environmentally superior to landfilling or aerobic wind-row composting, it is difficult to justify holding them to these higher standards. L-3

With respect to mitigation measure 5.2b, bullet four, item one (substrate haulage in sealed containers), would a standard MSW collection vehicle (“trash truck”) be considered a sealed container? L-4

RRWMD concurs with the EIR’s assessment that development of AD facilities in California would reduce GHG emissions (Impact 5.4). Removal of organics from the waste stream will help reduce GHG emissions from landfill operations (equipment emissions, fugitive emissions and vehicle emissions). This should be identified as a beneficial project impact and preferred to current landfill operations. L-5

According to the EPA, landfills are the largest source of human generated methane in the US. Therefore the successful implementation of the AD Initiative across the State has the potential to be the largest GHG reduction of any single program.

Noise

Mitigation Measure 7.2 uses a noise threshold of 45 dBA at a sensitive receptor if no local regulations are available. The 45 dBA standard should be expressed as CNEL of Ldn and this standard should be applied to interior noise levels not exterior. L-6

Public Services
The EIR should identify that the project would have a beneficial impact on solid waste disposal by diverting organic material for beneficial reuse and reducing the amount of material requiring landfilling, thereby preserving limited landfill capacity. L-7

Transportation
RRWMD concurs with the analysis (Impact 9.2) that co-location of AD facilities at existing solid waste disposal facilities would not result in a substantial increase in operational traffic volumes since this material arrives in the existing municipal solid waste stream. L-8

Aesthetics
Considering the existing disturbance to visual resources at existing waste disposal sites due to vegetation removal and terrain modification from landfilling activities, co-location of AD facilities at these sites would not be expected to result in significant aesthetic impacts or further substantially degrade visual qualities. Therefore, Measure 10.1a should be modified as follows: Avoid siting AD facilities near scenic vistas and corridors designated within an applicable land use plan and the State Scenic Highway Program "except where the facility would be co-located with an existing solid waste disposal facility and the project would not substantially degrade the existing visual qualities". L-9

Hazards and Hazardous Materials
Mitigation Measure 11.1 requires preparation of a Phase I Environmental Site Assessment prior to earth disturbance for any AD facility. This measure seems unnecessary for AD projects proposed to be co-located at existing solid waste disposal facilities where the presence or absence of contamination is likely to be readily known. L-10

Mitigation Measure 11.5 requires AD facilities to be sited at least one quarter mile from existing or proposed schools, daycare facilities, hospitals and other sensitive land uses. This measure should be modified so that an AD facility would not be precluded by a school or daycare facility proposed after an application for an AD facility has been submitted and/or where an AD facility would be co-located on an existing waste disposal site. L-11

Other CEQA Considerations

The EIR should identify that the construction of AD facilities and the diversion of organic waste from the municipal waste stream could potentially reduce agricultural, biological and cultural resource impacts as compared to land disposal of this waste. L-12

Alternatives

No Project
The No Project Alternative should identify that without the proposed project the likely consequence would be continued disposal of organics in landfills throughout the state. This continued land disposal L-13

would result in increased impacts (e.g., air quality, biology, etc.) as compared to the proposed development of AD facilities. L-13 (cont.)

Increased Aerobic Composting Alternative

RRWMD agrees that Aerobic Composting provides a complimentary method to AD projects for the processing of organic waste. However from an environmental impact perspective, we do not believe it is environmentally superior then AD. Aerobic Composting has equivalent or greater impacts as compared to AD. Many local air boards have raised concerns regarding air emissions from open air composting operations, If not properly managed odor and vector impacts can occur, the operations take significant land area (which can result in biological and visual impacts) and Aerobic Composting lacks the beneficial impact of providing a potential alternative energy source. L-14

Conclusion

In conclusion, we believe the proposed AD Initiative is necessary to facilitate and encourage the development of AD facilities to achieve CalRecycle and our community's goals of reducing the disposal of organics in landfills. While site specific analysis will be required, we agree with the EIR's analysis that impacts can generally be reduced to less than significant levels, that in-vessel AD facilities are an environmentally superior alternative to landfilling, and that AD facilities provide and important and valuable source of renewable energy. L-15

Sincerely,

Mark Schleich

Mark Schleich, Deputy Director

Response L-1

Part of the AD Initiative is to continue to work with other agencies that will have a role in the operation of AD facilities. In addition, implementation of Mitigation Measures 5.1a would require the assessment air pollutant emissions on a project-by-project basis to ensure compliance with the applicable air district thresholds and/or guidance and incorporate further emission mitigation if required.

Response L-2

The AD Initiative includes preparing draft revised regulations for AD facilities within the authority and responsibility of CalRecycle (page 3-3 of the Draft Program EIR). However, at this time, the permitting and regulatory framework for proposed AD facilities is described in the Draft Program EIR on pages 3-15 through 3-17. See response to Comment C-2.

Response L-3

See responses to Comments H-1 and H-2.

Response L-4

See response to Comment J-7.

Response L-5

Comment noted. The beneficial diversion of organics from the waste stream and the associated reduction in landfill activities is noted on page 5-25 of the Draft Program EIR.

Response L-6

As described on page 7-9 of the Draft Program EIR: “Operational equipment, especially those that run 24-hours a day, the appropriate noise level would be in compliance with local noise ordinances; or 45 dBA at the location of the nearest sensitive receptor.” Nighttime ambient noise in rural environments can be 45 dBA or less, and by limiting the noise at the sensitive receptor location (rather than interior noise) to 45 dBA, the criterion ensures that the interior standard would be met as well. Furthermore, the hourly equivalent sound level (Leq), rather than the 24-hour CNEL or Ldn, is the metric typically used to determine stationary source noise compliance. A site specific noise study could determine that the ambient noise level is always above 45 dBA (such as areas near a freeway), in which case local conditions could determine that meeting the 45 dBA requirement might not be necessary, because it would provide no benefit.

Response L-7

Comment noted. The landfill capacity benefit is mentioned on page 3-2 of the Draft Program EIR: “Under its Strategic Directive 6.1, CalRecycle seeks to reduce by 50 percent the amount of organic waste disposed in the state’s landfills by 2020. In addition to helping conserve limited landfill capacity, this CalRecycle policy recognizes that organic wastes are a resource, not just solid wastes that must be disposed.” One of the objectives of the project is to assist in meeting the CalRecycle Strategic Directive 6.1.

Response L-8

Comment noted.

Response L-9

Co-location would lessen the need for vegetative removal and terrain modification, but the addition of tanks and other equipment could create a potential view impact, especially along a scenic corridor.

Response L-10

The need for a site assessment is warranted for a co-located project; however, a previous Environmental Site Assessment for an existing facility could potentially be utilized.

Response L-11

Mitigation Measure 11.5 pertains to existing or proposed schools, daycare facilities, hospitals, and other sensitive land uses. The “proposed” statement in this measure applies to sensitive land uses that were already proposed prior to AD facility application submittal and consideration.

Response L-12

Comment noted. Benefits of the diversion of organics from landfills are discussed in the Draft Program EIR.

Response L-13

Comment noted. The No Project Alternative’s impact considerations are discussed on pages 13-7 and 13-8 of the Draft Program EIR. The analysis notes that “The No Project Alternative would not assist CalRecycle in Meeting the Goals of Strategic Directive 6.1; it would slow the pace of removing organic materials from landfills and it would not support the goals of AB 32 greenhouse gas reduction goals or the development of renewable fuels."

Response L-14

See response to Comment H-8.

Response L-15

Comment noted.

Letter M

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April 4, 2011

Ken Decio, Project Manager
CalRecycle
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1001 I Street
Sacramento, CA 95812-4025

Subject: Comment Letter – Draft Program Environmental Impact Report for Anaerobic Digester Facilities for the Treatment of Municipal Organic Solid Waste

Dear Mr. Decio:

Members of the Inland Empire Disposal Association are writing to provide comments on the Draft Program Environmental Impact Report for Anaerobic Digester Facilities for the Treatment of Municipal Organic Solid Waste. Our members concur with the findings that this Draft Program EIR provides useful information for policy considerations related to certain AD facilities in preparing site-specific environmental documentation that may be required for discretionary AD facility applications and/or permits submitted to CalRecycle and other regulatory agencies and local jurisdictions.

Further, this Draft Program EIR will assist local governments and state agencies (both lead and responsible agencies) by providing initial program-level analyses that will identify potential environmental effects of AD facilities and discuss mitigation measures or best management practices that can reduce or eliminate the environmental effects. The Draft Program EIR also will provide pertinent information that can serve as the basis for analyzing the environmental effects of individual projects.

We understand that this Draft Program EIR is limited in scope and includes In-vessel AD facilities which are located at existing or new permitted solid waste facilities or stand-alone AD facilities in areas zoned for industrial or solid waste handling activities that may require local land use approval. We further recognize that dairy manure digesters, dairy manure co-digesters, wastewater treatment plant digesters and In-ground digester cell technology at landfills are not included in the scope of this Draft Program EIR.

The following specific comments are being made to seek clarifications and/or strengthen the characterization of the chain of contemplated actions.

<u>2.3.1 Type of EIR</u> (Page 2-3) M-1

Key elements of CEQA Guidelines, Sections 15152 and 15168 should be spelled out to clarify the advantages, purpose and function of the Draft Program EIR.

M-2

Mitigation Measure 5.2b (Page 5-21)

The language in this section, relating to AD facilities not requiring an OIMP, should also reference local air district rules and regulations governing odor nuisances. Odor control strategies must be consistent with local air district requirements.

M-3

Land Use and Land Use Planning (Page 12-2)

A brief discussion needs to be included in this section to note that a change in use or intensity of uses may trigger additional land use approvals. These may include zone changes, general plan amendments, conditional use permits, etc. AD facility projects are generally discretionary and subject to local land use decision making and environmental justice considerations.

M-4

As an outgrowth of our member's review of the Draft Program EIR, we have concluded that a CalRecycle Permitting/Regulatory Framework Guidance Document must be developed to assist state and local agencies to effectively interpret Title 14 regulatory requirements as they apply to the AD facility EIR mitigation measures or best management practices that can reduce or eliminate the environmental effects of discretionary projects. The application of permitting requirements and CEQA compliance must be applied on a case-by-case basis.

We hope that the CalRecycle staff will include these comments in the Final Program Environmental Impact Report for Anaerobic Digester Facilities for the Treatment of Municipal Organic Solid Waste. As stakeholders, we hope that there will be further opportunities to discuss and provide input into the development and implementation of a permitting/regulatory framework guidance document.

Sincerely,

Paul F. Ryan
Executive Director
Inland Empire Disposal Association
951/288-5049

cc: IEDA Membership

Response M-1

Several of the tiering considerations and advantages of a program EIR described in the CEQA Guidelines were expanded upon in the Draft Program EIR, page 2-3, as follows:

> “This Draft Program EIR also should assist in achieving consistent mitigation between individual projects. Program EIR and tiering regulations can be found in California Public Resources Code §21093 and §21094, and CEQA Guidelines §15152 and §15168. A few notable excerpts include CEQA Guidelines §15152(d), which states: ‘Where an EIR has been prepared and certified for a program, plan, policy, or ordinance consistent with the requirements of this section, any lead agency for a later project pursuant to or consistent with the program, plan, policy, or ordinance should limit the EIR or negative declaration on the later project to effects which (1) Were not examined as significant effects on the environment in the prior EIR; or (2) Are susceptible to substantial reduction or avoidance by the choice of specific revisions in the project, by the imposition of conditions, or other means.’ Also, the advantages of using a program EIR are listed in the CEQA Guidelines §15168(b), which states that a program EIR can ‘(1) Provide an occasion for a more exhaustive consideration of effects and alternatives than would be practical in an EIR on an individual action, (2) Ensure consideration of cumulative impacts that might be slighted in a case-by-case analysis, (3) Avoid duplicative reconsideration of basic policy considerations, (4) Allow the Lead Agency to consider broad policy alternatives and programwide mitigation measures at an early time when the agency has greater flexibility to deal with basic problems or cumulative impacts, and (5) Allow reduction in paperwork.’”

Response M-2

Mitigation Measure 5.2b references the use of OIMP if the AD facility is considered to be a composting site. If it is not a composting site, it will fall under the local air district requirements for odor. See response to Comment J-7.

Response M-3

It is anticipated that zoning changes will not be required for a co-located AD facility or one sited in an industrial zone. In addition, since there are currently no commercial mixed solid waste AD facilities in California, such facilities are generally not currently considered in local General Plans or Community Plans. However, it is understood that local factors, including regulations, will be analyzed on a project by project basis. The Draft Program EIR, page 12-2 is revised as follows:

> ### “ Land Use and Land Use Planning
>
> AD facilities would be co-located with permitted solid waste facilities or located in areas zoned for industrial or solid waste handling activities and are thus anticipated to comply <u>in most cases</u> with land use planning and zoning requirements.”

Response M-4

Comment noted. See also responses to Comments C-2, K-6 and 1-24.

Letter N

California Refuse Recycling Council
CRRC
CELEBRATING 50 YEARS
1961-2011

JOINT STATE OFFICE

April 4, 2011

Ken Decio, Project Manager
CalRecycle
1001 I Street
P.O. Box 2815
Sacramento, CA 95812-2815

RE: Comments regarding Draft Program Environmental Impact Report – Statewide Anaerobic Digester Facilities for the Treatment of Municipal Organic Solid Waste

Dear Mr. Decio:

The California Refuse Recycling Council (CRRC) is a statewide non-profit trade association comprised of over 120 companies involved in the collection and processing of municipal organic solid wastes that also operate 20 composting facilities, 50 material recovery facilities, 35 construction and demolition debris processing facilities, and over 12 landfills statewide. Our industry, in partnership with local government, has been instrumental in our state's efforts to attain the recycling mandate of 64% waste diversion from landfills in 2009, required by the California Integrated Waste Management Act of 1989 (AB 939), and will remain critical to the reduce greenhouse gas emission and implement the measure of the AB 32 Scoping Plan.

The purpose of this correspondence is to provide our primary comments regarding explicit Title 14 permitting references for the Draft Program EIR, and CRRC will provide additional secondary comments prior to April 4, 2011.

CRRC has a long history of supporting the Title 14 regulations for the transfer, processing, and composting of organic wastes. The anaerobic digestion (AD) of organic waste is a type of technology that includes the transfer, processing and composting of N-1

Joint State Office | 1121 L Street, Suite 505 | Sacramento, California 95814
Phone: 916-444-CRRC (2772) Fax: 916-442-0623 www.crrcstate.org

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N-1 (cont.)

organic wastes which the current Title 14 regulations can easily be applied. There is no justification to suggest that a new regulatory package specific to AD facilities be recommended, but instead the explicit application of the current Title 14 regulations needs to occur. The Program EIR should assist local government on the regulation and permitting of AD facilities, where there needs to be clarity and certainty to develop the emerging AD industry.

N-2

CRRC supports that AD facilities that use organic wastes need to be permitted following current Title 14-tiered permitting structure since the material is putrescible and fails the three-part test. On page 3-15 in section 3.13, the draft Program EIR, uses the vernacular of “would” and “should” when discussing the regulation of AD facilities under Title 14, and reverts to a “case-by-case” determination. This type of language and case-by-case statements leave the applicant, the LEA, and the CEQA Lead Agency open to interpretation and uncertainty when permitting, where there should be certainty using current Title 14 regulations. The Program EIR should facilitate equitable permitting and not promote confusion and potential loopholes.

N-3

The language in the Program EIR needs to be explicit and clear to provide the explicit permitting of AD Facilities using current Title 14 regulations:

- The pre-processing of food waste AD feedstock anywhere at any time, including an operational area at a waste water treatment plant “shall” be permitted using Title 14 transfer and processing regulations.
- AD facilities “shall” be permitted using Title 14 transfer and processing regulations, and the Title 14 composting regulations for the digestate management.

Should you have any questions, please contact me at 916-739-1200.

Sincerely,

Evan W.R. Edgar
Regulatory Advocate

Response N-1

Comment noted.

Response N-2

See response to Comment C-2.

Response N-3

See response to Comment C-2.

WASTE MANAGEMENT

WASTE MANAGEMENT / PUBLIC AFFAIRS
915 L Street, Suite 1430
Sacramento, CA 95814
(916) 552-5859
(916) 448-2470 Fax

April 4, 2011

Mr. Ken Decio, Senior Integrated Waste Management Specialist
Department of Resources Recycling and Recovery (CalRecycle)
1001 I Street, MS 10A-15
PO Box 4025
Sacramento, CA 95812

Via Email: Ken.Decio@CalRecycle.ca.gov

Subject: Comments: Program Environmental Impact Report for Anaerobic Digester Projects (STATEWIDE ANAEROBIC DIGESTER FACILITIES FOR THE TREATMENT OF MUNICIPAL ORGANIC SOLID WASTE, Draft Program Environmental Impact Report, February 2011 SCH No. 2010042100)

Dear Mr. Decio:

Waste Management appreciates the opportunity to submit comments on the Draft Program Environmental Impact Report (DPEIR) for anaerobic digester projects noted in the subject line above. I have represented Waste Management (WM) on the Technical Advisory Group (TAG) and viewed the TAG as a valuable avenue for making input to the contractor, ESA and CalRecycle staff during the early development of this project.

The stated purpose of development of the DPEIR was summarized in the presentation made at the March 15, 2011, workshop in Sacramento, as follows:

1. Assist in meeting CalRecycle Strategic Directive 6.1: Reduce the amount of organics in the waste stream by 50 percent by 2020.
2. Provide a CEQA resource for local and regional decision makers relative to a subset of AD projects.
3. Provide impact analysis of AD facilities as a starting point for local jurisdictions in preparing CEQA compliance for local AD projects.

WM has developed a comprehensive organics management strategy within the company and has set rigorous goals for diversion of organics from land disposal through various programs. It is our over-arching goal to make input into the DPEIR document that will promote a variety of methods to divert organics from landfills, while meeting the primary objective of assisting with the siting of anaerobic digesters described in the DPEIR.

However, Waste Management is concerned with CalRecycle's decision to exclude In-Ground Digester Cell technology as a form of anaerobic digestion fully covered by the DPEIR. Instead, this technology is simply evaluated as an "Alternative" to other digestion processes covered by the DPEIR. We believe that CalRecycle is missing a significant opportunity to support cost-effective alternatives to traditional in-vessel wet O-1

O-1 (cont.) digestion technologies. WM believes that dry digestion technologies, including in-ground anaerobic digestion, can cost-effectively divert additional organic materials from landfills, reduce the greenhouse gas emissions that may otherwise occur, and contribute to the goal of reduction of organics disposal in California landfills by 50% by 2020. It is our opinion that dry digesters provide a much more cost effective approach toward achieving a 33% alternative energy production level by 2020, and works best for higher diversion and the zero waste goals for California.

O-2 Attached for your consideration is a recent paper that was published on the relative benefits and cost-effectiveness of in-ground dry anaerobic digestions technologies recently demonstrated by WM. This paper was published last year as part of the Global Waste Management Symposium that was held in San Antonio, Texas:

> http://www.wastesymposium.com/GWS2010/Public/Content.aspx?ID=1013008&sortMenu=104000

The capital cost of in-ground dry digestion technologies is typically 50-70% less than wet digestion technologies. Tip fees for materials going to a dry digestion type of facility can be less than that required to sustain a wet digestion technology. To exclude this type of documented process from full evaluation in the DPEIR misses an opportunity to more quickly facilitate the development of dry digestion technologies.

O-3 We also challenge the apparent assumption of the DPEIR that in-ground dry digestion technology is not a form of "in-vessel" anaerobic digestion. There are a wide number of in-vessel dry digestion technologies, for example:

- http://www.google.com/url?sa=t&source=web&cd=1&sqi=2&ved=0CBcQFjAA&url=http%3A%2F%2Fwww.harvestpower.com%2Fupload%2Fpdf_article_2010_08_25__06_17_58.pdf&ei=J_qVTZX3FZKK0QHIltn2Cw&usg=AFQjCNFnnEwTv3ylKds9Gc34joLtvPu_7g
- http://blog.harvestpower.com/technology/dry-fermentation/
- http://www.anaerobic-digestion.com/html/the_dranco_process.php
- http://www.waste-management-world.com/index/display/article-display/339836/articles/waste-management-world/volume-9/issue-4/features/state-of-the-art-2008-anaerobic-digestion-of-solid-waste.html

WM certainly supports the inclusion of these forms of in-vessel dry digestion technology. WM believes that in-ground anaerobic dry digestion technologies should be considered a form of in-vessel anaerobic digestion. *Even though the vessel is "in-ground", it should still be considered "in-vessel".*

Waste Management submits the following specific comments for consideration in the DPEIR for AD technologies.

O-4

Definition of "In-Vessel": The term "vessel" or "in-vessel" is used 21 times in the DPEIR. However, there is no definition for this term. WM recommends the inclusion of a broad definition for the term "in-vessel", such as:

> The term "in-vessel" means a structural device used to contain the anaerobic digestion process. The container may be in-ground, above-ground or on the ground, including, tanks, buildings, structures and control systems fabricated of materials designed to contain the anaerobic digestion process including, but not limited to steel, plastics, concrete and earthen forms.

O-5

Request Inclusion of the In-Ground Dry Digester Cell Technology in the DPEIR: In-Ground Dry Digester Cell offers a significant opportunity to cost-effectively accept increasing volumes of organic materials specifically selected and segregated for this purpose. Materials directed to this alternative should be carefully managed to ensure controlled diversion of selected materials (e.g., green waste, food waste, and other high organics streams) to the digester cell to maximize methane production and effective control of environmental impacts of the decomposition process. The document should clearly identify the In-Ground Digester Cell as a form of "in-vessel" anaerobic digestion technology cover by the DPEIR.

O-6

Support for Development of Regulations Specifically Designed for AD Projects: CalRecycle has done a good job in using broad interpretation of the existing transfer and processing regulations and existing composting regulations to assemble an interim regulatory structure to allow AD projects to advance. However, WM believes there is the need for a specific regulatory framework to manage and promote efficient and effective AD projects that contribute to alternative fuels and energy, reduce the carbon footprint of the organics waste stream and reduce the volume of organics buried in landfills. The transfer/processing and composting regulations have no potential for addressing the many technological advancements that will be forthcoming in AD development. Completion of the DPEIR for AD technologies should be one phase in the development of an appropriate regulatory framework for all AD technologies and alternatives.

O-7

Co-location to Facilitate Siting of AD Projects: Co-location of solid waste AD projects with other similar land uses and activities makes sense. Landfills, transfer stations, waste water treatment facilities and compost facilities offer favorable siting locations for development of the AD project defined in the DPEIR as well as the alternatives noted, except for the "no project" option. Co-location creates greater efficiency, reduces thresholds for land use determinations, CEQA compliance and permitting, as well as reducing the potential for objections that may be directed at a "Greenfield" project. Co-location allows for on-site processing and management of digestate, liquids and residuals at the same location with no transportation, combined odor mitigation, and other system efficiencies. O-7 (cont.)

O-8

Concern Regarding Time Limitation for Feedstock Storage: There is an assumption in the DPEIR that feedstock materials must be introduced into the AD processing vessel within 24 hours of arrival at the AD facility. This limitation is based on the presumption of environmental and health impacts that may be attributed to putrescible materials that may lead to odor, vectors and other environmental impacts. While the environmental concerns are legitimate, the time limitation may be inconsistent with normal operating procedures at solid waste facilities, including AD facilities. State law requires that solid waste be removed from a collection transfer and processing facility with 48 hours for the same health and environmental reasons. These same time parameters may be appropriate for AD facilities too. The 48 hour limit may better accommodate weekend operations at the AD facility. Additional provisions that would allow storage for longer than 48 hours outside of the digestion vessel or prior to commencement of digestions are essential. Such storage prior to digestion may be appropriately accompanied with provisions to pull a vacuum on the stored feedstock with emission control technologies. At least one option that should be included is the provision of negative air flow to a biofilter from the stored material prior to commencement of the anaerobic digestion process. The DPEIR should evaluate the full range of options that can be used to mitigate vectors, odors and other environmental impacts without having to resort to placement into the AD vessel within 24 hours of arrival on site.

O-9

"Experimental" Digester Cells: In Chapter 13 (page 13-12), the document states that:

> "*In-ground digester cells are still experimental and much is still unknown about viable feedstocks, environmental performance, and economic feasibility. Digester cells may be able to play a role in* diverting *a portion of the organics stream from landfill disposal, but given the lack of demonstration on food waste, it is unclear whether these cells will be able to achieve the same levels of efficiency and environmental performance as in-vessel* digesters."

While expressing this undocumented statement, the DPEIR also cites a successful food waste project in Solon, OH (a Waste Management project) and a similar project in Yolo County, CA that contradict the assumptions that these projects have not demonstrated economic feasibility using food waste and have achieved the goals set forth in the environmental assessment. In the case of the Yolo County project, the final report has entire sections devoted to the feedstocks, environmental performance, and economic feasibility. How can the DPEIR state that "much is unknown"? Also, please see the attached technical paper referenced above and attached to this letter. Significant data has been compiled from a number of in-ground dry digestion projects but was not included in this analysis of alternatives. What is the justification of not using this data to determine the level of efficiency and environmental performance of Landfill In-Ground Digester Cells as a form of in-vessel anaerobic digestion? O-9 cont.

O-10 **Project Comparisons, Table 13-1:** In Chapter 13, Alternatives, there is narrative discussion and a graph that displays the consultant's analysis of the comparison of significant impacts for the project and the alternatives. Waste Management asserts that the consultant should provide more detailed justification as to why some projects are listed as potentially greater (PG) impact than other projects. For example, under Impact 5.1 and 5.2 the co-digestion at dairy manure digesters alternative and landfill-in ground digestion cell alternative are both listed as PG and E, respectively. What rational was used to make this determination? Both dairy manure digester and landfill in-ground digester cell alternatives are completely covered with a liner. How can they have more odor than co-digestion at WWTP or an anaerobic digester as indicated in this table – particularly if negative air to a biofilter is provided during the loading and unloading stages? Throughout this table similar determinations are made without proper justification or documentation as to how this was concluded. Such documentation should be accompanied by citation of technical publications that support any particular conclusion. Justification should be provided so one could easily follow the rational for the reasoning behind the comparison and determination. For Table 13-1, the consultant should provide more detailed justification as to why some projects are listed as potentially greater impact than other projects. Similar comments have been submitted by Ramin Yazdani, Ph.D., P.E., Project Manager of the Yolo County Central Landfill project. Waste Management is concurring with Dr. Yazdani's comments and citing them as the source of this comment.

O-11 **Guidance Document:** At the public workshop, Mark DeBie of CalRecycle referenced a Guidance Document that will bring more clarity and direction to utilization of the DPEIR in the development of local projects. Please advise us on the schedule for development of the Guidance Document. Waste Management encourages CalRecycle to take the broadest view possible in this guidance document for the development of Anaerobic Digestion technologies. We specifically request that this guidance document include Dry Fermentation technologies and specifically "in-ground anaerobic digestion" as supported technologies in this guidance document.

Waste Management appreciates the opportunity to comment on the regulations. We further look forward to participating in discussion of the regulations and comments submitted by the interested parties in a public forum. CalRecycle has made a concerted effort to make the business of the department an open and transparent process. We request the department schedule a public workshop to discuss the next iteration of the Draft Programmatic Environmental Impact Report for anaerobic digester facilities.

Sincerely,

Chuck White, P.E.
Director of Regulatory Affairs / West Group

Attachment: "Evolution of a Dry Anaerobic Composting Technique that Processes Food Waste and Yard Waste Using a Reusable Series of Batch Pods", G. Hater, N. Swan, C. Pierce, and R. Green, Global Waste Management Symposium, San Antonio, Texas, 2010

cc: Mr. Mark Leary, Acting Director, CalRecycle, Mark.Leary@CalRecycle.ca.gov
Mr. Ted Rauh, Deputy Director, Enforcement and Compliance, CalRecycle, Ted.Rauh@CalRecycle.ca.gov
Mr. Mark DeBie, Branch Chief, Permits and Certification Division, CalRecycle, Mark.DeBie@CalRecycle.ca.gov

Evolution of a Dry Anaerobic Composting Technique that Processes Food Waste and Yard Waste Using a Reusable Series of Batch Pods

G. Hater[1], N. Swan[2], C. Pierce[3], and R. Green[1]

ABSTRACT: The EU has been anaerobically digesting various types of food waste for many years and has more than 100 facilities in operation and under construction. The first generations of anaerobic digesters were all wet digesters with suspended solids concentrations less than 8%. These digesters require that the feedstock be "pumpable" and thus ground to a particle size less than 12mm. The extreme resizing of incoming food waste continues to be a limiting cost factor on the front end of the process and results in a paste-like digestate that must be mixed with compost in order to make the end product usable. In the last five years "dry" anaerobic digestion has come of age in the EU. Dry anaerobic digesters/composters typically use yard waste as a support medium mixed with food waste to yield a 50% to 60% solids starting mixture. The differences between wet and advanced batch dry anaerobic digestion in the EU is illustrated in Table 1.

Table 1. Comparison of classic wet and advanced dry batch anaerobic digestion in the EU.

Process Details	**Wet Digestion**	**Dry Digestion**
Feed stock Preparation	Mandatory sizing to paste-like consistency	Mixing of food waste and yardwaste (often no grinding)
Type of Process	Continuous	Batch
Process residence time	Variable < 50 days	21 -28 days
Operating Temperature Range	Mesophillic or Thermophillic	Mesophillic or Thermophillic
Plastic Removal	Prefermentation	Post Fermentation Screening
Capital per ton Processed	2 -3X	1X
Foot Print (excluding digestate maturation)	1X	2X -3X
Compost Product (without amendment)	marginal	residential and agricultural compost
Estimated tip fee factor including preparation	1X	0.4 to 0.6X

---

1. Waste Management, Inc., 2956 Montana Ave, Cincinnati, Ohio 45211 USA
2. Cygnus Environmental Group, 1944 Roanoke Avenue, Louisville, KY 40205-1416 USA
3. Waste Management Organic Growth, Inc., 5076 N, Franklin, IN 46131 USA

Dry anaerobic processing fits the US solid waste practice of collecting and co-processing food and yard waste. The EU technology remains capital intensive in the US because of lack of tax supports for diversion. Therefore, the EU batch technology is difficult to justify except where tip fees are greater than $40/ton and energy values are greater than $0.10/kwh. In order to cooperate with the customer desire for organics diversion Waste Management has permitted, installed and is operating several full-scale batch anaerobic composters on yardwaste and food waste. Using unique materials of construction and location flexibility the technology can be built and operated anywhere in North America. The facilities are accepting food waste from numerous sources including food manufacturers, grocery stores, pork and poultry processors and produce packers. Gas quality and production rate, compost quality, residence time, operation in frigid weather and footprint are detailed. The anaerobic digester process is patent pending and commercially permitted as a Reclaimable Anaerobic Composter ™.

INTRODUCTION

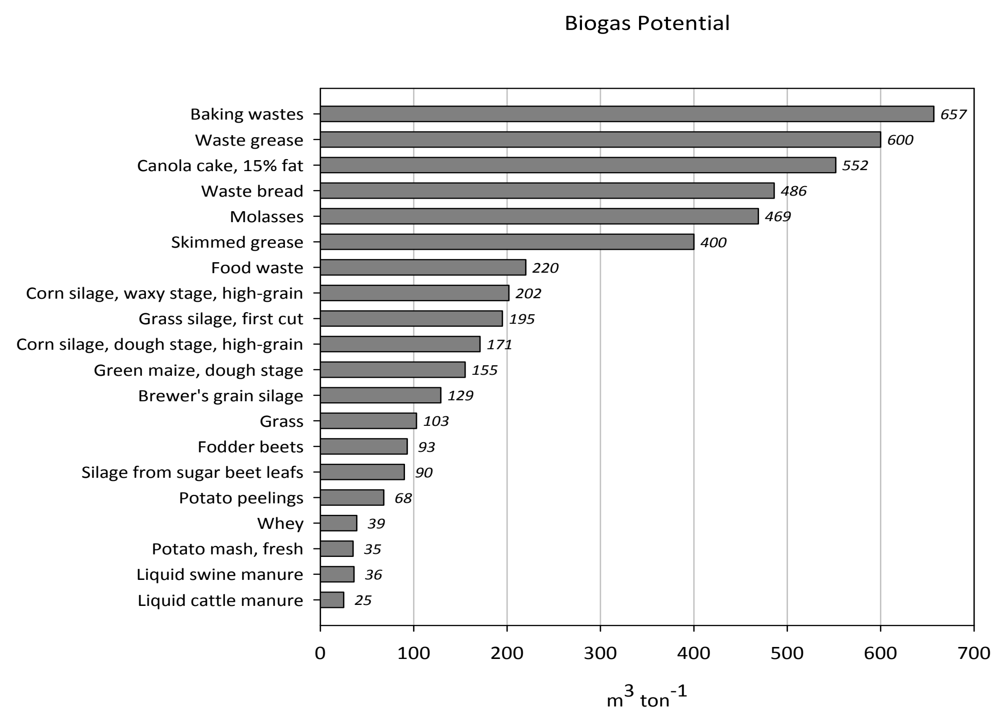
The EU has been anaerobically digesting various types of food waste for many years and has more than 100 facilities in operation and under construction. The first generations of anaerobic digesters were all wet digesters with suspended solids concentrations less than 8%. These digesters require that the feedstock be “pumpable” and thus ground to a particle size less than 12mm. The extreme resizing of incoming food waste continues to be a limiting cost factor on the front end of the process and results in a paste-like digestate that must be mixed with compost in order to make the end product usable. In the last five years “dry” anaerobic digestion has come of age in the EU. Dry anaerobic digesters/composters typically use yard waste as a support medium mixed with food waste to yield a 50% to 60% solids starting mixture. The differences between wet and advanced batch dry anaerobic digestion in the EU is illustrated in Table 1. Cost of production with amortization of capital is preventing the US from doing large scale wet Anaerobic Digestion (AD) for food waste. Reducing capital and preparation cost in order to operate in the competitive US market is critical until the food waste AD market gets established is critical for the next several years. Food waste in the US is largely pre-consumer process waste from industrial manufacturers, grocery store waste and preparation wastes from hospitals, jails and hospitals. The high methane value materials like bakery goods and fats are often not available in the US market because they are being diverted to animal feed lots in most cases. In most cases the top five waste streams listed in Table 2 are not available because feed lots take this material for a minimum charge in the US. Where as in the EU these materials are regulated to be kept out of the food chain and must go to AD. Also the US market has more meat by-products available which have higher protein content. Another waste stream that is rapidly becoming available is a commingled residential food waste and yard waste blend that is picked up at the curb. This stream has unique residential inorganic contaminants like glass, plastic and bones which are difficult to manage and the methane yield is unknown at this time. But, this waste stream lends itself to dry batch AD systems because of the woody components.

The bulk of the remainder of this paper is focused on meeting the green demand in the US without driving the price of AD beyond the realm of a feasible project. Much of the US market has a tip fee of $25 to $35 /ton This fee makes it hard to justify large capital intensive AD’s that are common in the EU.

Table 1. Comparison of classic wet and advanced dry batch anaerobic digestion in the EU.

Process Details	**Wet Digestion**	**Dry Digestion**
Feed stock Preparation	Mandatory sizing to paste-like consistency	Mixing of food waste and yardwaste (often no grinding)
Type of Process	Continuous	Batch
Process residence time	Variable < 50 days	21 -28 days
Operating Temperature Range	Mesophillic or Thermophillic	Mesophillic or Thermophillic
Plastic Removal	Prefermentation	Post Fermentation Screening
Capital per ton Processed	2 -3X	1X
Foot Print (excluding digestate maturation)	1X	2X -3X
Compost Product (without amendment)	marginal	residential and agricultural compost
Estimated tip fee factor including preparation	1X	0.4 to 0.6X

Table 2. Biogas Yield based on substrate type



Adapted from Mattias Effennberger, 2006. "State of the Art of (Agricultural) Biogas Technology in Germany"
In: *Biogas Opportunities in Alberta: Learning from European, American and Canadian Successes, Edmonton, Albert*

RESULTS AND DISCUSSION

WM has designed, permitted and built four full scale batch Anaerobic Digesters, two in Solon, Ohio and two in Louisville, Kentucky. Two of the digesters are in boundary property of a closed MSW landfill that has gas collection and sales and the other two are on an operating landfill footprint that has gas collection and sales. Each reclaimable Anaerobic Digester (RAC) is constructed of HDPE and the dimensions are variable depending on market size. Typically these digesters are 40' to 65' wide and 80' to 150' long and depth up to 15'. This batch digester allows for 50% yard waste by volume and 50% food waste by volume, less a small volume of AD seed material or inoculants. The individual RAC's are sealed to prevent oxygen intrusion. Up to 3500 tons of material can be processed at one time. An illustration is provided in Figure 1.

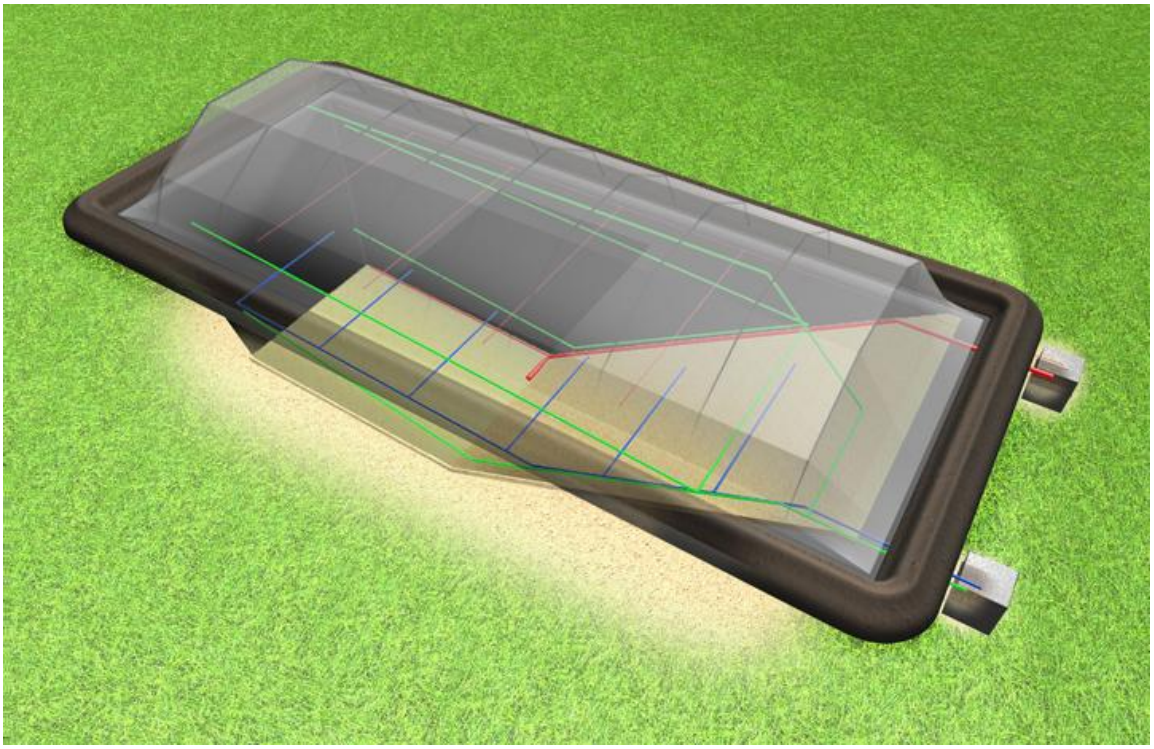


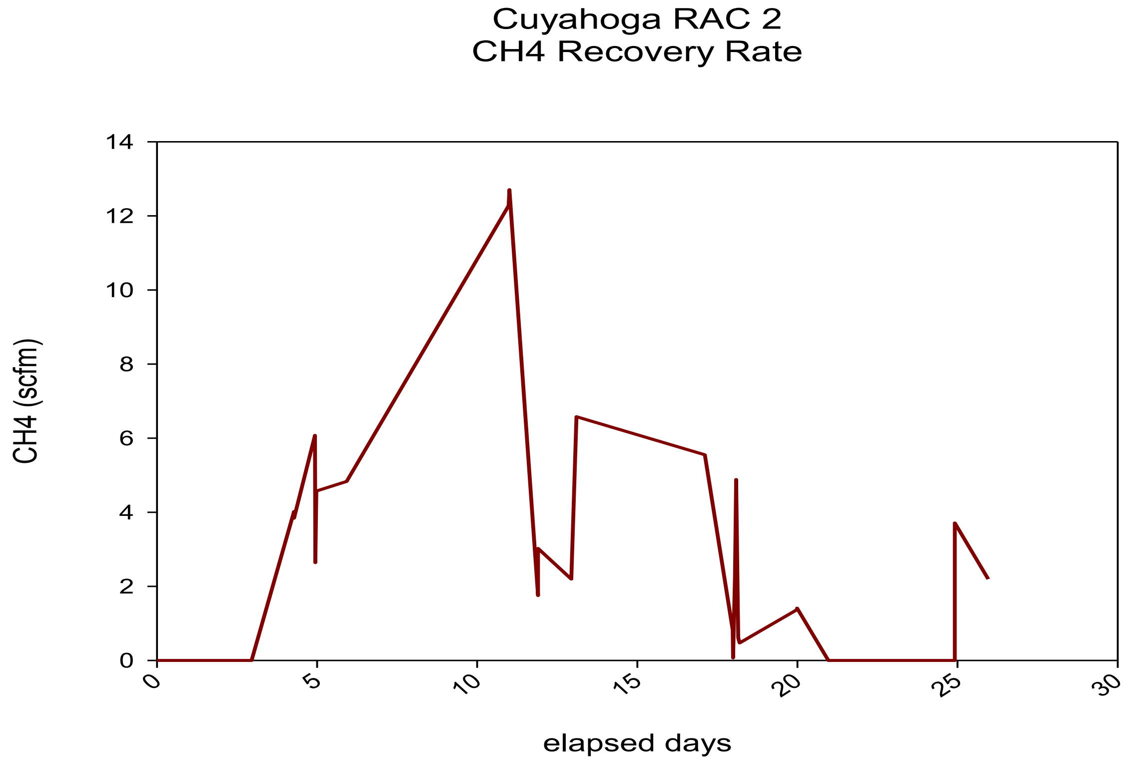
Figure 1. Artists rendering of Reclaimable Anaerobic Composter^{TM} (RAC)^{TM}(PATENT PENDING) Red Piping is liquid removal (or recirculation); Blue Piping is aeration; Green Piping is gas recovery (Note liner protection, gas recovery headers and recirculation header details are purposely not detailed).

Cycle time is dependant on incoming volume and the fermentation rate of the feedstock. Incoming material is mixed with yard waste and then added to the digester. During the filling step, odors are eliminated by sending the adjacent air under the temporary filling cover to a biofilter. The methanogenic step is typically 30 to 60 days. Because of the inexpensive materials of construction our systems are larger volumetrically larger than EU type batch AD systems. This in turn allows us to harvest gas for a longer period of time and collect a bigger percentage of the gas curve. Table 3 details a typical batch AD cycle.

Table 3. Sequence of Operations.

Operation	Duration
Mixing & Placement	Intermittent intervals for up to 30 days
Capping (gas tight)	< ½ day
Aeration (Optional)	3 to 7 days
Methane Recovery	30 to 60 days
Aeration	1 to 7 days
Unloading	< 1 day
Maturation	30 – 60 days

Vetting of this AD technology continues at both locations. As the market develops our feed stocks are improving in gas potential. The first batch of material was predominantly meat by-products and green vegetables with a laboratory BMP (Biochemical Methane Potential) of 21-33 mL methane/gm (519.5 ft^3/ wet ton of feed stock). Full-scale gas production from the digester is detailed in Figure 2.



Period: 12/18/09 - 1/13/10
estimated total methane recovered = 139,973 cu ft.

Figure 2. Rough gas curve from Ohio vetting facility.

Percent methane is generally very high quality. No hydrogen sulfide or siloxanes have been detected. Methane concentration is typically 60% to 74% by volume as detailed in Figure 3.

Letter O

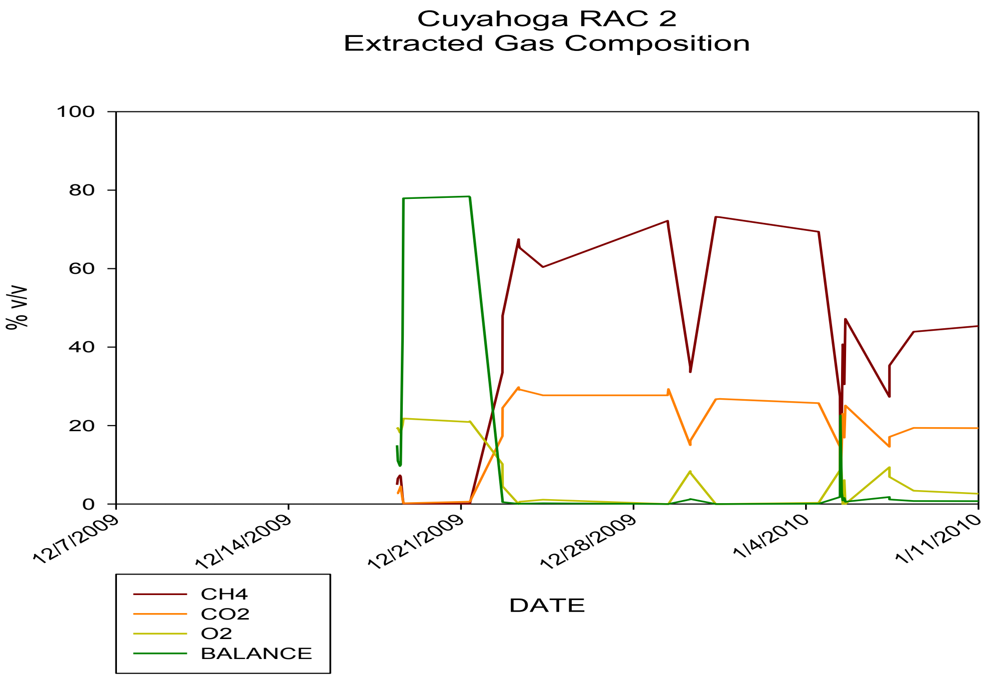


Figure 3. Methane Concentration in Ohio vetting facility.

The initial work yielded in excess of 130,000 ft^3 of methane in the first 28 days of operation. For this waste stream L_o = 1.45 ft^3/ lb. and k =1.46$^{-1\ yr}$. Retention time is temperature dependant and cycle times may be higher in the winter months. Most of the above data was collected under a three foot blanket of snow with ambient temperatures well below freezing. In-ground digesters will have shorter cycles in warmer months and warmer climates. Obviously a supplemental heat source is anther option.

Figure 4 is a conceptual view of half a RAC system build out for 60,000-80,000 tpy of combined material. Figure 5 is a photo of the RAC filling in Ohio in the fall of 2009.

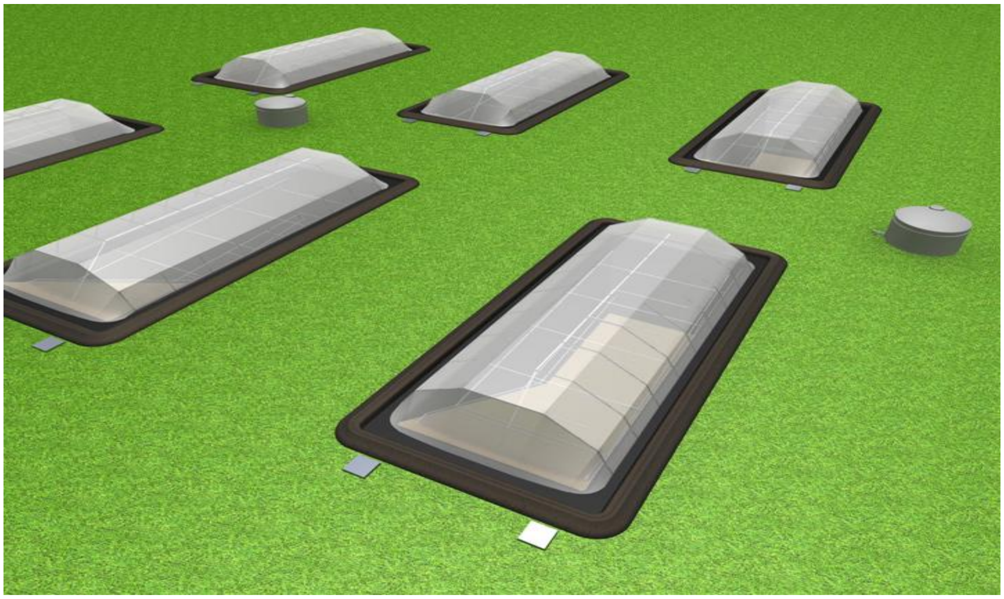


Figure 4. Artist conceptual rendering of a RAC system.

Figure 5. RAC loading at Cuyahoga RAC facility in Ohio.

CONCLUSIONS

With the preliminary success of the operations, we are now testing full-scale anaerobic composting of better methane producing waste streams and working on the automation of the mixing, loading and unloading steps. Location of these digesters adjacent to existing gas collection systems has allowed us to no build a capital intensive gas to energy or heating interconnect. Also, these AD systems are receiving variable methane yield waste streams. By piggy backing on an existing infrastructure, feed quality can oscillate without disrupting gas usage. The RAC system is an inexpensive batch energy producer apparatus that has been tested full scale. Currently engineering is underway to automate the system. The system is 25% to 40% of the capital of a EU dry digester.

ACKNOWLEDGEMENTS

The authors wish to acknowledge the hard work and dedication of Mr. John Barbush and Pike Contracting.

Response O-1

Dry digesters were not excluded from the scope of the Draft Program EIR. They are introduced on page 3-8 of the Draft Program EIR "high-solids/ dry systems" with references to photos included in Appendix B.

However, in-ground digester cells are not included in the scope of the project. See response to Comment F-2.

Response O-2

A citation to the article referenced by the commenter was included in the Draft Program EIR on page 13-12, with several additional text revisions as follows:

> "In-ground digester cells are still experimental and much is still unknown about viable feedstocks, environmental performance, and economic feasibility. However, research into this technology continues to explore these factors, such as the recent article *Evolution of a Dry Anaerobic Composting Technique that Processes Food Wastes and Yard Waste Using a Reusable Series of Batch Pods* (Hater, G., et al, 2010)."

The reference section in Chapter 13 (page 13-20) was also revised to add the new reference as follows:

> "Hater, G, Swan, N., Pierce, C., and Green, R., 2010. *Evolution of a Dry Anaerobic Composting Technique that Processes Food Wastes and Yard Waste Using a Reusable Series of Batch Pods*. Global Waste Management Symposium, San Antonio, Texas, 2010."

Response O-3

All of the links provided in this comment describe traditional above-ground dry digestion systems. None of them discuss in-ground digesters.

In-ground digesters can be considered a form of "in-vessel" anaerobic digestion, but they are not a form of anaerobic digesters that is considered in the scope of this Program EIR. See response to comment F-2.

Response O-4

For the purposes of the Program EIR and the scope of project identified in Chapter 3 (Project Description) a general definition of "in-vessel" would be a structure used to contain the anaerobic digestion process. The structure could include tanks or sealed rooms. The sealed rooms would typically be in a building under negative pressure and more than likely the air from the rooms and building would go through a biofilter or other system to control odors.

Response O-5

See response to Comment F-2.

Response O-6

Comment noted. Commenter supports development of specific regulatory framework to manage and promote efficient and effective AD projects.

Response O-7

Comment noted. Commenter supports co-location of AD projects with other similar land uses, such as landfills, transfer stations, waste water treatment facilities and compost facilities.

Response O-8

See responses to Comments H-1 and J-7.

Response O-9

Please see responses to Comments O-2, and F-2.

Response O-10

Please see response to Comment F-1.

Response O-11

In-ground digester as well as all other alternatives will be referenced in the CalRecycle Guidance Document for using the Program EIR that is referenced by the commenter.

Letter P

email

date	Monday, April 04, 2011 3:27 PM
to	Decio, Ken
from	Joyce Dillard [mailto:dillardjoyce@yahoo.com]
subject	Statewide Anaerobic Digester Facilities for the Treatment of Municipal Organic Solid Waste (SCH #2010042100) DEIR due 4.4.2011

California Department of Resources Recycling and Recovery CalRecycle is the Lead Agency and we question their authority. P-1

ANAEROBIC DIGESTER FACILITIES are rooted in local municipalities GENERAL PLANS and COMMUNITY PLANS. This Program Draft EIR cannot cover each application of Elements and Mitigation Measures already adopted by the local municipalities. It cannot cover operations and maintenance needs of the facilities. P-2

We question that this PROGRAM DRAFT EIR qualifies considering the local municipality jurisdiction over: P-3

- Geography
- Contemplated Actions
- Rules, Regulations, Plans to Govern
- Activities Carried Out by an Authority with Similar Environmental Effects

This DEIR has limited potentially significant impacts to only eight categories which may not be correct based on the adoptions of General Plans: P-4

1. Aesthetics
2. Air Quality and Greenhouse Gas Emissions
3. Hazards and Hazardous Materials
4. Hydrology and Water Quality
5. Noise
6. Public Services and Utilities
7. Transportation and Traffic
8. Cumulative Impacts

There may be significant impacts in the eight categories deemed insignificant in this document:

1. Agricultural and Forest Resources
2. Biological Resources
3. Cultural Resources
4. Geology, Soils and Seismicity
5. Land Use and Land Use Planning

P-4 (cont.)

6. Mineral Resources
7. Population and Housing
8. Recreation

P-5

The geology, soils and seismicity has been key factors in placement of carbon sequestration projects in California (Terminal Island Renewable Energy Project TIRE) and will continue to be the most significant factor in determining placement for facilities due to the nature of migrating gases.

Oil wells, faults, methane conditions including migration and bubbling, underground storage tanks and pipelines are all public health and safety conditions, not under CalRecycles jurisdiction.

The recent earthquake in Japan should weigh into decisions of proper placement, monitoring and mitigation and the effects on humans, plants and animals.

Monitoring needs to be scientific, factual and conducted by trained, qualified personnel.

Infrastructure needs to be in place whether it be pipelines, roads or utilities (energy) for production.

P-6

Plans such as Flood Control, Congestion, Emergency Services are under the jurisdiction of the local municipalities not CalRecycle.

P-7

Budgetary issues are key factors in the operations and maintenance of any facility and any mitigation measures or alternatives need to be addressed at the loca

Lead agencies need to be responsible. Does the lead agency status trigger a mandate and responsibility for reimbursement.

P-8

Water and electricity, in the City of Los Angeles Charter, are under the jurisdiction of a proprietary department, the Los Angeles Department of Water and Power LADWP, and are subject to ratepayer fees. Assets of this department are in other than Los Angeles County.

P-9

Groundwater, groundwater basin plans, and non-adjudicated basins need to be addressed for responsibility of contamination issues.

P-10

Pipelines can be affected. Any overweight truck issues should be addressed as damage is done to infrastructure.

P-11

You considered the following issues not significant:

- Agricultural and Forest Resources
- Biological Resources
- Cultural Resources
- Geology, Soils and Seismicity
- Land Use and Land Use Planning
- Mineral Resources
- Population and Housing
- Recreation

We disagree as there is a history of lawsuits regarding such issues.

P-12

With greenhouse gas emissions effects, forests even play a larger role in urban settings, especially with fires and the damage caused to watersheds and in odors.

P-13

Oil wells and methane issues are important to areas like Los Angeles.

P-14

We find the following impacts very significant:

5. Air Quality and Greenhouse Gas

Impact 5.2: Operation of AD facilities in California could create objectionable odors affecting a substantial number of people.

P-14
(cont.)

6. Hydrology

Impact 6.2: The operation of AD facilities could adversely affect surface and groundwater quality.

Impact 6.3: AD facilities could be exposed to flooding hazards.

Impact 6.4: Construction of AD facilities could change drainage and flooding patterns

Impact 6.5: AD facilities could require additional water supplies resulting in depletion of groundwater.

Impact 6.7: AD facilities could contribute to cumulative impacts to water quality.

8. Public Services and Utilities

Impact 8.1: The project would not substantially increase demands on fire protection services.

Impact 8.2: The project could potentially exceed wastewater treatment requirements of the Regional Water Quality Control Board (RWQCB).

Impact 8.3: The project could result in significant environmental effects from the construction and operation of new water and wastewater treatment facilities or expansion of existing facilities.

Impact 8.4: The project would not result in significant environmental effects from the construction of new stormwater treatment facilities or expansion of existing facilities.

Impact 8.5: The project would not require significant levels of new or expanded water supply resources or entitlements.

Impact 8.6: The project could result in exceeding the capacity of a wastewater treatment provider.

Impact 8.7: The project could result in the construction of new energy supplies and could require additional energy infrastructure.

Impact 8.8: Development of AD facilities would not contribute to cumulative impacts to public services and utilities.

11. Hazards and Hazardous Materials

Impact 11.1: Construction of AD facilities could result in the potential exposure of construction workers, the public and the environment to preexisting soil and/or groundwater contamination.

Joyce Dillard
P.O. Box 31377
Los Angeles, CA 90031

Response P-1

Comment noted. Agencies and other groups involved in the Technical Advisory Group (TAG) have not questioned CalRecycle's role as Lead Agency for the Program EIR.

Response P-2

Because there are currently no commercial mixed solid waste AD facilities in California, such facilities are generally not currently considered in local General Plans or Community Plans.

The commenter asserts that there are many local factors that need to be considered before digester development is approved. It is understood that local factors, including regulations, will be analyzed on a project by project basis. As described in the Draft Program EIR, Executive Summary (page 1-1), the purpose of the Draft Program EIR is to: "inform future policy considerations related to AD facilities and assist state and local agencies in preparing site-specific environmental documentation that may be required for AD facility applications and/or permits submitted to CalRecycle, regulatory agencies and local jurisdictions. In the event CalRecycle or other public agencies adopt regulations or ordinances relating to regulating or permitting AD facilities, the Draft Program EIR provides useful information and can serve as the basis for analyzing the environmental effects of individual projects."

Response P-3

Commenter does not specify what the Draft Program EIR should "qualify" for. See also response to Comment P-2.

Response P-4

Commenter vaguely asserts that some impacts may be significant due to adopted local General Plans. See responses to Comments P-2 and P-11 as well.

Response P-5

Please see response to Comment P-2 regarding analysis of local considerations.

Response P-6

Please see response to Comment P-2 regarding analysis of local considerations.

Response P-7

The Program EIR does not trigger a mandate and responsibility for reimbursement to CalRecycle from local agencies.

Response P-8

Please see response to Comment P-2 regarding analysis of local considerations.

Response P-9

Please see response to Comment P-2 regarding analysis of local considerations.

Response P-10

Please see response to Comment P-2 regarding analysis of local considerations. Specific impacts to public utilities will be analyzed at the project level.

Response P-11

A "history of lawsuits" associated with environmental criteria (none of which are cited by the commenter) does not mean that all projects would result in significant impacts for the same criteria. Local effects will need to be considered for specific AD facility projects.

As noted on page 12-1 of the Draft Program EIR, "The NOP dismissed potential impacts in these resource areas as they are not anticipated to have potentially significant impacts at the program level, although they could require evaluation for individual projects due to the potential for local effects."

Response P-12

The commenter's assertion as to the importance of urban forests for greenhouse gas reduction is noted. However, this does not affect the analysis of the project under CEQA. No changes have been made to the document. Please see response to Comment P-2 regarding analysis of local considerations.

Response P-13

Please see response to Comment P-2 regarding analysis of local considerations.

Response P-14

Commenter lists impacts that they think should be considered significant, yet does not provide any analysis or data to support this assertion.

Letter Q

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April 4, 2011

Mr. Ken Decio, Senior Integrated Waste Management Specialist
Department of Resources Recycling and Recovery (CalRecycle)
1001 I Street, MS 10A-15
PO Box 4025
Sacramento, CA 95812

Via email: **Ken.Decio@CalRecycle.ca.gov**

Subject: Program Environmental Impact Report for Anaerobic Digester Projects:
STATEWIDE ANAEROBIC DIGESTER FACILITIES FOR THE TREATMENT OF MUNICIPAL ORGANIC SOLID WASTE, Draft Program Environmental Impact Report, February 2011
SCH No. 2010042100

Dear Mr. Decio,

Thank you for the opportunity to comment on the draft version of the Program EIR for Anaerobic Digestion Projects We appreciate the ability to serve on the Technical Advisory Group (TAG) and your willingness to include industry experts and additional information during the process. Overall, the result of this process is a document that does address issues and mitigations specific to the anaerobic digestion process. Therefore, we are primarily focused on clarifying issues related to how anaerobic technologies operate.

Our company, Harvest Power, Inc., d/b/a Harvest Organics Inc., is committed to a new era of organic waste management, including anaerobic digestion. In partnership with communities and organic waste generators we develop, build, own and operate state-of-the-art facilities that produce renewable energy and soil enhancement products from discarded organic materials. By harvesting these valuable resources, we enable communities and businesses to increase their energy independence, reduce their environmental impact and reliably manage their organic waste in a cost effective manner. Harvest plans to expand our current operations to include Anaerobic Digestion facilities in California. These facilities will often be associated with composting facilities, and focused on the development of covered aerated static pile (CASP) systems.

The Program EIR will assist municipalities and other regulatory agencies in facilitating permitting of anaerobic digestion facilities within the current regulatory framework. Clarification of definitions, environmental impacts and mitigations will enable a more direct and efficient CEQA review.

As the document indicates, there are a number of different types of anaerobic digestion facilities. Beyond the wet and high solids differences, there are a variety of environmentally responsible ways of reusing the digestate and leachate resulting from the process.

Figure 3-1: Anaerobic Digestion of Municipal Organic Solid Waste (and associated verbiage) Q-1

This diagram shows the accepted pathways for liquid leachate from AD facilities. It includes reclaimed water, liquid fertilizer/soil amendment, land application or into the sanitary sewer. Please add the following to the list: *When associated with a compost facility, it can also be recirculated into the second phase of a dry anaerobic digestion system as an addition to composting process, along with the digestate.*

3.1.3 -- CalRecycle Permitting/Regulatory Structure Q-2

The section reviews the placement of AD in the current CalRecycle regulatory structure. "If the feedstocks reach a temperature of at least 50 degrees Celsius/122 degrees Fahrenheit) on site, then the facility could be regulated as a compostable material handling facility." The purpose of this requirement is unclear. If it is to reach pathogen reduction, the CalRecycle regulations indicate that active compost shall be maintained at a temperature of 55 degrees Celsius (131 degrees Fahrenheit) or higher for a minimum pathogen reduction period of 3 days. This section should state that the purpose of the temperature requirement and why it is used to define this particular anaerobic digestion technology as a compost process. If it is for pathogen reduction purposes, it appears that it should mirror CalRecycle's composting regulations.

Anaerobic Digestion technologies can be combined with composting facilities to fully recycle all of the organic materials. By "on site" in this section, it is difficult to determine if the temperature requirement can be met through another process (windrow or aerated static composting) or within the same technology. Certain anaerobic digestion systems recycle the digestate and leachate into an adjacent composting process, with additional greenwaste. Through this process they produce a proven, marketable compost product in addition to energy. In these cases, the anaerobic digestion is a pre-processing of materials for composting. The pathogen reduction is reached during the composting process, and the food waste produces energy and the volatile organics, and odor, are reduced. Q-3

The language in the program EIR related to the slotting of composting and anaerobic digestion begins to clarify the regulatory structure in terms of transfer stations and composting facilities. But in order to streamline permitting, while protecting human health and the environment, co-located technologies could actually be combined together under the composting permit process. This would reduce the need for two permits on one site, for two interconnected processes. Q-4

Figure 3 -3: Anaerobic Digestion Processes and Potential Environmental Effects from Operational Phases Q-5

As discussed in the comment in Figure 3-1, the liquids resulting from the digestion process can be recalculated or incorporated into an adjacent composting operation. The definition of "recycle" needs to reflect this process.

Q-6

3.7.3: Post-Processing

Digestate

Please add recirculation and compost addition language as described for Figure 3-3.

Q-7

The Environmental Impacts and Mitigations section provides a review of solutions that are currently available. The mitigations need to not only address the environmental impacts, but do so in a manner that takes the anaerobic digestion technology and industry into account.

Specifically, the air section is critical as multiple air districts are reviewing and updating their air regulations. The mitigations need to focus on alternatives that are available and affordable. Furthermore, the current low natural gas prices are encouraging the use of electricity generated from AD facilities to make this technology environmentally viable in California. Currently, the air districts are restricting their emissions which will result in either extremely efficient engines or the use of alternatives. Ranking the choices in this document may prevent the development of AD facilities, if they cannot produce energy with an economically viable result.

Q-8

Measure 51.b

The final bullet in this section suggests alternatives to internal combustion engines. The current language favors gas production which, currently, may not be economically viable because of low natural gas pricing in California. Therefore, all viable alternatives to chose alternatives meeting CARB or regional air board requirements should be included. We recommend replacing the final air mitigation bullet with the following language.

For energy generation, chose the proven technology to generate the selected energy with the lowest NOx emissions, following regional air district regulatory thresholds. Examples may include: internal combustion engines with lower NOx emissions and fuel cells for electricity production, conversion to transportation fuel (compressed biomethane), or the injection of biomethane into the utility gas systems. If there are lower NOx alternatives technologies available at the time of AD facility development, these should be considered as well during the facility design process for each energy output.

Q-9

Measure 5.2b

In this section, odor control mitigations are recommended for the anaerobic digestion process. In a two stage batch system, the resulting digestate can have a significantly lower VOC (and odor) content. Thus the following language is recommended.

Handle digestate within enclosed building, or mix with greenwaste and incorporate into a composting operation within the same business day, and/or directly pump to sealed, liquid-tight containers for transportation.

Harvest Power welcomes the opportunity to meet with you or Paul Miller to discuss these remaining clarifications. Please feel free to contact me at 510-847-0038.

Sincerely,

Linda Novick
Project Manager
Harvest Power

Response Q-1

Figure 3-1 of the Draft Program EIR has been revised to include a bullet point under post-processing of liquid digestate that specifies an additional use as follows:

- "Compost"

Response Q-2

The purpose for the reference to temperature is because the composting requirements are applicable to materials that are at 122 degrees Fahrenheit or greater while handled at a solid waste facility. If the solid waste material is handled at temperatures less than 122 degrees Fahrenheit, then the facility would not be viewed as a composting activity. This section has been revised to make it clearer that the temperature requirement determines the CalRecyle regulations that apply. See response to Comment C-2.

Response Q-3

Comment noted.

Response Q-4

Comment noted. An AD facility can be permitted under one permit.

Response Q-5

Figure 3-3 of the Draft Program EIR has been revised to include an arrow from post-processing of liquid digestate that specifies an additional use as follows:

- "Compost"

Response Q-6

The Draft Program EIR description of liquid digestate usage on page 3-11 has been revised as follows:

> "The liquid can be recirculated in wet digesters (to a point), discharged to surface waters, percolation ponds, sanitary sewers, or beneficially used as irrigation water for agricultural crops or recycled for use in composting processes."

Response Q-7

Comment noted.

Response Q-8

The final bullet point in Mitigation Measure 5.1b, pages 5-20 and 5-21 of the Draft Program EIR, has been revised as follows:

- "For projects that are unable to use internal combustion engines due to air district regulations (i.e., NOx emission limits), other options for generating renewable energy from biogas should be considered. Other options that should be evaluated for using biogas or biomethane as an energy source include: ~~Where feasible as an alternative to internal combustion engines, which generate nitrogen oxides (NOx) emissions, use biogas from AD facilities~~ use as a transportation fuel (compressed biomethane), use in fuel cells to generate clean electricity, use for on-site heating, or injection of biomethane into the utility gas pipeline system. If there are other lower NOx alternative technologies available at the time of AD facility development, these should be considered as well during the facility design process. "

Response Q-9

Mitigation Measure 5.2b has been revised. Refer to response to comment J-7. See also response to Comment H-1.

WATER RECLAMATION
SOLID WASTE MANAGEMENT

COUNTY SANITATION DISTRICTS
OF LOS ANGELES COUNTY

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www.lacsd.org

STEPHEN R. MAGUIN
Chief Engineer and General Manager

April 4, 2011

File No. 31R-10.10

Mr. Paul Miller
Senior Project Manager
ESA - Land Management & Biological Resources
2600 Capitol Avenue, Suite 200
Sacramento, CA 95816

Dear Mr. Miller:

Comments on the CalRecycle Draft Program Environmental Impact Report (DPEIR)
"Statewide Anaerobic Digester Facilities for the Treatment of Municipal Organic Solid Waste"

The Sanitation Districts of Los Angeles County appreciate the opportunity to comment on the CalRecycle Draft Program Environmental Impact Report (DPEIR) "Statewide Anaerobic Digester (AD) Facilities for the Treatment of Municipal Organic Solid Waste". We have the following comments.

- The project title should reflect that the feedstocks are "selected" municipal organic solid wastes, and that only "in-vessel" AD is considered in the project. The DPIER describes the feedstock as excluding manure (except as seed material), biosolids, and co-digested biosolids, and the description of AD facilities states that they are in-vessel digesters only. These policy issues should be briefly explained in the Executive Summary. R-1
- The greenhouse gas (GHG) benefits of AD facilities need to be fully evaluated through a life cycle assessment (LCA) before conclusions are made concerning these issues. An LCA of GHG benefits for selected organic waste in-vessel AD should not be evaluated on a stand-alone basis or as a replacement to landfilling, rather, it must be conducted on an equal basis for all potential management options, including landfilling, composting, and AD, for the same waste stream. R-2
- The DPEIR (on page 5-26) lists specific assumptions in the two Life Cycle Assessments cited (*DiStefano & Belenky*, and *Haight*) that could impact the findings of these studies and their impact on this DPEIR. These specific assumptions should also be considered good reasons to not consider these studies in the DPEIR. Nevertheless they are used in the DPEIR. The role of sequestration is the central controversial issue with an LCA (such as in the Draft Report *Life Cycle Assessment and Economic Analysis of Organic Waste Management and Greenhouse Gas Reduction Options*). CalRecycle only needs to explain the "atmospheric flow approach" that is supposedly currently in use in California in order to utilize this type of information. The DPEIR says "landfill carbon sequestration is not considered an emission offset, which was not discussed in the above studies" but this is not clearly addressed in these references. It is not mentioned at all in *DiStefano*, and the *Haight* study seems to consider landfill sequestration. How *Haight* considered sequestration was unclear since it cited references that were not available for this R-3

review. Given this situation, the DPEIR should eliminate references to LCAs, and use another approach. R-3 (cont.)

- The reasons that the landfill in-ground digester cell alternative was not fully considered do not seem to be valid. The DPEIR assumes that they can only be sited on appropriately lined landfills, but it would seem that they could be sited on their own liners. They also state that landfill based digester cells would fail to meet the project objectives because they are still experimental, and that viable feedstocks, environmental performance, and economic feasibility are not well understood. However, the same is true for the subject AD Project, as explained on page 2-1 "Currently there are no commercial-scale anaerobic digester (AD) facilities processing organics in California." R-4
- The DPEIR (on page 4-7) cites the *DiStefano* paper for dry digesters in Western Europe. Because this technology is specifically excluded from the project and only considered as an alternative in Chapter 13, this reference should not be cited, except in the alternative. R-5
- The DPEIR states that one of the primary reasons for diverting organics from landfills to in-vessel digesters is to reduce fugitive landfill methane emissions. In spite of policy decisions to reduce landfilling, it has not been demonstrated that diverting organics will reduce landfill emissions. Cover issues and gas collection are the primary influences on emissions, smaller changes in refuse organic content could have little or no effect on emissions. R-6
- Section 3.2 states that the State's Climate Change Scoping Plan (CARB, 2008), makes CalRecycle responsible for taking actions to reduce the emission of methane from landfills, but methane control at landfills is regulated by the California Air Resources Board in 17 CCR § 95460, et seq. R-7

Thank you for the opportunity to comment on the draft EIR. If you have any questions, please contact Mario Iacoboni at (562) 908-4288, extension 2474.

Very truly yours,

Stephen R. Maguin

Mario Iacoboni
Supervising Engineer
Energy Recovery Section
Solid Waste Management Department

MI:BC:dsh

cc: Ken Decio (CalRecycle)

Response R-1

The title is descriptive of the scope of the Draft Program EIR. Also, the Executive Summary (Chapter 1 of the Draft Program EIR) includes a description of facilities and feedstocks included and excluded from the scope on pages 1-3 and 1-4.

Response R-2

The Draft Program EIR includes reference to the use of life-cycle analysis for GHG but does not utilize it to make a finding relative to the potential impacts associated with the implementation of the project. The Draft Program EIR also recognizes that individual projects will vary relative to GHG emissions and impacts and defers to local policy and procedures for final evaluation of GHG impacts and mitigations on a project-by-project basis.

Response R-3

The references to the study by DiStefano and Belenky, as well as the study by Haight, were only intended to provide information and a perspective relative to GHG emissions. The California specific assumptions were included so as to identify some caveats that should be noted when reviewing the study results. After providing a brief summary of the studies for perspective and the California specific caveats, the Draft Program EIR states on page 5-26 that “due to the many unknown variables and operational considerations associated with quantification of GHGs on a statewide programmatic level, GHG emissions determination is too speculative at this juncture”. Furthermore, Mitigation Measure 5.1a would require the assessment of GHG emissions on a project-by-project basis to ensure compliance with the applicable air district thresholds and/or guidance and incorporate further emission mitigation if required.

Response R-4

See response to Comment F-2. The examples provided for in-ground digester cells were all at landfill locations. Both the attachment to Letter O and the description information for the in-ground cells in the Draft Program EIR (see Chapter 13) describe demonstrations of in-ground cells at landfills.

Response R-5

See response to Comment O-1.

Response R-6

The AB 32 Climate Change Scoping Plan estimates that AD facilities in California could avoid methane emissions from landfills at a level of 2 million metric tons per year of carbon dioxide equivalents (page 1-2 of the Draft Program EIR).

Response R-7

CalRecycle is working in partnership with the California Air Resources Board to reduce methane emissions from landfills. As such, the Draft Program EIR has been revised on page 3-2 as follows:

> "Under the State's *Climate Change Scoping Plan* (CARB, 2008), CalRecycle has committed to take ~~is responsible for taking~~ actions to reduce the emission of methane, a potent greenhouse gas, from landfills."

27 March 2011

To: Michele Young
Organics Manager
City of San Jose, Environmental Services

From: Rob Williams, P.E.
Consultant

RE: Review of Draft Programmatic MSW AD EIR*

*Report Title:

Draft Program Environmental Impact Report for Statewide Anaerobic Digester Facilities for the Treatment of Municipal Organic Solid Waste, Feb. 2011 (SCH No. 2010042100).

Available from
http://www.calrecycle.ca.gov/SWFacilities/Compostables/AnaerobicDig/default.htm

Enclosed please find my comments and suggestions from review of the CalRecycle Draft Program Environmental Impact Report (EIR) for Anaerobic Digestion Facilities which is currently open for public comment.

The following comments are submitted to you and the City of San Jose to help inform potential comments by the City.

Respectfully,

Rob Williams, P.E.

Consultant

Comments from Review of the Draft Program Environmental Impact Report for Statewide Anaerobic Digester Facilities for the Treatment of Municipal Organic Solid Waste, Feb. 2011 (SCH No. 2010042100).[1]

S-1

The document has shaped up nicely and I note that many of the comments, submitted as part of the TAG, on the Administrative Draft are incorporated. I appreciate the problem faced by CalRecycle that, in order for a Programmatic EIR to have any meaning or standing, there must be a "Program" or policy declared or in place addressable by the EIR (which in this case, is the AD Initiative), while not appearing to favor one technology path over others. This leads to the awkward, if not contradictory, statements in Chapter 1:

> *"CalRecycle emphasizes that the intent of this document is not to identify AD facilities as preferred to alternative waste management options, or to identify preferred AD facility systems or vendors." (pg. 1-1)*

Followed by:

> *"CalRecycle intends to adopt the AD Initiative, a comprehensive program to foster the development of AD facilities to convert organic solid wastes into sources of energy, valuable compost feedstocks, soil amendments, and other products." (pg. 1-2)*

and,

> *"It is the policy of CalRecycle to encourage the development of AD facilities in California as an alternative to the landfill disposal of organic solid waste." (pg. 1-2)*

Whether or not the first quote is contradicted by the following two is a matter of reader prospective. It might be helpful for CalRecycle to reduce the appearance of contradictory statements or policy by clarifying basic requirements for a programmatic EIR (there must be a program) while clearly stating policy with respect to fate of biodegradable materials in the post-recycle waste stream.[2]

General and Detailed Comments

Important comments are summarized immediately below in paragraph form. The most critical comment, which identifies a potential significant document weakness, appears first (Insufficient Analysis…). Detailed and specific comments by page, figure or table number appear at the end in table format.

S-2

Insufficient Analysis of Project Alternatives Impacts

In general, there is insufficient information on potential impacts of project alternatives and little to no analysis to support project comparisons. Because CEQA Guidelines §15126.6(d) "requires that an EIR include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed project", these unsupported assertions are a significant weakness in the document.

There are no actual impacts discussed or analyzed for the Co-Digestion at Dairy Manure Digesters Alternative (only assertions in Table 13-1). Impacts for the Increased Aerobic Composting Alternative are not developed or supported in the text (Why are impacts in air quality, greenhouse gases, hydrology and noise E or PG for this alternative? Why are impacts for noise, public services, utilities,

---

[1] Available from http://www.calrecycle.ca.gov/SWFacilities/Compostables/AnaerobicDig/default.htm

[2] For example, if the goal is to reduce landfill methane and leachate emissions by reducing the amount of biodegradable material (biogenic material or "organics") going to landfill, then a technology neutral policy would encourage the development of all methods, policies and technologies that would lawfully and environmentally help achieve the goal (i.e., landfill ban of or tax on biodegradable materials, biochemical and thermochemical conversion, "green pricing" for energy from diverted biomass (but less for LFG), etc.).

transportation, aesthetics, hazards and hazardous materials E or LS?). Impacts for In-Ground Digester Cell are also not developed or supported (report reader is asked to view assertions in Table 13-1). Many of the asserted comparisons in the Table 13-1 (E, LS, PG) and are not supported by analysis in the text (Please see detailed comments in table below [section 13 comments]) S-2 (cont.)

Project Mitigation Measures
The project Environmental Impacts and Mitigation Measures (Report Table 1-1) seem reasonably complete and well considered. There are a few minor suggestions or comments (mitigation measures 5.2b and 6.2c). Details are in the Table below.

Clarify definition of AD and scope of document:
Because of Michael Theroux's comments (at the public hearing in Sacramento) alluding to anaerobic fermentation processes for liquid fuel products (ethanol, butanol, and perhaps others…) and the implication that these processes and products could be covered by this EIR, we suggest clarifying that the document is intended for AD processes that produce biogas (e.g., CO_2 & CH_4 or CO_2, CH_4 & H_2 plus trace contaminants). There may be other environmental impacts associated with ethanol, butanol or other production that are not addressed in the current document (acids and disposal for acid hydrolysis processes, combustion and VOC emissions from distillation processes and ethanol evaporation from fermentation solids, etc,). S-3

Suggested modified definition of AD for text or Glossary:
(as a companion to above comment, suggest modifying the AD entry in the Glossary)
AD = A dedicated unit process for controlling the anaerobic decomposition of organic material and producing a biogas (composed primarily of carbon dioxide, methane, water vapor and trace contaminants), and a digestate (generally composed of solids and non-fuel liquids). Some AD systems can be operated to yield small amounts of hydrogen with a reduced amount of methane. Typically consists of one or more enclosed, temperature controlled tanks with material handling equipment designed to prevent the introduction of oxygen from the atmosphere. S-4

Ch. 13 Alternatives to Project Descriptions/Definitional Suggestions
There remain some inconsistent, incomplete or misleading descriptions and definitions of Thermochemical Conversion Technologies. Please see specific comments and suggestions in the table below. S-5

In the following Table are detailed comments and suggested corrections or changes by page, figure or table number. Some are minor editorial comments, or point out missing citations, mistakes or typos, questions on numbers, data (or math). Others are more significant (some of which are summarized above).

Table of specific comments and suggestions by page, Figure or Table number.

Page/ figure	Comment / Suggestion
p. 2-1	Section 2.2, First sentence, “Compostable organic materials comprise approximately 25 percent or 10 million tons per year of the solid waste stream for California landfills (CalRecycle, 2009).” S-6 It’s not clear what “compostable organic materials” are and how this applies to AD processes or the EIR. Does “Compostable material” mean biogenic matter, biodegradable materials, material suitable for AD?? Suggest describing total amount of biomass or biodegradable in landfill stream and/or total suitable for AD (but ‘compostable’ seems confusing). Suggest adding definition of “Compostable Material” to Glossary
p.2-2	CR&R / ArrowBio facility was also selected by the City of LA for the emerging class of alternative landfill technology RFP S-7
p.3-3	First sentences in section 3.4 Background of AD. S-8 This seems to be initial definition of AD and is incomplete (key part of AD is production of methane containing biogas). In light of Michael Theroux’s comment at public hearing that anaerobic processes (fermentation) can also yield alcohols or other, suggest change the first two sentences to read: “Anaerobic digestion is the biological decomposition of organic matter, with little or no oxygen, producing a biogas composed primarily of CO2 and methane (though systems can be operated to produce some hydrogen gas with less methane product)” “Anaerobic <u>decomposition</u> (not digestion) yielding methane occurs naturally in marshes, wetlands, landfills, ruminants, and certain insects”
p.3-3 bottom of page	The main reason that AD of organic fraction of MSW is employed widely in Europe is because the landfill directive requires treatment of biodegradable material before landfill -- for purposes of improved environmental performance of the landfill (not to reduce volume of solid waste or recover energy) S-9
Figure 3-1	Liquid from digester may be added to compost in some cases. S-10 Industrial CO_2 is a possible product from upgrading of biogas S-11 ESA (2011) is cited as figure source but Ch. 3 references do not list ESA (2011) S-12 If this figure is original to this document, then no citation is needed.
Figure 3-2	Figure source ESA (2010) is not listed in Ch. References. S-13 This figure is similar to diagrams that occur much earlier in the literature than sources cited here (e.g., Gujer and Zehnder (1983) or earlier). It is likely that the cited sources (CIWMB (2009) and ESA (2010)) are not the original sources for the figure. (I see that we <u>did not</u> give a source for the figure in the CIWMB (2009) report). Gujer, W., and Zehnder, A. J. B., "Conversion processes in anaerobic digestion." *Wat. Sci. Tech.*, Vol. 15, no. 8-9, 1983, pp. 127-167.
Figure 3-3	Figure source ESA (2010) is not listed in Ch. References. S-14 Add “wetting, pulping or slurry creation” as a possible AD pre-treatment step S-15 Liquid can be added to compost…
p. 3-8	In section 3.6 (Feedstocks), “green material” is not well defined (what are urban crop residues?). Does urban green material mean “leaves, grass, landscape and tree clippings/prunings, etc.”? S-16 Should also add definitions of food waste and green material to Glossary
p. 3-9	In section 3.7.1 Pre-Processing – middle of paragraph, suggest use of “contaminants” in place of “residual wastes” S-17

p. 3-9 /10	While describing “wet AD” systems, there is implication that (significant) water is added to the system. It is true that significant amounts of liquid is added to the substrate before wet digestion, but any economic wet system will need to recirculate as much digestate liquid as feasible, so net fresh water addition is relatively small. Suggest revise text so that is clear that recycled liquid is practical and practiced.	S-18
p. 3-10	Middle of page - - discussion of mesophilic/thermophilic. The term “Studies have revealed” is used to begin sentence about hyperthermophilic and psychrophilic organisms yet these “studies” are not cited. Please cite these studies or reword sentence.	S-19
p. 3-10	Next to last paragraph, last sentence: “reactors may be aerated” would mean these are not AD systems. Perhaps you mean “reactors may be periodically aerated” for pre or post treatment or certain batch systems that are aerated at end of AD sequence to transition to aerobic composting stage, or similar? Please revise or clarify	S-20
Figure 3-4	Figure sources do not appear in reference list	S-21
Figure 3-4	Diagram only shows H2S removal for electrical generation. Gas treatment for recip. or turbine engines requires removal of siloxanes (if present) and often removal of some/most of water. Please revise figure	
Figure 3-4	Pathway for biogas to fuel cell: The “Reform Hydrogen” stage should be “Reform Methane” or “Reform to Hydrogen”. Please revise	
Figure 3-4	Need CNG/compressed biomethane route and, LNG route includes cooling/refrigeration steps. Please revise	
p. 3-11	Digestate: Beneficial use of liquid includes water recirculation (to a point) for wet AD systems as well as addition to compost when applicable and available. Please revise to show liquid recirculation as practical	S-22
p. 4-4	Last sentence before table 4-1: Should say something like “Figure 4-1 and Table 4-1 show the average composition of the disposed waste stream in California in 2008 (or 2007?).” (not current or existing)	S-23
Table 4-1	Cited sources do not appear in reference list	S-24
Fig. 4-1	Cited sources do not appear in reference list	S-25
p. 4-8	(Third line from top) It is not clear how authors determine that there are 28 million tons of biodegradable material in the disposal stream. From Table 4-1 and Fig. 4-1, it looks like there is 25.5 million tons of biogenic material (12.89 M tons “Other Organic” + 6.86 M tons paper + 5.77 M tons lumber). Is green ADC included in the 28 Mtons? Please check or clarify	S-26
p. 4-8	Next to last paragraph: The 200 M cubic meters of methane using the DiStefano study factors is reasonable. The 500 million MWh/y is off by a factor of 1000. It should be 500 million kWh/y, which is equivalent to about 59 MW capacity (840 kW per facility). Please check and revise	S-27
p. 4-9	Truck trip mileage: The 100 mile roundtrip per 18 ton haul truck used by DiStefano seems high and may not be appropriate for AD facilities in California (DiStefano does not give basis for this 100 mile assumption – see Table 1 in DiStefano). In addition, if AD facilities are mostly sited at existing MRFs, transfer stations and landfills, then the transportation impacts already exist since this material is being transported to these facilities now. Even if source separated matl. comes to AD facility at MRF or landfill in separate truck, this just offsets the same no. of trips compared to when it was hauled as MSW. Suggest reexamination of haul mileage or using a more authoritative source.	S-28
p. 5-22	Measure 5.2b: Retention time for incoming substrates - - Suggest change text to read “substrates must be put into the digester or closed buffer or holding vessel within 24 hours of receipt” Some systems utilize slurry holding tanks or buffers for prepared substrate before injection to digester.	S-29
p. 5-22	Measure 5.2b: Suggest …haulage of digestate to be in containers that keep liquids from escaping (but not necessarily gas-tight or “sealed”)	S-30

p. 6-3	WDR is not listed in acronym list or glossary . Please add	S-31
p. 6-17	Measure 6.2c: Large tank digesters (wet systems) can potentially leak through the bottom and not be easily noticed (accidental spill or leak). Suggest you consider this case and how to mitigate or detect direct to ground tank leakage.	S-32
p. 13-3	Bioreactor Landfill Alternative-Description of 'dry-tomb' landfill approach: The 'dry-tomb' landfill design is intended to limit moisture intrusion as the authors state, but not primarily to reduce or limit decomposition within the landfill (though that is the effect). The main purpose of the dry-tomb concept is to reduce production of landfill leachate that must be managed and prevented from leaching into ground water over the long-term. Suggest revising to include "limit production of leachate" to purpose of dry-tomb design.	S-33
p. 13-4	Next to last sentence. Pyrolysis produces "biochar" ONLY IF the feedstock was biomass. Char from pyrolysis of mixed waste (that includes plastics, tires, etc.) would not be considered biochar and it would likely face robust scrutiny if proposed for soil amendment. Suggest amending sentence to say "char" and explain in parenthesis that biochar requires a biomass feedstock.	S-34
p. 13-5	Non-combustion Thermal Conversion Technologies – first sentence mischaracterizes the technology by implying that all require high pressure and utilize steam (and "high heat" is inappropriate term) [the CIWMB 2007 reference cited has errors]. Suggest replacing first paragraph of section with these two paragraphs: "Non-combustion thermal conversion technologies refer to technologies that convert organic and other carbonaceous material under low-oxygen and high temperature conditions. Some systems add steam to the reaction and some operate above atmospheric pressure. Products include combustible gases, oils, and charcoals, as well as noncombustible ash and slag. Thermal conversion technologies operate at higher rates than biochemical conversion technologies (e.g., AD)" "Gasification technologies (which use some air or oxygen and sometimes steam) are optimized to produce a fuel or synthesis gas that can be used in products that include heat, electricity, gas and liquid fuels and chemicals. Pyrolysis (heating without added air or oxygen) is a thermal decomposition technique usually optimized to produce either an oil-like liquid with some char product or mostly char with little or no liquid. Pyrolysis also produces a fuel gas but in smaller amounts and inferior quality compared to gasification processes. Pyrolysis liquids can be refined to fuels or gasified to a fuel gas. Pyrolysis chars can be used as a solid fuel for combustion systems or potentially as soil amendments depending on quality and composition (e.g., char from a mixed waste feedstock would potentially have similar trace metals or other contaminants that are found in incinerator bottom ash"	S-35
p.13-6	Upper third of page – "Pyrolysis, which is…" and "Gasification differs from pyrolysis…" : Can strike these two paragraphs if you use suggested text in previous comment. Note: pyrolysis only creates a "biochar" if the feedstock was biogenic material (biomass). If the feedstock was mixed waste, plastics, tires, etc., then char would not be considered biochar and use as a soil amendment would be questionable.	
p.13-6	"Non-combustion thermal conversion facilities are capable of processing some, but not all of the organics in mixed solid wastes" -- This statement is <u>NOT</u> accurate. Suggest: "Non-combustion thermal conversion facilities are capable of processing all of the organics in mixed solid wastes but efficiency and energy output is higher using dryer feedstocks." Note; These systems can convert/treat all of the carbon-containing portions of mixed waste, if that is the main goal and energy product or efficiency was secondary. Managing feedstock moisture (or selecting for dryer feed components) is necessary to optimize energy output.	S-36

p. 13-9	Last paragraph under "Impacts" of the Co-digestion at WWTPs alternative. Paragraph is confusing because it reads like individual AD facilities are part of the WWTP co-digestion alternative and that individual AD systems would be built at WWTPs. Does the AD development at WWTPs phrasing mean feed pretreatment and injection equipment only, and the actual digester will be the existing WWTP biosolids digester? Suggest clarifying the Paragraph	S-37
p. 13-9	Co-Digestion at Dairy Manure Digesters Alternative – First paragraph, last sentence "Dairies are the only confined animal feeding operations in California that have on-going experience in operating AD…". There were at least two digesters at hog farms in California that operated for many years (Roy Sharp Farms or Royal Farms, Tulare County). Some Energy Commission websites read as if they are still in operation (http://www.energy.ca.gov/biomass/anaerobic.html). Suggest confirm that these are no longer in operation or revise sentence..	S-38
p. 13- 9 &10	Codigestion at dairy digesters. Concur with the analysis in this section, which for several reasons (few existing manure digesters, issues with nutrient and salt management at CAFOs, marginal economics of manure digester systems and strict air quality rules in the SJVAPCD) codigestion at manure digesters is not expected to be a destination for significant amounts of urban AD substrate. Why, then, is this considered an Alternative to the Project? The Alternative can be discarded for the same reasons as the Source Reduction Alt. ("not an alternative to AD that could address the large volumes of post consumer food waste currently being landfilled")	S-39
p. 13-10	Impacts of codigestion at dairy digesters. This section does not sufficiently develop impacts for this alternative. It only refers readers to Table 13-1 with no discussion of actual potential impacts and why they would be E, LS, or PG. The section instead explains why co-digestion w/ animal manure is likely to be small in scope (and perhaps therefore not a viable alternative to the project (for purposes of the EIR)). Because there is insufficient information to allow meaningful evaluation, you must add detail and authoritative information on co-digestion impacts for this EIR to be valid.	S-40
p. 13-11&12	Impacts section for Increased Aerobic Composting Alt. This section is also underdeveloped and readers are referred to Table 13-1 for comparisons with too little development or support. Why are impacts in air quality, greenhouse gases, hydrology and noise E or PG for this alternative? Why are impacts for noise, public services, utilities, transportation, aesthetics, hazards and hazardous matls. E or LS? The reasons may be obvious to the authors and many stakeholders, but these comparisons and conclusions need to be supported in the document.(Note; " CEQA Guidelines §15126.6(d) requires that an EIR include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed project.")	S-41
Figs. 13-1,13-2	These figures depict multiple schematics or photographs. Each photo or schematic is labeled Photo. 1, 2, etc. There is potential confusion because "photograph" numbering is repeated among the two figures (13-1 , 13-2). Suggest numbering schematics in 13-2 as "Photo 4 and 5" or calling them Schematics 1 and 2 or giving them individual Figure Numbers, etc..	S-42
p. 13-15	Impacts for In-Ground Digester Cell are not developed in the text and the comparisons in table 13-1 are not supported (insufficient information for meaningful comparison).	S-43

p.13 -15	Env. Superior Alternative Section, middle of first paragraph. The statement “The analysis in this chapter clearly shows that the No Project Alternative is not the environmentally superior alternative” is not supported and seems to contradict Table 13-1 comparisons (where ‘no-project’ has LS or E for all impact categories). Or, is there simply a mistake in the text and the word “not” should be omitted (‘No Project Alt.’ is env. superior)? There is very little analysis on ‘no-project’ impacts. In fact, the case could be made that “No-Project” has inferior environmental performance since it is the status quo (continue to landfill) with case by case AD EIR. This would require that you show landfilling as environmentally inferior.	S-44
Table 13-1	Many of the asserted comparisons in the Table (E, LS, PG) are not supported by analysis in the text (several comments above point this out). Because CEQA Guidelines §15126.6(d) “requires that an EIR include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed project”, these unsupported assertions represent a significant weakness in the document..	S-45

Response S-1

Comment noted. CalRecycle finds the key quotes to be consistent. The first quote on Draft Program EIR page 1-1 can be reiterated to summarize the intent, “CalRecycle emphasizes that the intent of this document is not to identify AD facilities as preferred to alternative waste management options…”

Response S-2

CEQA Guidelines §15126.6(d) also notes that “A matrix displaying the major characteristics and significant environmental effects of each alternative may be used to summarize the comparison. If an alternative would cause one or more significant effects in addition to those that would be caused by the project as proposed, the significant effects of the alternative shall be discussed, but in less detail than the significant effects of the project as proposed.” Tables 13-1 and 13-2 are provided in a matrix format to summarize the comparisons. Potentially significant impacts of the various alternatives are discussed in Chapter 13, albeit at less detail than the significant effects of the project as proposed (consistent with CEQA Guidelines cited directly above). With regard to the Dairy Manure Digesters Alternative, Chapter 13 provides an overview (and references) to a Program EIR on Dairy Manure Digester and Co-digester Facilities that was prepared by the Central Valley Water Board and was approved on December 10, 2010 (see page 13-9 of the Draft Program EIR). CalRecycle was a Technical Advisory Group (TAG) member and active participant on the Dairy Digester Program EIR.

Response S-3

This Program EIR does not analyze anaerobic fermentation processes for liquid fuel products.

Response S-4

The AD entry in the glossary has been updated consistent with this recommendation.

Response S-5

Comment noted.

Response S-6

This statement is from the CalRecycle Organics Policy Roadmap (referenced). It is intended to show the magnitude of the potential feedstocks for AD facilities. Compostable material is defined on page 3-16 of the Draft Program EIR as "any organic material that when accumulated will become active compost as defined in section 17852(a)(1)”. Compostable material has been added to the Glossary.

Response S-7

The text on page 2-2 (second paragraph) of the Draft Program EIR has been revised as follows:

> “The Los Angeles County Board of Supervisors selected this project in 2010 as a demonstration facility for the Southern California Conversion Technology Program. This facility was also selected by the City of Los Angeles for the emerging class of alternative landfill technology Request for Proposals (RFP).”

Response S-8

The text on page 3-3 of the Draft Program EIR has been revised as follows:

> “Anaerobic digestion is the biological decomposition of organic matter with little or no oxygen producing a biogas composed primarily of CO_2 and methane (though some systems can be operated to produce some hydrogen gas with less methane product). ~~The~~ a Anaerobic decomposition (not digestion) yielding methane~~process~~ occurs naturally in marshes, ~~and~~ wetlands, landfills, ruminants, and certain insects.”

Response S-9

Comment noted.

Response S-10

See response to Comment Q-1.

Response S-11

Comment noted.

Response S-12

The figure is original to this document, the ESA citation is a standard practice within EIR’s prepared by ESA. It is intended to clarify the source.

Response S-13

The figure is not original to this document, but ESA’s graphic presentation of the information from the CIWMB 2009 report that is cited.

Response S-14

The figure is original to this document, the ESA citation is a standard practice within EIR’s prepared by ESA. It is intended to clarify the source.

Response S-15

Figure 3-3 has been revised as suggested.

Response S-16

As discussed in Section 3.6 the food and green material categories are intended to be inclusive and not limited by current regulatory definitions or collection methods. Urban green material does include leaves, grass, landscape and tree clippings/prunings, etc. See Figure 4-1 on page 4-6 of the Draft Program EIR.

Response S-17

For the sentence identified, the text on page 3-9 of the Draft Program EIR has been revised as follows:

> “The amount of pre-processing equipment and contaminants ~~residual waste~~ (or waste that must be removed prior to digestion) would depend on the type of feedstock and digester technology.”

Response S-18

Commenter notes that any economic wet system will need to recirculate as much digestate liquid as feasible, so net fresh water addition is relatively small. Commenter further notes that recycling liquid is practical and practiced.

Response S-19

The text on page 3-10 of the Draft Program EIR has been revised as follows:

> “~~Studies have revealed microorganisms capable of degrading organic materials~~ Anaerobic digesters operating at higher and lower temperatures~~, but hyperthermophilic and psychrophilic digesters~~ have yet to enter the marketplace. Therefore, such systems will not be considered at present.”

Response S-20

The text on page 3-10 of the Draft Program EIR has been revised as follows:

> "For example, pre- and/or post-treatment ~~some~~ reactors can be added which may also be aerated to pre-hydrolyze solids or to oxidize ammonia in the effluent, solids may be separated and re-circulated, and other design innovations could be envisioned."

Response S-21

The source "Extension, 2010" for Figure 3-4 was added to the Reference section of Chapter 3 (page 3-18) of the Draft Program EIR as follows:

> "Extension, 2010. *Biogas Utilization and Cleanup*, http://www.extension.org/pages/30312/biogas-utilization-and-cleanup, article dated December 15, 2010."

Revisions were also made to Figure 3-4 in response to this comment.

Response S-22

See response to Comment Q-6. Recirculation has been added to the text.

Response S-23

The text on page 4-4 of the Draft Program EIR has been revised as follows:

> "**Figure 4-1** and **Table 4-1** show the most recent data on the ~~existing~~ composition of the disposed waste stream in California (the 2008 waste stream)."

Response S-24

The following reference has been added to page 4-9 of the Draft Program EIR.

> "California Integrated Waste Management Board (CIWMB). 2009. *California 2008 Statewide Waste Characterization Study*. Produced under contract by Cascadia Consulting Group. August 2009."

Response S-25

See response to Comment S-24. With regard to ESA, 2010, see response to Comment S-12.

Response S-26

The 28 million tons is a conservative estimate in the Program EIR from 2007 CIWMB discussions related to the development of the Organics Policy Roadmap strategies based upon the 2004 waste characterization study disposal volumes. It does not include green ADC. The commenter is correct that the 2007 waste characterization shows a lower number of approximately 25.5 million tons.

Response S-27

The estimated total electricity production from potential AD facilities in California on page 4-8 of the Draft Program EIR has been revised as follows:

> "Using factors from the DiStefano and Belenky study (2009), the assumed 70 AD facilities in California could generate approximately 200 million cubic meters of methane, which would correspond to about 500 million ~~mega~~kilowatt-hours of annual electrical capacity."

Response S-28

This does seem like a longer than expected trip length, but it results in a conservative estimations of potential air quality mobile emissions. AD facilities will not always be as local as the existing infrastructure of material recovery facilities (MRF) and transfer stations, so delivering materials to an AD facility should generally result in higher trip miles than delivering the material to the nearest MRF or transfer station. Site specific AD facilities being proposed may have better estimates on the average length of delivery trips and the size of trucks. AD facilities would eliminate or reduce the vehicle miles of truck trips to the landfill (compared to current disposal practices in California).

Response S-29

See response to Comment J-7.

Response S-30

See response to Comment J-7.

Response S-31

Waste Discharge Requirements (WDR's) are discussed in Chapter 6. The acronym has been added to Chapter 15.

Response S-32

See response to Comment J-13.

Response S-33

The text on page 13-3 (under Bioreactor Landfill Alternative) of the Draft Program EIR has been revised as follows:

> "Typical modern landfills operate on a "dry tomb" approach. This means that they are designed to exclude as much moisture as possible to limit the production of leachate. Limiting moisture results in slowing the decomposition rate of the waste mass."

Response S-34

The text on page 13-4 (next to last sentence) of the Draft Program EIR has been revised as follows:

Pyrolysis is identified in California law as a type of transformation. Pyrolysis produces char (or "biochar" if the feedstock is a biomass) and a pyrolitic oil in addition to a combustible gas. Biochar is known to have nutrient and water retention characteristics that can make it a valuable soil amendment.

Response S-35

The first sentence of the text on page 13-5 (directly under Non-combustion Thermal Conversion Technologies) of the Draft Program EIR has been revised as follows:

> ### "Non-combustion Thermal Conversion Technologies
>
> Non-combustion thermal conversion technologies refer to technologies that convert organic material under low-oxygen and high temperature conditions. ~~a range of technologies that use a combination of high heat, steam, high pressure, and oxygen-reduced environments to convert organic matter into heat and/or various products, including combustible gases, oils, and charcoals, as well as noncombustible ashes and molten slags (CIWMB, 2007).~~"

Response S-36

Comment noted. The sentence on page 13-6 has been revised to read:

> "Non-combustion thermal conversion facilities are capable of processing ~~some, but not~~ all of the organics in mixed solid wastes but efficiency and energy output is higher using dryer feedstocks."

Response S-37

The first sentence in the paragraph of the impacts discussion on page 13-9 of the Draft Program EIR is revised to read:

> "With the Co-Digestion at WWTPs Alternative, development of co-digestion facilities at existing ~~individual~~ AD facilities at WWTPs would generally result in impacts similar to the proposed project with regard to air quality and greenhouse gas emissions, hydrology and water quality, noise, public services and utilities, transportation and traffic, aesthetic resources, and hazards and hazardous materials."

Response S-38

As of April 2011, the US EPA AgSTAR database estimates that there are 167 anaerobic digester systems operating at commercial livestock farms in the United States. Of these, 137 are at dairies. All of the 14 in California are at dairies. No hog farms are listed. The following website is a link to the database.

> http://epa.gov/agstar/projects/index.html#ca

Response S-39

Dairy manure digesters were included primarily because there were approximately 1,752 dairies operating in California in 2009 and about a dozen dairies with AD facilities. The overall potential is high if the marginal economic returns and challenging regulatory environment can be improved. Co-digestion of mixed solid wastes at dairy manure digesters could dramatically increase the production of biogas and improve the overall economics of dairy manure digesters.

Response S-40

See response to Comment S-2. It should be noted that the commenter does not disagree in this comment with any specific determinations in Table 13-1, but asks for more detail.

Response S-41

As noted on page 13-12 of the Draft Program EIR, "Because the facilities are sited in more remote areas, this alternative will increase the amount of vehicle miles compared to the project". That is the basis for some of the potentially "PG" ratings related to air quality and greenhouse gas emissions (Impact 5.2), as well as the potential for developing new compost sites (Impact 5.1). If the site is in a remote area, it will potentially result in more emissions from trucks coming to and from the facility. The potential for increased noise to substantially increase noise levels at nearby land uses (Impact 7.2) is related to the potential for increased operations identified on page 13-11, “Increase in the types or volume of additional organics may require adding processing equipment or increasing operating hours.” The large size of the compost facilities that are often in remote areas is also a key factor in identifying hydrology impacts as “PG”. Because compost facilities can be 20 acres or more, controlling run-on and run-off waste would be more challenging than for an AD facility, which would have a much smaller footprint.

With regard to impacts that are equal “E” or less significant “LS”, composting would not have the large tanks and flares that would be at AD facilities so the aesthetic impacts would be less than the project. The Increased Composting Alternative would also have less water needs so the impacts on public services and utilities would also be less than the project impacts. For hazards and hazardous materials there would be no biogas so that impact would be less under the Increased Composting Alternative.

Response S-42

Comment noted. No changes required.

Response S-43

See responses to Comments F-2 and S-2. It should be noted that the commenter does not disagree in this comment with any specific determinations in Table 13-1, but asks for more detail.

Response S-44

The statements on page 13-15 of the Draft Program EIR are correct. The next sentence on page 13-15 further clarifies this, “While it [the No Project Alternative] has less impact than the project for several impacts because no AD construction impacts would occur, it [the No Project Alternative] completely fails to achieve any of the primary environmental benefits of the project.”

The last paragraph of the No Project Alternative discussion on page 13-8 indicates that “The No Project Alternative would not assist CalRecycle in meeting the goals of Strategic Directive 6.1; it would slow the pace of removing organic materials from landfills and it would not support the goals of AB 32 greenhouse gas reduction goals or the development of renewable fuels.”

Response S-45

See response to Comments S-2 and S-41.

Letter T

STATE OF CALIFORNIA
GOVERNOR'S OFFICE *of* PLANNING AND RESEARCH
STATE CLEARINGHOUSE AND PLANNING UNIT

JERRY BROWN
GOVERNOR

April 1, 2011

Ken Decio
California Department of Resources Recycling and Recovery
P.O. Box 4025 (1001 I Street)
Sacramento, CA 95812

Subject: Statewide Program EIR for Anaerobic Digester Facilities for the Treatment of Municipal Organic Solid Waste
SCH#: 2010042100

Dear Ken Decio:

The State Clearinghouse submitted the above named Draft EIR to selected state agencies for review. On the enclosed Document Details Report please note that the Clearinghouse has listed the state agencies that reviewed your document. The review period closed on March 30, 2011, and the comments from the responding agency (ies) is (are) enclosed. If this comment package is not in order, please notify the State Clearinghouse immediately. Please refer to the project's ten-digit State Clearinghouse number in future correspondence so that we may respond promptly.

Please note that Section 21104(c) of the California Public Resources Code states that:

> "A responsible or other public agency shall only make substantive comments regarding those activities involved in a project which are within an area of expertise of the agency or which are required to be carried out or approved by the agency. Those comments shall be supported by specific documentation."

These comments are forwarded for use in preparing your final environmental document. Should you need more information or clarification of the enclosed comments, we recommend that you contact the commenting agency directly.

This letter acknowledges that you have complied with the State Clearinghouse review requirements for draft environmental documents, pursuant to the California Environmental Quality Act. Please contact the State Clearinghouse at (916) 445-0613 if you have any questions regarding the environmental review process. T-1

Sincerely,

Scott Morgan
Director, State Clearinghouse

Enclosures
cc: Resources Agency

RECEIVED
APR 05 2011
By MS/K. Decio

Letter T

Document Details Report
State Clearinghouse Data Base

SCH# **2010042100**
Project Title Statewide Program EIR for Anaerobic Digester Facilities for the Treatment of Municipal Organic Solid Waste
Lead Agency Resources Recycling and Recovery, Department of

Type **EIR** Draft EIR

Description CalRecycle anticipate that anaerobic digester facilities processing the organic content of municipal solid waste will be developed across the state. Facilities which will be evaluated in the EIR include in-vessel digester facilities which are located at permitted solid waste facilities and within industrial areas. Feedstock materials which will be evaluated in the EIR include food waste, green material and mixed solid waste. Use of manure will be considered as a seed material for the purpose of increasing digester efficiency but not as a primary waste stream to be evaluated.

Lead Agency Contact

Name Ken Decio
Agency California Department of Resources Recycling and Recovery
Phone (916) 341-6313 ***Fax***
email
Address P.O. Box 4025 (1001 I Street)
City Sacramento ***State*** CA ***Zip*** 95812

Project Location

County
City
Region
Lat / Long
Cross Streets Statewide
Parcel No.
Township ***Range*** ***Section*** ***Base***

Proximity to:

Highways
Airports
Railways
Waterways
Schools
Land Use Projects would most likely occur on land designated for Public Facilities, Light Industrial or Industrial development

---

Project Issues Aesthetic/Visual; Agricultural Land; Air Quality; Archaeologic-Historic; Biological Resources; Coastal Zone; Drainage/Absorption; Flood Plain/Flooding; Forest Land/Fire Hazard; Geologic/Seismic; Noise; Public Services; Sewer Capacity; Soil Erosion/Compaction/Grading; Solid Waste; Toxic/Hazardous; Traffic/Circulation; Vegetation; Water Quality; Water Supply; Wetland/Riparian; Landuse

---

Reviewing Agencies Resources Agency; California Coastal Commission; Department of Conservation; Department of Fish and Game, Headquarters; Department of Parks and Recreation; Department of Water Resources; California Highway Patrol; Caltrans, Division of Transportation Planning; Air Resources Board, Major Industrial Projects; State Water Resources Control Board, Division of Water Quality; Department of Toxic Substances Control; Native American Heritage Commission; Regional Water Quality Control Bd., Region 5 (Sacramento)

Date Received 02/11/2011 ***Start of Review*** 02/14/2011 ***End of Review*** 03/30/2011

Note: Blanks in data fields result from insufficient information provided by lead agency.

Letter T

California Regional Water Quality Control Board
Central Valley Region
Katherine Hart, Chair

Linda S. Adams
Acting Secretary for
Environmental Protection

11020 Sun Center Drive, #200, Rancho Cordova, California 95670-6114
(916) 464-3291 • FAX (916) 464-4645
http://www.waterboards.ca.gov/centralvalley

Edmund G. Brown Jr.
Governor

Clear
3/30/11
e

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MAR 14 2011
STATE CLEARING HOUSE

9 March 2011

Ken Decio
California Department of Resources Recycling and Recovery
1001 I Street
Sacramento, CA 95814

COMMENTS ON DRAFT STATEWIDE ANAEROBIC DIGESTER FACILITIES PROGRAM ENVIRONMENTAL IMPACT REPORT, SCH#2010042100

We have reviewed the draft *Statewide Anaerobic Digester Facilities Program Environmental Impact Report*. Our review focuses on the water quality aspects of the report. Based on our review, we have the following comments:

T-2

1) Section 3.7.3 of the report includes a section that discusses "digestate." We commented on this section of the report following our review of the administrative draft report in our 1 November 2010 letter. We note that an additional sentence has been added to this section that we have underlined in the following quotation:

   The liquid can be discharged to surface waters, percolation ponds, sanitary sewers, or beneficially used as irrigation water for agricultural crops. Efforts are underway to convert the liquid digestate into value added fertilizer. However, chemical composition of the liquid effluent may restrict options. Some post-digestion aeration and/or filtration may be required prior to discharge to reduce the solids content, oxygen demand, ammonia concentrations, and/or salt concentration. The solid (or remaining digestate) can be aerobically composted, disposed of in landfills or beneficially used as a soil amendment for agricultural crops.

   We previously commented that this section should include the permits required for each of the discharges mentioned in the above statement. As written, the paragraph appears to imply that digestate can be discharged to surface waters or percolation ponds without permitting requirements from the appropriate regional water quality control board. These permits would prescribe requirements for each discharge. The following are the necessary permits for each discharge category: Discharge of the digestate to surface waters would require an individual National Pollutant Discharge Elimination (NPDES) permit; discharge of the digestate to percolation ponds would require individual waste discharge requirements (WDRs); reuse of the digestate as irrigation water for crops or reuse of the solids as a soil amendment would also require individual WDRs; and composting of the solids at the digester facility would require WDRs or coverage under a future general conditional waiver currently being developed by the State Water Resources Control Board.

T-2
(cont.)

We also note that the new sentence, underlined above, states that "aeration and/or filtration may be required." Neither aeration nor filtration can remove salts or ammonia from water. We recommend that the word "treatment" be added to this sentence.

2) Section 3.12 of the report includes *Table 3-1: Approvals Potentially Needed for Anaerobic Digester Facilities*. We commented on this section of the report following our review of the administrative draft report in our 1 November 2010 letter and requested that other required permits be added to the table. Two of these permits are still not listed in the table including:

   a) An NPDES permit for discharges of treated digestate to surface waters.

   b) Coverage under the NPDES General Industrial Storm Water Permit for industrial sites that discharge storm water offsite or to waters of the State.

This concludes our comments on the draft *Statewide Anaerobic Digester Facilities Program Environmental Impact Report*. If you have any questions, please contact me at (916) 464-4622 or by email at bbrattain@waterboards.ca.gov.

WILLIAM BRATTAIN, P.E.
Water Resources Control Engineer
Title 27 Permitting and Mining

cc: State Clearinghouse, Sacramento
John Menke, State Water Resources Control Board, Sacramento
Paul Miller, ESA Land Management & Biological Resources, Sacramento

Response T-1

Comment noted that CalRecycle has complied with the State Clearinghouse review requirements for the Draft Program EIR pursuant to CEQA.

Response T-2

This letter from the California Regional Water Quality Control Board, Central Valley Region, was received directly at CalRecycle and is includes at Comment Letter A. See responses to Comment Letter A.

C&R.4 Oral Comments on Draft Program EIR

March 15, 2011

Evan Edgar, Engineer, California Compost Coalition

Comment 1-1. Great framework on document. Good framework for local government and lead agencies. Great to have the CEQA Program EIR prepared to take the mystery away from AD. Timely to have this document available now.

Response 1-1. Comment noted.

Comment 1-2. CCC believes the AD Regulatory process has enough Title 14 regulations today that you don’t need more. Between distinct transfer processing regulations plus the clear and distinct compost regulations. There is no need for an additional AD regulatory package. Use regulations in place.

Response 1-2. Comment noted.

Comment 1-3. Evan Edgar has comments on Section 3.13. The language should be clearer. It should not say “would/could/or should” be utilized or on a case by case basis. The language should be changed to say will or shall require the following permits. It needs to be more certain. LEAs need good guidance. Some LEAs get it, like the Alameda County LEA is requiring East Bay MUD to have a full permit for the 600 TPD preprocessing facility. We concur with that. It would be nice to see more clarity. Shall require Title 14 permit; especially the preprocessing in the operational area, any place, any time, any where. If you go over 15 TPD of food waste processing it should be a registration permit if over 100 TPD it should be a full permit. For the AD digestion processing itself, it now says if process is above 122 degrees it could be regulated by compost regulations and if below 122 degrees it could be regulated as a transfer/processing facility. More clarity needed in the Program EIR.

Response 1-3. See response to Comment C-2.

Comment 1-4. In response to a follow-up question from Mark DeBie, (Should compost regs be amended for the ambiguous aspects of AD?) Evan Edgar indicated that could be acceptable as long as it is clear that AD is currently covered by the compost and transfer processing regulations. Down the road there could be need for some additional clarity.

Response 1-4. Comment noted.

Linda Novick, Project Manager, Harvest Power

Comment 1-5. Linda Novick has not reviewed the full Program EIR yet in detail. Great to have the TAG be able to comment on each phase of the CEQA.

Response 1-5. Comment noted.

Comment 1-6. Concern about Mitigation Measure 5.1b that would encourage projects to use alternatives to internal combustion engines that generate electricity in air districts where they are difficult to permit. The mitigation would encourage projects to go to gas rather than electricity. But gas prices are low now and that might make the finances of AD projects difficult. There are newer and different engine generator sets that Harvest is looking at as well as others. The mitigation measure should be revisited.

Response 1-6. See response to Comment Q-8.

Comment 1-7. Figure 3-1. Harvest often puts liquid leachate back onto compost (not just solid digestate). It should be added to the chart. More written comments will follow.

Response 1-7. See response to Comment Q-1.

Michael Theroux, Vice President, JDMT, Inc.

Comment 1-8. The diversity of forms of AD systems these days is exploding. The number of kinds of systems here and in Europe is growing. There should be a reflection in the document that we point to systems that don’t fit any of this – except the general bracket of AD. Specific example, use of species of Clostridium to make drop in biofuels. Genetically modified organisms are not included. The document is immediately obsolete. The document needs to reflect this to local agencies.

Response 1-8. The Draft Program EIR analyzes the prevalent AD technologies at this time. However, as noted in the Project Description, page 3-1: “The Program EIR is a starting point for the environmental review of AD facilities proposed in local jurisdictions.” Specific AD technologies and local factors would need to be considered on a project-by-project basis.

See also response to Comments S-3 and S-4.

Comment 1-9. There needs to be a caveat to state that there is diversity that is exploding. Everyone does it slightly differently.

Response 1-9. See response to Comment 1-8.

Michele Young, Organics Manager, City of San Jose Environmental Services

Comment 1-10. Thanks to planning team and TAG members for the good learning process. San Jose is a City that will be using this as they are in the process of releasing a CEQA document on their AD project.

Response 1-10. Comment noted.

Comment 1-11. Alternatives, can compost facilities actually meet the gap. There is pressure on compost facilities.

> **Response 1-11.** Please see the discussion in the Draft Program EIR that begins under the heading “Environmentally Superior Alternative” on page 13-15. Compost facilities would be better at trying to fill the gap than the other alternatives.

Comment 1-12. Has there been collaboration with other agencies for using the documents?

> **Response 1-12.** A number of agencies are represented on the TAG. On and ongoing basis CalRecycle will reach out to other agencies that have involvement in AD development, but it is not formal yet. Several agencies commented on the Draft Program EIR. We received the perspective of water agencies and some waste management agencies.

Evan Edgar, Engineer, California Compost Coalition

Comment 1-13. Support not adding Bioreactor to the Alternatives Section of the DPEIR. Compost industry is stretched now. Program EIR should address Covered Aerated Static Pile composting. These have fewer impacts than windrow composting. This should be mentioned in the DPEIR.

> **Response 1-13.** See response to Comment C-5.

John Cupps, Consultant to the San Luis Obispo County Integrated Waste Management Authority

Comment 1-14. Comments on Mitigation Measure 5.2b. Question about sealed containers? Are these air tight? Typical containers are not air tight.

> **Response 1-14.** See response to Comment J-7.

Comment 1-15. Also question on the time limits in Mitigation Measure 5.2b. 24 hours may not be feasible for plug flow reactors. May need more than 24 hours for regularly feeding reactors with material pick-ups only 5 days a week. 24-hour example should be deleted.

> **Response 1-15.** As the commenter notes, the 24-hour statement is an example of a time limit. As such, it does not establish a set time limit and would not preclude variations in on-site retention times depending on technological and site-specific logistics and other considerations. See response to comment J-7.

Comment 1-16. What is the effect of this document? The document may set minimum standards. Is this a CalRecycle statement of minimum standards for AD facilities? Or will mitigations be on a site by site basis?

> **Response 1-16.** See responses to Comment G-5 and H-1, H-2.

Comment 1-17. What is the relationship between this document (esp. mitigation measurements) in comparison of odor regulations? Does this document define odor reduction measurement?

> **Response 1-17.** It is beyond the scope of the Draft Program EIR. All projects will be looked at on the merits of their odor mitigations. See also response to Comment H-1, H-2.

Michael Theroux, Vice President, JDMT, Inc.

Comment 1-18. Patterns related to supply chain and life cycle analysis. Feedstock input and output. General idea, look at entire supply chain. What constitutes good management in the supply chain?

> **Response 1-18.** Comment noted. Good management is important in the supply chain, and as such, education of suppliers has been included in the Draft Program EIR in Mitigation Measure 10.2b.

Evan Edgar, Engineer, California Compost Coalition

Comment 1-19. Mitigation 5.2b. Covered containers rather than sealed containers.

> **Response 1-19.** See response to Comment J-7.

Comment 1-20. Mitigation 5.2b. Provision to provide enclosed, negative pressure buildings for indoor receiving and preprocessing. This is typical for AD processing facilities. Right above it there is a requirement for processing in 24 hours. He suggests that if a negative pressure building is used then the limit could be 48 hours.

> **Response 1-20.** Comment noted. See responses to Comments H-1, H-2, J-7, and 1-15.

Comment 1-21. Page 11-20. Should an AD facility be fully enclosed there should be no need for FAA approval. May be appropriate for landfills. But not a fully enclosed facility.

> **Response 1-21.** See Comment 1-22. Matt Cotton explains that there are scenarios where FAA review would be relevant and important, but may not be required for all cases. This would be determined on a project-by-project basis.

Matt Cotton, IWMC

Comment 1-22. If co-locating at a compost site the FAA regulations are relevant and important. More about providing information, you may not have to do it. It is not just about feedstock.

> **Response 1-22.** Comment noted.

Evan Edgar, Engineer, California Compost Coalition

Comment 1-23. Figure 3-4. Clearly identify CNG, it is an important end produce for fleets. Hope to co-locate AD facility next to CNG fleet refueling stations. It should be shown on this figure.

> **Response 1-23.** CNG has been added to Figure 3-4.

Comment 1-24. Last comment. Hopes that the new Guidance Document replaces the current AD Guidance Document. There should not be two documents.

> **Response 1-24.** Comment noted. That would be a goal, just having one guidance document. However, it is unknown at this time whether there will be one or two Guidance Documents since the guidance to navigate the EIR may be different than the guidance on navigating the regulations.

March 30, 2011

Mike Mohajer, Los Angeles County Sanitation District

Comment 2-1. Overall, excellent document by CalRecycle. It will help substantially when someone wants to go through their own CEQA process. Really a helpful document, good information on greenhouse gases. Would like to see more conversion technologies environmental reports. Support for efforts.

> **Response 2-1.** Comment noted.

Unidentified Commenter

Comment 2-2. Mark Wood is here. It would be good if Mike could help with guidance document.

> **Response 2-2.** Comment noted.

Chuck Tobian, Burrtec Waste & Recycling Services

Comment 2-3. Program EIR was one step. Are there other activities? – Such as interfacing with the CEC.

> **Response 2-13.** Commented noted.

Kim Tran, City of Los Angeles

Comment 2-4. Permitting of AD facilities – will they be permitted as solid waste facilities or will there be other requirements?

Response 2-4. The Draft Program EIR outlines permitting requirements on pages 3-14 through 3-17. There is a Guidance document available at http://www.calrecycle.ca.gov/Publications/default.asp?pubid=1345.

See also, response to Comment C-2.

Comment 2-5. Digestate – what are the requirements regarding compost for land application?

Response 2-5. As indicated in the Draft Program EIR starting on page 6-14, digestate resulting from AD that is composted and meets the pathogen and metals threshold requirements can be used as compost. Mitigation Measure 6.2e requires that land application for liquid digestate or residual solids adhere to all requirements of applicable Waste Discharge Requirements (WDRs) issues by the appropriate regional water board.

Chuck Tobian, Burrtec Waste Industries

Comment 2-6. Wastewater agencies are prominent. Mark de Bie had an earlier meeting with wastewater agencies. Is that continuing?

Response 2-6. The scope of the Draft PEIR does not include AD at WWTPs. Discussions with WWTPs representatives continue on a separate track.

Comment 2-7. Would be good to know about project(s) in progress?

Response 2-7. Information about projects CalRecycle is tracking can be found at http://www.calrecycle.ca.gov/Organics/Conversion/

C&R.5 Index of Comments and Responses

This index covers the issues discussed in the comments received on the Draft Program EIR and responses to the comments. Bolded comments (i.e., **S-4**) indicate the location of substantial information in either the comment or the response to the comment. Written comments (A- through T-) and responses to written comments are included in **Section C&R.3**. Oral comment summaries (1- and 2-) and responses to oral comments are included in **Section C&R.4**.

CalRecycle Review Draft

GUIDANCE DOCUMENT FOR CEQA REVIEW OF MUNICIPAL ORGANIC WASTE ANAEROBIC DIGESTER FACILITIES IN CALIFORNIA

Using the Program EIR

Prepared for the
California Department of Resources
Recycling and Recovery (CalRecycle)

August 2011

ESA

CalRecycle Review Draft

GUIDANCE DOCUMENT FOR CALIFORNIA ENVIRONMENTAL QUALITY ACT REVIEW OF MUNICIPAL ORGANIC WASTE ANAEROBIC DIGESTER FACILITIES IN CALIFORNIA

Using the Program Environmental Impact Report

Prepared for the
California Department of Resources
Recycling and Recovery (CalRecycle)

August 2011

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209134

TABLE OF CONTENTS

Guidance Document for CEQA Review

Appendices

Acronyms

AD	Anaerobic Digestion or Digester. In the Program EIR, AD is used as the acronym in referring to the Anaerobic Digester Facilities (AD Facilities) and the Anaerobic Digestion Initiative (AD Initiative).
AD Facilities	Anaerobic Digester Facilities
AD Initiative	Anaerobic Digestion Initiative
BMP	Best Management Practice
CEQA	California Environmental Quality Act
EIR	Environmental Impact Report
MMRP	Mitigation Monitoring and Reporting Plan
TAG	Technical Advisory Group (see member's list Page 14-3 in the Program EIR)

GUIDANCE DOCUMENT

Overview of the Guidance Document

This user's manual is intended to assist local agencies throughout California in evaluating applications to operate Anaerobic Digester facilities (AD Facilities).

- The Program EIR is a programmatic review that will expedite future site-specific environmental review by lead agencies with discretion to approve AD facilities, pursuant to CEQA.
- Program EIR reduces the need for duplicative review of general environmental impacts, cumulative impacts, and broad alternatives, thus expediting the local CEQA review for site-specific projects.
- The Program EIR contains information from a variety of sources that has been organized according to the requirements for CEQA documents. While lead agencies and consultants may have limited knowledge of AD facilities, the Program EIR benefitted from the considerable integrated waste management and conversion technology knowledge of a Technical Advisory Group (TAG) that provided input throughout the development of the Program EIR.
- The Program EIR contains technical information developed based on current operating projects provided by the TAG, which was comprised of a broad spectrum of individuals interested in AD facilities from universities; local governments; advocacy/environmental groups; solid waste industries; federal, state, and regional agencies; and utilities. The Program EIR contains potential mitigation measure approaches for the potentially significant impact identified in the Program EIR and can be utilized by local agencies in addressing potential environmental impacts.
- The Program EIR contains a number of commonly utilized design and operational practices: best management practices (BMPs) that could be included as aspects of a proposed project.

The remainder of this guidance document includes:

- Overview of the Program EIR;
- Using the Program EIR for Local Projects;
- Local Project consistency with the Program EIR;
- Mitigation Monitoring and Reporting Plan (MMRP); and
- Appendices.

Overview of the Program EIR

In June 2011, the California Department of Resources Recycling and Recovery (CalRecycle) adopted the Anaerobic Digestion Initiative (AD Initiative) (see Appendix A), a comprehensive program to foster the development of anaerobic digestion facilities (AD facilities) which convert organic solid wastes into sources of energy and can produce valuable compost feedstocks, soil amendments and other products. A statewide Program Environmental Impact Report (Program EIR) was prepared for the AD Initiative, evaluating impacts of the development of AD facilities and requiring mitigation to reduce significant impacts to a less-than-significant level, and the EIR was certified by CalRecycle. The Program EIR and associated documents can be found and downloaded at:

http://www.calrecycle.ca.gov/SWFacilities/Compostables/AnaerobicDig/

The Program EIR determined that on a programmatic level all the impacts of AD facilities could be mitigated to a less-than-significant level with implementation of the mitigation measures. Individual projects could result in localized impacts that would need to be analyzed in a tiered CEQA document.

Using the Program EIR for Local Projects

Program EIR Advantages

The advantages of using a program EIR are listed in the CEQA Guidelines §15168(b), which states that a Program EIR can:

- Provide an occasion for a more exhaustive consideration of effects and alternatives than would be practical in an EIR on an individual action;
- Ensure consideration of cumulative impacts that might be slighted in a case-by-case analysis;
- Avoid duplicative reconsideration of basic policy considerations;
- Allow the Lead Agency to consider broad policy alternatives and programwide mitigation measures at an early time when the agency has greater flexibility to deal with basic problems or cumulative impacts; and
- Allow reduction in paperwork.

Tiering

Tiering refers to using the analysis of general matters contained in a broader EIR with later EIRs and negative declarations on a narrower project; incorporating by reference the general discussions from the broader EIR; and concentrating the later EIR or negative declaration solely on the issues specific tot the later project (CEQA Guidelines §15168(b)).

An agency should limit the EIR or negative declaration on the later project to effects which (CEQA Guidelines, §15152 subd. (d)):

- Were not examined as significant effects on the environment in the prior EIR; or
- Are susceptible to substantial reduction or avoidance by the choice of specific revision in the project, by the imposition of conditions, or other means.

When tiering is used, the later EIRs or negative declarations shall refer to the prior Program EIR and state where a copy of the prior Program EIR may be examined. The later EIR or negative declaration should state that the lead agency is using the tiering concept and that it is being tiered with the earlier Program EIR. (CEQA Guidelines §15152(g))

Scope of Future CEQA Documents (Subjects that can be Excluded)

Where a lead agency has prepared and certified a first tier EIR for a policy, plan, program, or ordinance, the scope of later EIRs or negative declarations can be limited as follows. By statute (Public Resources Code, §21094, subd. (a)), the analysis need not "examine" those significant effects of the later projects that:

- Have already been mitigated or avoided as part of the prior project approval, as evidenced in the findings adopted for the prior project; or
- Were examined at a sufficient level of detail in the prior EIR that they can be mitigated or avoided by site specific revisions, the imposition of conditions, or by other means in connection with the approval of the later project.

If there are no potential new effects, due either to the specifics of the project and its location, or other changes to the project or its circumstances (as described in Section 15162 of the CEQA Guidelines), the lead agency may find that the later project is within the scope of the program EIR, and no further documentation is needed (CEQA Guidelines Section 15168(c)(2)). For future AD Facility project, total reliance on the Project EIR is not likely, because the Program EIR did not analyze site specific impacts at any locations.

Scope of Future CEQA Documents (Subjects to Include)

When considering the potential effects of a later project, the local lead agency should consider if the effects in question were "examined at a sufficient level of detail in the prior" EIR. The agency need not generate additional information to devise necessary means to avoid or mitigate them, and such effects need not be addressed in the later environmental document. On the other hand, if the agency needs additional information to formulate the necessary revisions, conditions, or measures, then the effects should be addressed. It is up to the lead agency for the later project to decide how much site or project specific information is necessary to determine if additional measures are necessary (Guide to CEQA, 2007).

Subdivision (c) of section 15168 provides that, where the subsequent activities involved site specific operations, the agency should use a written checklist or similar device (Initial Study) to document the evaluation of the site and the activity to determine whether the environmental effects of the operation were covered in the program EIR. Some lead agencies find it useful to modify CEQA Guidelines Appendix G (the Environmental Checklist Form) by adding an extra column for impacts adequately addressed in the Program EIR, and explaining their reasoning in the response.

If it cannot be clearly demonstrated that the project falls within the scope of the Program EIR without additional analysis, it will be necessary to prepare a subsequent (tiered) negative declaration/mitigated negative declaration or EIR. Subdivision (f) of Section 15152 provides that "a later EIR shall be required when the initial study or other analysis finds that the later project may cause significant effects on the environment that were not adequately addressed in the prior EIR. A negative declaration shall be required when the provisions of Section 15070 are met."

When tiering, Program EIR mitigation measures should be incorporated unless subsequent analysis shows those measures should be modified to fit the particular circumstances. Keep in mind, however, that some program-level mitigation measures are designed to address cumulative, rather than project-specific, impacts. Care should be taken when modifying or eliminating those measures in a tiered document.

Cover the Local Issues

Local issues may or may not reflect the same issues covered in the Program EIR. However, just because a resource area was not covered in the Program EIR does not mean that it will not need to be analyzed in the local project document. The local lead agency must exercise its judgment.

Specific Local Issues (what was not looked at in the Program EIR)

Resource areas that were dismissed as potential impacts at the program level are as follows: agricultural and forest resources, biological resources, cultural resources, geology, soils and seismicity, land us and land use planning, mineral resources, population and housing, and recreation. The Notice of Preparation (NOP) dismissed potential impacts in these resource areas as they are not anticipated to have potentially significant impacts at the program level, although they could require evaluation for individual projects due to the potential for local effects. These issues should be considered locally when determining the scope of tiered CEQA documents.

Review Impacts Considered in the Program EIR and Mitigation Measures in the Program EIR

The Program EIR provides mitigation measures for seven resources topics (see Appendix A). Local lead agencies would be required to analyze the following resource areas in light of the Program EIR and the project-specific circumstances: air quality and greenhouse gases; hydrology; noise; public services and utilities; transportation; aesthetics; and hazards and hazardous materials. This list is not to be considered exhaustive since the local project may require other resource areas on a project-by-project basis (as listed above in "Specific Local Issues").

Consider Best Management Practices (BMPs) identified in the Program EIR

Appendix B is a list of the BMPs that were assumed to be part of the project evaluated in the Program EIR and therefore do not appear in the mitigation measures of the Program EIR. Local projects will need to be consistent in applying these BMPs (or equivalent measures) as applicable for tiered CEQA documents.

Cumulative Impacts

While the Program EIR resource sections analyze the impacts of AD facility development located at permitted solid waste facilities and within industrially zoned areas, the cumulative analysis also considers the impacts from other closely related, past, present, and reasonable foreseeable future projects throughout California. The appropriate geographic scope for cumulative impacts analysis associated with resource areas ranges from site-specific to statewide. Lead agencies for the local AD Facility Project will need to consider potential site-specific cumulative impacts.

Alternatives

The Program EIR considered various technology alternatives to AD Facilities and found none to be environmentally superior to the proposed project. Any tiered EIRs could rely upon that determination (unless there are unusual local considerations). However, tiered EIRs may still need to consider potential alternatives that would lessen potentially significant site-specific impacts.

Local Project Consistency with the Program EIR

Local AD Facility projects that are consistent with the Program EIR may be limited to site-specific issues not disclosed in the Program EIR. Local AD project would be consistent with the Program EIR if they are consistent with the facilities analyzed in the Program EIR.

AD Facilities included in the scope: In-vessel AD facilities which are located at existing or new permitted solid waste facilities or stand-alone AD facilities in areas zoned for industrial or solid waste handling activities.

There are several variations of in-vessel digester technologies. The Program EIR allows for flexibility in technology choices at the local level, as different in-vessel technologies have the same general processes. The Program EIR applies to both low-solids/wet systems and high-solids/dry systems.

Feedstock materials included in the scope: Food waste, green material, and mixed solid waste. The food and green material categories are intended to be inclusive and not limited by current regulatory definitions or collection methods—“food” includes cannery waste; meat; poultry; fish; cheese waste; food processing waste; fats, oils, and greases (FOGs); etc., and “green material” includes urban, agricultural, crop residues, contaminated green materials (containing inorganic material), etc. Use of manure is consistent as nitrogen nutrient amendment material for the purpose of increasing the growth of microorganisms and digester efficiency, but not as a primary waste stream to be evaluated.

The following projects would not be consistent with the Program EIR.

AD Facilities not included in the scope: Dairy manure digesters, dairy manure co-digesters, wastewater treatment plant digesters, and in-ground digester cell technology (as described in Chapter 13 of the Program EIR).

Feedstock materials not included in the scope: Biosolids, untreated septage, waste co-digested with biosolids at wastewater treatment plants or dairy manure co-digesters, and hazardous waste. Unprocessed mammalian tissue (i.e., dead cows, carcasses, etc.) is also not included in the scope of this Program EIR.

Mitigation Monitoring and Reporting Plan (MMRP)

California Public Resources Code §21081.6(a)(1) requires public agencies, as part of the certification of an EIR, to prepare and adopt a reporting or monitoring program in order to mitigate or avoid significant effects on the environment. This program should be structured to ensure that changes to the project that the lead agency has adopted to mitigate or avoid significant environmental impacts are carried out during project implementation. CalRecycle adopted a Mitigation Monitoring and Reporting Plan (MMRP) as part of the approval of the AD Initiative. The MMRP for the Program EIR is attached as Appendix C in this document and can be found online at:

http://www.calrecycle.ca.gov/SWFacilities/Compostables/AnaerobicDig/

The MMRP should be a helpful guide for local jurisdictions that need to adopt an MMRP as part of the approval of a local AD facility.

References

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State of California, *California Environmental Quality Act*, Public Resources Code, Division 13, Sections 21000 through 21177, as of January 1, 2011.

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Appendix A

Anaerobic Digestion Initiative

APPENDIX A

The Anaerobic Digestion Initiative

Under its Strategic Directive 6.1, CalRecycle seeks to reduce by 50 percent the amount of organic waste disposed in the state's landfills by 2020. In addition to helping conserve limited landfill capacity, this CalRecycle policy recognizes that organic wastes are a resource, not just solid wastes that must be disposed. Organic wastes have an energy value that can be captured and utilized and are also a necessary component of compost, soil amendments, and other useful products. Directive 6.1 also encompasses one of CalRecycle's actions to help California significantly reduce its generation of greenhouse gases. Under the state's *Climate Change Scoping Plan* (CARB, 2008), CalRecycle is responsible for taking actions to reduce the emission of methane, a potent greenhouse gas, from landfills. AD facilities utilize organic wastes as a feedstock from which to produce biogas (which is captured and contains a high percentage of methane). Typically the methane gas produced by the anaerobic digestion process is converted to liquefied natural gas (LNG), compressed natural gas (CNG), or electricity (using internal combustion engines or fuel cells) for on-site energy needs and export to the energy grid (CARB, 2008). The development of AD facilities is one of CalRecycle's charges under the AB 32 Climate Change Scoping Plan. The AB 32 Climate Change Scoping Plan estimates that AD facilities in California could reduce methane emissions from landfills at a level of 2 million metric tons of carbon dioxide equivalents (CO_2e) per year by the year 2020 (CARB, 2008). Anaerobic digestion also can contribute to meeting the state's Renewable Portfolio Standard and Low Carbon Fuel Standard. To assist in achieving those objectives, CalRecycle intends to adopt the AD Initiative, a comprehensive program to foster the development of AD facilities to convert organic solid wastes into sources of energy, valuable compost feedstocks, soil amendments, and other products.

The AD Initiative consists of CalRecycle's adoption of a policy and a series of discrete actions to implement the policy, together with additional actions that will be developed and implemented in the future:

- It is the policy of CalRecycle to encourage the development of AD facilities in California as an alternative to the landfill disposal of organic solid waste. Specifically, as an initial measure, CalRecycle will encourage the establishment of in-vessel digesters located at existing or new solid waste facilities and in areas zoned for industrial or solid waste handling activities.
- CalRecycle shall, not later than Jan. 1, 2012, establish programs to implement the above policy, including without limitation:
    - Provide research grants, loans, and contracts (dependent on funding availability) to develop AD facilities and for activities that advance the state of knowledge about anaerobic digestion and its applications and the uses of products and by-

  products, including anaerobic digestion demonstration projects that use the organic fraction of municipal solid waste as a feedstock.

  - Develop guidance publications to assist operators who seek to establish AD facilities.
  - Develop guidance publications to assist LEAs and other local and regional government agencies that permit and regulate AD facilities, specifically guidance for co-location at solid waste facilities.
  - Draft revised regulations for aspects of specific design, operation and permitting of AD facilities within the authority and responsibility of CalRecycle.
  - Promote anaerobic digestion through CalRecycle's participation with the California Energy Commission in implementing AB 118 (Alternative and Renewable Fuel and Vehicle Technology Program), the Bioenergy Interagency Working Group, and with the Air Resources Board in implementing the Anaerobic Digestion and Low Carbon Fuel Standard measures in the AB 32 Climate Change Scoping Plan.
  - Work with the California Pollution Control Financing Authority and California Alternative Energy and Advanced Transportation Financing Authority to help anaerobic digestion project proposals obtain funding.
  - Participate on technical workgroups convened by the Climate Action Reserve to develop or modify protocols, such as the Organic Waste Digestion Project Protocol, for projects that divert and anaerobically digest organic waste that otherwise would have gone to solid waste landfills.

AD Initiative Objectives

The AD Initiative has several objectives including the following:

- Assist in meeting CalRecycle Strategic Directive 6.1: Reduce the amount of organics in the waste stream by 50 percent by 2020.
- Support Assembly Bill 32 (AB 32), the California Global Warming Solutions Act of 2006, greenhouse gas reduction measures related to the use of anaerobic digestion:
  - Measures E-3. Achieve a 33 percent renewable energy mix by 2020. (Anaerobic digestion facilities produce biogas, which is a renewable energy source.)
  - RW-3. High Recycling/Zero Waste. (Anaerobic digestion is one of five subcategories listed under this measure.)
- Assist local governments and state agencies (both lead and responsible agencies) by providing program-level analyses that will identify potential environmental effects of AD facilities and discuss mitigation measures or best management practices that can reduce or eliminate the environmental effects.

Appendix B

Program EIR Mitigation Measures – Table 1-1 from the Final EIR

TABLE 1-1 (REVISED)
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance Before Mitigation	Impact Significance After Mitigation
5. Air Quality and Greenhouse Gas			
Impact 5.1: Construction and operations of AD facilities within California would result in emissions of criteria air pollutants at levels that could substantially contribute to a potential violation of applicable air quality standards or to nonattainment conditions.	**Measure 5.1a:** Applicants shall prepare and submit an Air Quality Technical Report as part of the environmental assessments for the development of future AD facilities on a specific project-by-project basis. The technical report shall include an analysis of potential air quality impacts for all steps of the project (including a screening level analysis to determine if construction and operation [for all on-site processes, including any end-use and disposal methods] related criteria air pollutant emissions would exceed applicable air district thresholds, as well as greenhouse gas (GHG) emissions and any health risk associated with toxic air contaminants (TACs) from all AD facility sources) and reduction measures. Preparation of the technical report should be coordinated with the appropriate air district and shall identify compliance with all applicable New Source Review and Best Available Control Technology (BACT) requirements. The technical report shall identify all project emissions from permitted (stationary) and non-permitted (mobile and area) sources and mitigation measures (as appropriate) designed to reduce significant emissions to below the applicable air district thresholds of significance, and if these thresholds cannot be met with mitigation, then the individual AD facility project could require additional CEQA review or additional mitigation measures. **Measure 5.1b:** Applicants shall require construction contractors and system operators to implement the following Best Management Practices (BMPs) as applicable during construction and operations: • Facilities shall be required to comply with the rules and regulations from the applicable Air Quality Management District (AQMD) or Air Pollution Control District (APCD). • Facilities shall require substrate unloading and pre-processing activities to occur indoors within enclosed, negative pressure buildings. Collected foul air (including volatile organic compounds (VOCs) off-gassed from undigested substrates) should be treated via biofilter or air scrubbing system. • Use equipment meeting, at a minimum, Tier II emission standards. • Minimize idling time either by shutting equipment off when not in use or reducing the time of idling to 5 minutes (as required by the state airborne toxics control measure [Title 13, §2485 of the California Code of Regulations]). Provide clear signage that posts this requirement for workers at the entrances to the site. • Maintain all equipment in proper working condition according to manufacturer's specifications. • Use electric equipment when possible. For projects that are unable to use internal combustion engines due to air district regulations (i.e., NOx emission limits), other options for generating renewable energy from biogas should be considered. Other options that should be evaluated for using biogas or biomethane as an energy source include: use as a transportation fuel (compressed biomethane), use in fuel cells to generate clean electricity, use for on-site heating, or injection of biomethane into the utility gas pipeline system. If there are other lower NOx alternative technologies available at the time of AD facility development, these should be considered as well during the facility design process.	S	LSM

LS – Less than Significant LSM – Less than Significant with Mitigation NI – No Impact S – Significant

TABLE 1-1 (REVISED)
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

		Impact Significance	
Impact	**Mitigation Measure**	Before Mitigation	After Mitigation
Impact 5.2: Operation of AD facilities in California could create objectionable odors affecting a substantial number of people.	**Measure 5.2a:** Applicants for the development of AD facilities shall comply with appropriate local land use plans, policies, and regulations, including applicable setbacks and buffer areas from sensitive land uses for potentially odoriferous processes. **Measure 5.2b:** If an AD facility handles compostable material and is classified as a compostable material handling facility, the facility must develop an Odor Impact Minimization Plan (OIMP) pursuant to 14 CCR 17863.4. Otherwise, applicants shall develop and implement an Odor Management Plan (OMP) that incorporates equivalent odor reduction controls for digester operations and is consistent with local air district odor management requirements. These plans shall identify and describe potential odor sources, as well as identify the potential, intensity, and frequency of odor from these likely sources. In addition, the plans will specify odor control technologies and management practices that if implemented, would mitigate odors associated with the majority of facilities to less than significant. However, less or more control measures may be required for individual projects. Odor control strategies and management practices that can be incorporated into these plans include, but are not limited to, the following: - Require substrate haulage to the AD facility within covered, liquid leak-proof containers. - Establish time limit for on-site retention of undigested substrates (i.e., feedstocks should be processed and placed into the portion of the system where liquid discharge and air emissions can be controlled within 24 or 48 hours of receipt). - Provide enclosed, negative pressure buildings for indoor receiving and pre-processing. Treat collected foul air in a biofilter or air scrubbing system. - Establish contingency plans for operating downtime (e.g., equipment malfunction, power outage). - Manage delivery schedule to facilitate prompt handling of odorous substrates. - Handle fresh unstable digestate within enclosed building, or mix with green waste and incorporate into a composting operation within the same business day, and/or directly pump to covered, liquid leak-proof containers for transportation. - Protocol for monitoring and recording odor events. - Protocol for reporting and responding to odor events.	S	LSM
Impact 5.3: Construction and operation of AD facilities in California could lead to increases in chronic exposure of sensitive receptors in the vicinity to certain toxic air contaminants from stationary and mobile sources.	**Measure 5.3a:** Implement Mitigation Measures 5.1a and 5.1b. **Measure 5.3b:** Based on the Air Quality Technical Report (specified in Measure 5.1a), if the health risk is determined to be significant on a project-by-project basis with diesel particulate matter (DPM) as a major contributor, then the applicants shall implement control measures such that the AD facility health risk would be below the applicable air district threshold, which may include implementation of one or more of the following requirements, where feasible and appropriate: • Use either new diesel engines that are designed to minimize DPM emissions (usually through the use of catalyzed particulate filters in the exhaust) or retrofit older engines with catalyzed	S	LSM

LS – Less than Significant LSM – Less than Significant with Mitigation NI – No Impact S – Significant

TABLE 1-1 (REVISED)
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance	
		Before Mitigation	After Mitigation
	particulate filters (which will reduce DPM emissions by 85%); • Use electric equipment to be powered from the grid, which would eliminate local combustion emissions; • Use alternative fuels, such as compressed natural gas (CNG) or liquefied natural gas (LNG). **Measure 5.3c:** Hydrogen sulfide (H2S) contained in the biogas shall be scrubbed (i.e., via iron sponge or other technology) before emission to air can occur.		
Impact 5.4: Development of AD facilities in California could increase GHG emissions.	**Measure 5.4:** Implement Mitigation Measure 5.1a.	NI	NI
Impact 5.5: Development of AD facilities in California, together with anticipated cumulative development in the area, would contribute to regional criteria pollutants.	**Measure 5.5:** Implement Mitigation Measures 5.1a and 5.1b.	S	LSM
6. Hydrology			
Impact 6.1: Construction of AD Facilities could generate loose, erodible soils and other water quality pollutants that may impair water quality.	None required.	LS	LS
Impact 6.2: The operation of AD facilities could adversely affect surface and groundwater quality.	**Measure 6.2a:** During pre-processing, all water that contacts digester feedstock, including stormwater from feedstock handling and storage facilities and water from equipment washdown and feedstock wetting, shall be contained until appropriately disposed or utilized. Best Management Practices (BMPs) may be used to reduce loading of sediment, nutrients, trash, organic matter, and other pollutants. These BMPs may include, but are not limited to, trash grates and filters, oil-water separators, mechanical filters such as sand filters, vegetated swales, engineered wastewater treatment wetlands, settling ponds, and other facilities to reduce the potential loading of pollutants into surface waters or groundwater. All discharges of stormwater are prohibited unless covered under the General Industrial Stormwater Permit, other National Pollutant Discharge Elimination System (NPDES) permit, or are exempted from NPDES permitting requirements. The NPDES permits will generally require implementation of management measures to achieve a performance standard of best available technology economically achievable (BAT) and best conventional pollutant control technology (BCT), as appropriate. The General Industrial Stormwater Permit also requires the development of a storm water pollution prevention plan (SWPPP) and a monitoring plan, in compliance with permit requirements.[1] Other liquid and solid wastes may only be discharged pursuant to an NPDES permit or waste discharge requirement (WDR) order. **Measure 6.2b**: In order to minimize the amount of fugitive trash or feedstock released to surface waters, the following measures shall be implemented. When feasible, the project proponent shall preferentially select feedstocks that contain minimal amounts of trash that could become entrained in surface water, either via direct contact with stormwater flows or via other accidental release, such as due to wind. Processing of such feedstocks may, however, be unavoidable, such as in support of an AD facility that processes MSW. Therefore, the project applicant shall ensure that (1) drainage from all feedstock loading, unloading,	S	LSM

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[1] For more information, please refer to: http://www.swrcb.ca.gov/water_issues/programs/stormwater/industrial.shtml

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TABLE 1-1 (REVISED)
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance Before Mitigation	Impact Significance After Mitigation
	and storage areas is contained onsite or treated to remove trash and stray feedstock, and sediment prior to release as permitted; (2) in all feedstock loading and unloading areas, and all areas where feedstock is moved by front loaders or other uncovered or uncontained transport machinery, the applicant shall ensure that mechanical sweeping and/or equivalent trash control operational procedures are performed at least daily, during operations; and (3) the facility operator shall train all employees involved in feedstock handling so as to discourage, avoid, and minimize the release of feedstock or trash during operations. **Measure 6.2c**: In order to minimize water quality degradation associated with accidental spills at AD facilities, the applicant for individual projects that would be implemented under the Program EIR shall require project proponents to complete and adhere to the requirements of a Spill Prevention, Control, and Countermeasure (SPCC) Plan, which is based on the federal SPCC rule. Notification of the SPCC Plan shall be provided to the local Certified Unified Program Agency (CUPA). The SPCC Plan shall contain measures to prevent, contain, and otherwise minimize potential spills of pollutants during facility operation, in accordance with U.S. EPA requirements. For individual projects that would utilize wet digestion systems, in which processing and holding tanks would contain the (aqueous) digestion reaction and liquid digestate containing fats and oils, the SPCC Plan shall provide for installation and monitoring of secondary containment and/or leak detection systems to ensure that AD liquids are not accidentally discharged to navigable waters or adjoining shorelines. Monitoring of these systems shall be in accordance with SPCC Plan requirements. **Measure 6.2d:** Any proposed discharge to a pond for an individual project would require the project applicant to acquire WDRs from the appropriate regional board. The project applicant shall ensure that all ponds and discharges to such ponds adhere to all requirements under applicable WDRs. The need for pond liners in order to protect groundwater quality would be assessed during the regional board's review of the project, and requirements for pond liners would be included in the WDRs, as warranted. If appropriate, the WDRs would impose requirements for Class II surface impoundments as presented in Title 27 of the California Code of Regulations. Requirements include, but are not limited to, groundwater monitoring, double liner systems with leachate collection, water balance, a preliminary closure plan for clean closure, seismic analysis, and financial assurances. Compliance with WDRs may require the installation of facilities such as tanks and containers to store and process the digestate, the use of filter presses, and implementation of other water quality protection practices. **Measure 6.2e**: This measure would reduce potential for the movement of nutrients and other pollutants to groundwater and surface water for individual projects that would employ land application for liquid digestate or residual solids. The operators of individual projects implemented under this Program EIR shall ensure that land application of liquid digestate and/or residual solids adheres to all requirements of applicable WDRs. WDR requirements include but are not limited to, groundwater monitoring, completion of an anti-degradation analysis, and in some cases best practicable treatment and control to achieve salinity reduction in materials prior to discharge to land. WDRs would be issued by the appropriate regional board, and would consider site-specific conditions and waste characteristics, in order to determine applicable control measures and procedures that protect water quality.		

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TABLE 1-1 (REVISED)
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance	
		Before Mitigation	After Mitigation
	Measure 6.2f: This measure would reduce the potential for water quality degradation from projects that include discharge of liquid digestate to surface waters. The applicant for individual projects implemented under this Program EIR shall ensure that the discharge of liquid digestate to surface waters adheres to all NPDES permitting recommendations and requirements, as established by the appropriate regional board. Specific measures may include, but are not limited to, limitations on discharge volumes, seasonal discharge restrictions, limitations on loading rates and/or concentrations of specific constituents, and other facility-specific water quality control measures designed to protect receiving water quality and preserve beneficial uses identified in Basin Plans.		
Impact 6.3: AD facilities could be exposed to flooding hazards.	**Measure 6.3:** Individual applicants seeking coverage under this Program EIR shall ensure that, for their proposed AD facilities including pre-processing areas, feedstock storage areas, and digestate handling facilities, are protected from FEMA-defined 100-year flood events. Design measures may include, but are not limited to: facility siting, access placement, grading, elevated foundations, and site protection such as installation of levees or other protective features.	S	LSM
Impact 6.4: Construction of AD facilities could change drainage and flooding patterns	**Measure 6.4:** In order to ensure that the AD facilities would not result in detrimental increases in stormwater flow or flooding on site or downstream, the Applicant for each AD facility project shall prepare a comprehensive drainage plan (prior to construction) and implement the plan during construction. The comprehensive drainage plan shall include engineered stormwater retention facility designs, such as retention basins, flood control channels, storm drainage facilities, and other features as needed to ensure that, at a minimum, no net increase in stormwater discharge would occur during a 10-year, 24-hour storm event, as a result of project implementation. Project related increases in stormwater flows shall be assessed based on proposed changes in impervious surface coverage on site, as well as proposed grading and related changes in site topography.	S	LSM
Impact 6.5: AD facilities could require additional water supplies resulting in depletion of available water supplies.	None required.	LS	LS
Impact 6.6: AD facilities could become inundated as a result of seiche, tsunami, or mudflow.	**Measure 6.6:** To ensure that proposed AD facilities would not incur impacts associated with seiche, tsunami, or mudflow, the applicant for each individual project shall ensure that all facilities are located outside of potential risk areas for seiche, tsunami, and mudflow. In the event that a proposed facility would be sited within a potential risk area for one of these hazards, the facility shall be raised above projected maximum base inundation elevations, or shall be protected from inundation by the installation of berms, levees, or other protective facilities.	S	LSM
Impact 6.7: AD facilities could contribute to cumulative impacts to water quality.	**Measure 6.7:** Implement Mitigation Measures 6.2 (a-f) and 6.3.	S	LSM

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TABLE 1-1 (REVISED)
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance Before Mitigation	Impact Significance After Mitigation
7. Noise			
Impact 7.1: Construction of AD facilities could temporarily increase noise levels at nearby sensitive receptor locations or result in noise levels in excess of standards in local general plans, noise ordinances, or other applicable standards.	**Measure 7.1a:** Construction activities shall be limited to the hours between 7 a.m. and 7 p.m., Monday through Saturday, or an alternative schedule established by the local jurisdiction, or other limits to construction hours normally enforced by the local jurisdiction (see Measure 7.1d below). **Measure 7.1b:** Construction equipment noise shall be minimized by muffling and shielding intakes and exhaust on construction equipment to a level no less effective than the manufacture's specifications, and by shrouding or shielding impact tools. **Measure 7.1c:** Construction contractors within 750 feet of sensitive receptors shall locate fixed construction equipment, such as compressors and generators, and construction staging areas as far as possible from nearby sensitive receptors. **Measure 7.1d**: Construction contractors shall comply with all local noise ordinances and regulations and other measures deemed necessary by the Lead Agency.	S	LSM
Impact 7.2: Noise from operation of AD facilities could substantially increase ambient noise levels at nearby land uses or result in noise levels in excess of standards in local general plans, local noise ordinances, or other applicable standards.	**Measure 7.2:** AD facilities located within 2,000 feet of a sensitive receptor shall conduct a site specific noise study. If operational sound levels would exceed local regulations, or 45 dBA at a sensitive receptor (if no regulations are available), additional sound-proofing such as enclosures, muffling, shielding, or other attenuation measures shall be installed to meet the required sound level.	S	LSM
Impact 7.3: AD facility operational activities associated with transportation would not increase ambient noise levels at nearby land uses.	None required.	LS	LS
Impact 7.4: Development of AD facilities could result in a cumulative increase in noise levels.	**Measure 7.4:** Implement Mitigation Measures 7.1a through 7.1d and Measure 7.2.	S	LSM
8. Public Services and Utilities			
Impact 8.1: The project could substantially increase demands on fire protection services.	**Measure 8.1:** Implement Mitigation Measures 10.1b, 10.3c, and 11.4a.	S	LSM
Impact 8.2: The project could potentially exceed wastewater treatment requirements of the Regional Water Quality Control Board (RWQCB).	**Measure 8.2a:** Implement Mitigation Measure 8.3b if the operator does not have an existing agreement, such as for co-located facilities. **Measure 8.2b:** In addition to an agreement for service, coordination with the wastewater treatment provider would be needed to determine if pre-treatment would be required to meet the RWQCB requirements for the existing wastewater treatment facility.	S	LSM

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TABLE 1-1 (REVISED)
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance Before Mitigation	Impact Significance After Mitigation
Impact 8.3: The project could result in significant environmental effects from the construction and operation of new water and wastewater treatment facilities or expansion of existing facilities.	**Measure 8.3a:** If the project proposes to obtain water from a water supplier (municipal system or other public water entity), the developer would enter into an agreement for service with the supplier. **Measure 8.3b**: If the project proposes to obtain wastewater service from a wastewater treatment provider (municipal or other public entity), the developer would enter into an agreement for service with the provider. **Measure 8.3c:** Alternate water sources, such as non-potable and recycled water, shall be used during the pre-processing and AD process phases where needed and as available.	S	LSM
Impact 8.4: The project would not result in significant environmental effects from the construction of new stormwater treatment facilities or expansion of existing facilities.	None required.	LS	LS
Impact 8.5: The project would not require significant levels of new or expanded water supply resources or entitlements.	None required.	LS	LS
Impact 8.6: The project could result in exceeding the capacity of a wastewater treatment provider.	**Measure 8.6:** If the project proposes to obtain wastewater service from a wastewater treatment provider (municipal or other public entity), implement Mitigation Measure 8.3b.	S	LSM
Impact 8.7: The project could result in the construction of new energy supplies and could require additional energy infrastructure.	**Measure 8.7:** Projects requiring off-site energy infrastructure must complete CEQA review for the proposed energy improvements as a separate project. Infrastructure improvements may qualify as a categorical exemption pursuant to CEQA.	S	LSM
Impact 8.8: Development of AD facilities would not contribute to cumulative impacts to public services and utilities.	None required.	LS	LS
9. Transportation			
Impact 9.1: Construction of AD facilities would intermittently and temporarily increase traffic congestion due to vehicle trips generated by construction workers and construction vehicles on area roadways.	**Measure 9.1:** The contractor(s) will obtain any necessary road encroachment permits prior to installation of pipelines within the existing roadway right-of-way. As part of the road encroachment permit process, the contractor(s) will submit a traffic safety / traffic management plan (for work in the public right-of-way) to the agencies having jurisdiction over the affected roads. Elements of the plan will likely include, but are not necessarily limited to, the following: • Develop circulation and detour plans to minimize impacts to local street circulation. Use haul routes minimizing truck traffic on local roadways to the extent possible. Use flaggers and/or signage to guide vehicles through and/or around the construction zone. • To the extent feasible, and as needed to avoid adverse impacts on traffic flow, schedule truck trips outside of peak morning and evening commute hours. • Limit lane closures during peak traffic hours to the extent possible. Restore roads and streets to normal operation by covering trenches with steel plates outside of allowed working hours or when work is not in progress. • Limit, where possible, the pipeline construction work zone to a width that, at a minimum, maintains alternate one-way traffic flow past the construction zone. • Install traffic control devices as specified in Caltrans' Manual of Traffic Controls for Construction and Maintenance Work Zones where needed to maintain safe driving conditions. Use flaggers	S	LSM

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TABLE 1-1 (REVISED)
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance Before Mitigation	After Mitigation
	and/or signage to safely direct traffic through construction work zones. • Coordinate with facility owners or administrators of sensitive land uses such as police and fire stations, hospitals, and schools. Provide advance notification to the facility owner or operator of the timing, location, and duration of construction activities. • Coordinate with the local public transit providers so that bus routes or bus stops in work zones can be temporarily relocated as the service provider deems necessary.		
Impact 9.2: AD facility operations would not substantially increase on-going (operational) traffic volumes on roadways serving the facilities.	**Measure 9.2:** Measures will be imposed by applicable local agencies, as needed, to address site-specific significant traffic impacts identified during subsequent facility-specific analyses, implementation of which would reduce those impacts to a less-than-significant level.	S	LSM
Impact 9.3: AD facilities could potentially cause traffic safety hazards for vehicles, bicyclists, and pedestrians on public roadways, and could increase traffic hazards due to possible road wear or to accidental spills of digestate (liquids and solids).	**Measure 9.3a:** Implement Measure 9.1, which stipulates actions required of the contractor(s) to reduce potential traffic safety impacts to a less-than-significant level. **Measure 9.3b:** Prior to construction, the contractor(s), in cooperation with the agencies having jurisdiction over the affected roadways, will survey and describe the pre-construction roadway conditions on rural roadways and residential streets. Within 30 days after construction is completed, the affected agencies will survey these same roadways and residential streets in order to identify any damage that has occurred. Roads damaged by construction will be repaired to a structural condition equal to the condition that existed prior to construction activity. **Measure 9.3c:** Prior to initiation of project operations, the project sponsor(s) will submit a Spill Prevention Plan to the appropriate local agency. The Spill Prevention Plan will include, among other provisions, a requirement that each truck driver know how to carry out the emergency measures described in the Spill Prevention Plan (therefore reducing roadway hazards if an accidental spill were to occur).	S	LSM
Impact 9.4: AD facilities could intermittently and temporarily impede access to local streets or adjacent uses (including access for emergency vehicles), as well as disruption to bicycle/pedestrian access and circulation.	**Measure 9.4:** Implement Measure 9.1, which stipulates actions required of the contractor(s) to reduce potential access impacts to a less-than-significant level.	S	LSM
Impact 9.5: The project could contribute to cumulative impacts to traffic and transportation (traffic congestion, traffic safety, and emergency vehicle access).	**Measure 9.5a:** Prior to construction, the project sponsor will coordinate with the appropriate local government departments, Caltrans, and utility districts and agencies regarding the timing of construction projects that would occur near AD project sites. Specific measures to mitigate potential significant impacts will be determined as part of the interagency coordination, and could include measures such as employing flaggers during key construction periods, designating alternate haul routes, and providing more outreach and community noticing. **Measure 9.5b:** Implement Mitigation Measure 9.2. **Measure 9.5c:** Implement Mitigation Measures 9.1, 9.3b and 9.3c.	S	LSM

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TABLE 1-1 (REVISED)
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

		Impact Significance	
Impact	**Mitigation Measure**	Before Mitigation	After Mitigation
10. Aesthetics			
Impact 10.1: AD facilities could have adverse effects on a scenic vista and/or scenic resources.	**Measure 10.1a:** Avoid siting AD facilities near scenic vistas and corridors designated within an applicable land use plan and the State Scenic Highway Program. **Measure 10.1b**: Landscaping and/or vegetated berms should be used to minimize views of facilities from sensitive views.	S	LSM
Impact 10.2: AD facilities could degrade the existing visual character/quality of the site and its surroundings.	**Measure 10.2a:** Implement Mitigation Measures 10.1a and 10.1b. **Measure 10.2b:** Facilities using truck tippers or other un-enclosed unloading should consider using litter fences to manage blowing litter. Facilities should educate haulers delivering materials to the AD facility through literature, web links, or provide training on the acceptance of waste at the facilities to minimize litter. Facility operators should develop a protocol to identify feedstocks that are severely contaminated with potential litter and reject unacceptable loads. **Measure 10.2c:** Clean-up crews can be used as necessary to control litter. **Measure 10.2d:** Feedstocks and digestate byproducts should be stored in enclosed facilities or processed in a timely manner to prevent visibly deteriorated site conditions. **Measure 10.2e:** Project operators should consider enclosure of pre-processing operations if it provides an aesthetic and/or noise attenuating benefit.	S	LSM
Impact 10.3: AD facilities could create a new source of light or glare with adverse affects to daytime and/or nighttime views.	**Measure 10.3a:** Implement 10.1b. **Measure 10.3b:** Any lighting (portable or permanent) should be hooded and directed onto the project site. This would reduce effects to nighttime skies from uplighting, reduce glare, and prevent light from spilling onto adjoining properties and roads. **Measure 10.3c:** Flares may be enclosed to reduce the visibility of flames during operation.	S	LSM
Impact 10.4: The project could result in cumulative impacts to visual resources.	**Measure 10.4:** Implement Mitigation Measures 10.1a, 10.1b, 10.2a, 10.2b, 10.2c, 10.2d, 10.2e, 10.3a, 10.3b, and 10.3c.	S	LSM
11. Hazards and Hazardous Materials			
Impact 11.1: Construction of AD facilities could result in the potential exposure of construction workers, the public and the environment to preexisting soil and/or groundwater contamination.	**Mitigation Measure 11.1:** Prior to final project design and any earth disturbing activities, the applicant or agency(ies) responsible shall conduct a Phase I Environmental Site Assessment (ESA). The Phase I ESA shall be prepared by a Registered Environmental Assessor (REA) or other qualified professional to assess the potential for contaminated soil or groundwater conditions at the project site; specifically in the area proposed for construction of AD facilities. The Phase I ESA shall include a review of appropriate federal, State and local hazardous materials databases to identify hazardous waste sites at on-site and off-site locations within a one quarter mile radius of the project location. This Phase I ESA shall also include a review of existing and past land uses through aerial photographs, historical records, interviews of owners and/or operators of the property, observations during a reconnaissance site visit, and review of other relevant existing information that could identify the potential existence of contaminated soil or groundwater. If no contaminated soil or groundwater is identified or if the Phase I ESA does not recommend any further investigation then the project applicant or agency(ies) responsible shall proceed with final project design and	S	LSM

LS – Less than Significant LSM – Less than Significant with Mitigation NI – No Impact S – Significant

TABLE 1-1 (REVISED)
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance	
		Before Mitigation	After Mitigation
	construction. OR If existing soil or groundwater contamination is identified, and if the Phase I ESA recommends further review, the applicant or agency(ies) responsible shall retain a REA to conduct follow-up sampling to characterize the contamination and to identify any required remediation that shall be conducted consistent with applicable regulations prior to any earth disturbing activities. The environmental professional shall prepare a report that includes, but is not limited to, activities performed for the assessment, summary of anticipated contaminants and contaminant concentrations at the proposed construction site, and recommendations for appropriate handling of any contaminated materials during construction.		
Impact 11.2: Transportation, use, disposal or accidental spill of hazardous materials during construction of AD facilities would not result in the potential exposure of construction workers, the public and the environment to hazardous materials.	None required.	LS	LS
Impact 11.3: Transportation, use, disposal or accidental spill of hazardous materials during the operation and maintenance of AD facilities would not result in potential harmful exposures of the public or the environment to hazardous materials.	**Mitigation Measure 11.3:** Implement Mitigation Measures 5.1a and 6.2a-f.	S	LSM
Impact 11.4: Operation of AD facilities could increase the risk of fire hazards due to the potential release of biogas.	**Mitigation Measure 11.4a:** Prior to project approval, AD facility operators shall prepare and implement a Fire Safety Plan that outlines fire hazards, describes facility operations procedures to prevent ignition of fires, requires regular inspection of fire suppression systems, and provides for worker training in safety procedures as well as protocols for responding to fire incidents. The Fire Safety Plan shall be reviewed and approved by the local fire enforcement agency. **Mitigation Measure 11.4b**: Implement Mitigation Measure 11.5.	S	LSM
Impact 11.5: AD facilities could be located within one quarter mile of a school resulting in potential hazards associated with accidental release of hazardous materials, including biogas.	**Mitigation Measure 11.5:** AD facilities shall be sited at least one quarter mile from existing or proposed schools, daycare facilities, hospitals and other sensitive land uses.	LS	LS
Impact 11.6: AD facility operations could generate vectors (flies, mosquitoes, rodents, etc.) exceeding regulatory agency thresholds for the presence of vectors.	None required.	LS	LS
Impact 11.7: AD facilities could be located within five miles of a public airport or private airstrip and create an aviation hazard.	**Mitigation Measure 11.7:** For any AD facility proposed within 5 statute miles of an airport's air operations area, the operator will notify the Federal Aviation Administration (FAA) Regional Airports Division office and the airport operator of the proposed facility as early in the process as possible. AD facilities with any open air (outdoor) activities must receive an FAA Determination of No Hazard prior to project approval.	S	LSM
Impact 11.8: Development of AD facilities could contribute to cumulative impacts related to hazardous materials.	**Mitigation Measure 11.8:** Implement Mitigation Measures 11.1, 11.4, 11.5, and 11.7.	LS	LS

LS – Less than Significant
LSM – Less than Significant with Mitigation
NI – No Impact
S – Significant

Appendix C

Best Management Practices (BMPS)assumed in the Program EIR

APPENDIX C

Best Management Practices (BMPs) in the Program EIR

In addition to the mitigation measures in the Program EIR, there were also some BMPs assumed as part of the setting for Environmental Resource Chapters in the Program EIR. Local project need to incorporate these measures (or equivalent measures) for the tiered document to be consistent with the Program EIR.

Water Quality

- Construct physical barriers to prevent erosion and sedimentation, including setbacks and buffers, rooftop and impervious surface disconnection, rain gardens and cisterns, and other installations (page 6-13)
- Construct and maintain sedimentation basins (page 6-13 of the Program EIR)
- Limit construction work during storm events (page 6-13 of the Program EIR)
- Use swales and mechanical or chemical means of stormwater treatment during construction, including vegetated swales, bioretention cells, chemical treatments, and mechanical stormwater filters (page 6-13 of the Program EIR)
- Implement spill control, sediment control, and pollution control training. (page 6-13 of the Program EIR)

Hazardous Materials

- To avoid hazardous materials transport from the facility: (page 11-14 of the Program EIR)
  - Install sediment barriers such as silt fence and fiber rolls along perimeter of construction area
  - Maintain equipment and vehicles used for construction
  - Develop and implement a spill prevention and cleanup plan
  - Provide hazardous waste training for construction workers
- Sort mixed solid wastes prior to delivery to remove any household hazardous wastes (page 11-14 of the Program EIR)
- Segregate and sample hazardous wastes and appropriately dispose at licensed landfill facilities. (page 11-14 of the Program EIR)
- Store hazardous materials in containers according to the manufacturer’s guidelines and label appropriately (page 11-14 of the Program EIR)

- Retain the Material Safety Data Sheet for each chemical (page 11-14 of the Program EIR)
- Inform workers of the hazards associated with the materials they handle and maintain records documenting training. (page 11-14 of the Program EIR)
- To control vector populations, implement best management practices such as enclosing waste storage areas within a building; routine cleaning; insect traps, rodent control services, and chemical treatment; and minimize stagnant waters. (page 11-18 of the Program EIR)

Appendix D

Mitigation Monitoring and Reporting Plan (MMRP) for the Program EIR

MITIGATION MONITORING AND REPORTING PLAN

Impact	Mitigation Measure	Responsibility for Compliance	Method for Compliance	Timing of Compliance
5. Air Quality and Greenhouse Gas				
Impact 5.1: Construction and operations of AD facilities within California would result in emissions of criteria air pollutants at levels that could substantially contribute to a potential violation of applicable air quality standards or to nonattainment conditions.	**Measure 5.1a:** Applicants shall prepare and submit an Air Quality Technical Report as part of the environmental assessments for the development of future AD facilities on a specific project-by-project basis. The technical report shall include an analysis of potential air quality impacts for all steps of the project (including a screening level analysis to determine if construction and operation [for all on-site processes, including any end-use and disposal methods] related criteria air pollutant emissions would exceed applicable air district thresholds, as well as greenhouse gas (GHG) emissions and any health risk associated with toxic air contaminants (TACs) from all AD facility sources) and reduction measures. Preparation of the technical report should be coordinated with the appropriate air district and shall identify compliance with all applicable New Source Review and Best Available Control Technology (BACT) requirements. The technical report shall identify all project emissions from permitted (stationary) and non-permitted (mobile and area) sources and mitigation measures (as appropriate) designed to reduce significant emissions to below the applicable air district thresholds of significance, and if these thresholds cannot be met with mitigation, then the individual AD facility project could require additional CEQA review or additional mitigation measures.	Project Applicant Local Lead Agency	Submit Air Quality Technical Report. Review and acceptance of Air Quality Technical Report.	Local CEQA Review Local CEQA Review
	Measure 5.1b: Applicants shall require construction contractors and system operators to implement the following Best Management Practices (BMPs) as applicable during construction and operations: • Facilities shall be required to comply with the rules and regulations from the applicable Air Quality Management District (AQMD) or Air Pollution Control District (APCD). • Facilities shall require substrate unloading and pre-processing activities to occur indoors within enclosed, negative pressure buildings. Collected foul air (including volatile organic compounds (VOCs) off-gassed from undigested substrates) should be treated via biofilter or air scrubbing system. • Use equipment meeting, at a minimum, Tier II emission standards. • Minimize idling time either by shutting equipment off when not in use or reducing the time of idling to 5 minutes (as required by the state airborne toxics control measure [Title 13, §2485 of the California Code of Regulations]). Provide clear signage that posts this requirement for workers at the entrances to the site. • Maintain all equipment in proper working condition according to manufacturer's specifications. • Use electric equipment when possible.	Project Applicant/ Operator Construction Contractor Local Air District	Implement BMPs during construction and operations. Enforce construction and operation air quality rules and regulations and compliance.	Construction and Operations Construction and Operations

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LEA – Local Enforcement Agency

Impact	Mitigation Measure	Responsibility for Compliance	Method for Compliance	Timing of Compliance
	For projects that are unable to use internal combustion engines due to air district regulations (i.e., NOx emission limits), other options for generating renewable energy from biogas should be considered. Other options that should be evaluated for using biogas or biomethane as an energy source include: use as a transportation fuel (compressed biomethane), use in fuel cells to generate clean electricity, use for on-site heating, or injection of biomethane into the utility gas pipeline system. If there are other lower NOx alternative technologies available at the time of AD facility development, these should be considered as well during the facility design process.			
Impact 5.2: Operation of AD facilities in California could create objectionable odors affecting a substantial number of people.	**Measure 5.2a:** Applicants for the development of AD facilities shall comply with appropriate local land use plans, policies, and regulations, including applicable setbacks and buffer areas from sensitive land uses for potentially odoriferous processes.	Project Applicant	Comply with local land use plans, policies and regulations related to odor and sensitive receptors.	Local CEQA Review
	Measure 5.2b: If an AD facility handles compostable material and is classified as a compostable material handling facility, the facility must develop an Odor Impact Minimization Plan (OIMP) pursuant to 14 CCR 17863.4. Otherwise, applicants shall develop and implement an Odor Management Plan (OMP) that incorporates equivalent odor reduction controls for digester operations and is consistent with local air district odor management requirements. These plans shall identify and describe potential odor sources, as well as identify the potential, intensity, and frequency of odor from these likely sources. In addition, the plans will specify odor control technologies and management practices that if implemented, would mitigate odors associated with the majority of facilities to less than significant. However, less or more control measures may be required for individual projects. Odor control strategies and management practices that can be incorporated into these plans include, but are not limited to, the following: - Require substrate haulage to the AD facility within covered, liquid leak-proof containers. - Establish time limit for on-site retention of undigested substrates (i.e., feedstocks should be processed and placed into the portion of the system where liquid discharge and air emissions can be controlled within 24 or 48 hours of receipt). - Provide enclosed, negative pressure buildings for indoor receiving and pre-processing. Treat collected foul air in a biofilter or air scrubbing system. - Establish contingency plans for operating downtime (e.g., equipment malfunction, power outage).	Project Applicant/ Operator LEA (composting permit) and/or Local Air District (other facilities)	Develop and implement an OIMP or Odor Management Plan. Enforce OIMP or Odor Management Plan.	Operations Operations

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LEA – Local Enforcement Agency

Impact	Mitigation Measure	Responsibility for Compliance	Method for Compliance	Timing of Compliance
	- Manage delivery schedule to facilitate prompt handling of odorous substrates. - Handle fresh unstable digestate within enclosed building, or mix with green waste and incorporate into a composting operation within the same business day, and/or directly pump to covered, liquid leak-proof containers for transportation. - Protocol for monitoring and recording odor events. - Protocol for reporting and responding to odor events.			
Impact 5.3: Construction and operation of AD facilities in California could lead to increases in chronic exposure of sensitive receptors in the vicinity to certain toxic air contaminants from stationary and mobile sources.	**Measure 5.3a:** Implement Mitigation Measures 5.1a and 5.1b.	See Mitigation Measures 5.1a and 5.1b		
	Measure 5.3b: Based on the Air Quality Technical Report (specified in Measure 5.1a), if the health risk is determined to be significant on a project-by-project basis with diesel particulate matter (DPM) as a major contributor, then the applicants shall implement control measures such that the AD facility health risk would be below the applicable air district threshold, which may include implementation of one or more of the following requirements, where feasible and appropriate: • Use either new diesel engines that are designed to minimize DPM emissions (usually through the use of catalyzed particulate filters in the exhaust) or retrofit older engines with catalyzed particulate filters (which will reduce DPM emissions by 85%); • Use electric equipment to be powered from the grid, which would eliminate local combustion emissions; Use alternative fuels, such as compressed natural gas (CNG) or liquefied natural gas (LNG).	Project Applicant/ Operator	Implement measures to reduce DPM.	Local CEQA Review/during Operations
	Measure 5.3c: Hydrogen sulfide (H2S) contained in the biogas shall be scrubbed (i.e., via iron sponge or other technology) before emission to air can occur.	Operator	Scrub H_2S as required.	Operations
Impact 5.4: Development of AD facilities in California could increase GHG emissions.	**Measure 5.4:** Implement Mitigation Measure 5.1a.	See Mitigation Measure 5.1a		
Impact 5.5: Development of AD facilities in California, together with anticipated cumulative development in the area, would contribute to regional criteria pollutants.	**Measure 5.5:** Implement Mitigation Measures 5.1a and 5.1b.	See Mitigation Measures 5.1a and 5.1b		

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MITIGATION MONITORING AND REPORTING PLAN

Impact	Mitigation Measure	Responsibility for Compliance	Method for Compliance	Timing of Compliance
6. Hydrology and Water Quality				
Impact 6.2: The operation of AD facilities could adversely affect surface and groundwater quality.	**Measure 6.2a:** During pre-processing, all water that contacts digester feedstock, including stormwater from feedstock handling and storage facilities and water from equipment washdown and feedstock wetting, shall be contained until appropriately disposed or utilized. Best Management Practices (BMPs) may be used to reduce loading of sediment, nutrients, trash, organic matter, and other pollutants. These BMPs may include, but are not limited to, trash grates and filters, oil-water separators, mechanical filters such as sand filters, vegetated swales, engineered wastewater treatment wetlands, settling ponds, and other facilities to reduce the potential loading of pollutants into surface waters or groundwater. All discharges of stormwater are prohibited unless covered under the General Industrial Stormwater Permit, other National Pollutant Discharge Elimination System (NPDES) permit, or are exempted from NPDES permitting requirements. The NPDES permits will generally require implementation of management measures to achieve a performance standard of best available technology economically achievable (BAT) and best conventional pollutant control technology (BCT), as appropriate. The General Industrial Stormwater Permit also requires the development of a storm water pollution prevention plan (SWPPP) and a monitoring plan, in compliance with permit requirements.[1] Other liquid and solid wastes may only be discharged pursuant to an NPDES permit or waste discharge requirement (WDR) order.	Operator Regional Water Quality Control Board	Contain water during pre-processing activities. Enforce water quality regulations.	Operations Operations
	Measure 6.2b: In order to minimize the amount of fugitive trash or feedstock released to surface waters, the following measures shall be implemented. When feasible, the project proponent shall preferentially select feedstocks that contain minimal amounts of trash that could become entrained in surface water, either via direct contact with stormwater flows or via other accidental release, such as due to wind. Processing of such feedstocks may, however, be unavoidable, such as in support of an AD facility that processes MSW. Therefore, the project applicant shall ensure that (1) drainage from all feedstock loading, unloading, and storage areas is contained onsite or treated to remove trash and stray feedstock, and sediment prior to release as permitted; (2) in all feedstock loading and unloading areas, and all areas where feedstock is moved by front loaders or other uncovered or uncontained transport machinery, the applicant shall ensure that mechanical sweeping and/or equivalent trash control operational procedures are performed at least daily, during operations; and (3) the facility operator shall train all employees involved in feedstock handling so as to discourage, avoid, and minimize the release of feedstock or trash during operations.	Project Applicant/ Operator Regional Water Quality Control Board	Implement measures to minimize fugitive trash/feedstock release to surface waters. Enforce water quality regulations.	Operations Operations

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[1] For more information, please refer to: http://www.swrcb.ca.gov/water_issues/programs/stormwater/industrial.shtml

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MITIGATION MONITORING AND REPORTING PLAN

Impact	Mitigation Measure	Responsibility for Compliance	Method for Compliance	Timing of Compliance
	Measure 6.2c: In order to minimize water quality degradation associated with accidental spills at AD facilities, the applicant for individual projects that would be implemented under the Program EIR shall require project proponents to complete and adhere to the requirements of a Spill Prevention, Control, and Countermeasure (SPCC) Plan, which is based on the federal SPCC rule. Notification of the SPCC Plan shall be provided to the local Certified Unified Program Agency (CUPA). The SPCC Plan shall contain measures to prevent, contain, and otherwise minimize potential spills of pollutants during facility operation, in accordance with U.S. EPA requirements. For individual projects that would utilize wet digestion systems, in which processing and holding tanks would contain the (aqueous) digestion reaction and liquid digestate containing fats and oils, the SPCC Plan shall provide for installation and monitoring of secondary containment and/or leak detection systems to ensure that AD liquids are not accidentally discharged to navigable waters or adjoining shorelines. Monitoring of these systems shall be in accordance with SPCC Plan requirements.	Project Applicant/ Operator Local Lead Agency CUPA	Complete and adhere to SPCC Plan. Review and accept SPCC Plan. Review implementation of SPCC Plan.	Operations Local CEQA Review Prior to/during Operations
	Measure 6.2d: Any proposed discharge to a pond for an individual project would require the project applicant to acquire WDRs from the appropriate regional board. The project applicant shall ensure that all ponds and discharges to such ponds adhere to all requirements under applicable WDRs. The need for pond liners in order to protect groundwater quality would be assessed during the regional board's review of the project, and requirements for pond liners would be included in the WDRs, as warranted. If appropriate, the WDRs would impose requirements for Class II surface impoundments as presented in Title 27 of the California Code of Regulations. Requirements include, but are not limited to, groundwater monitoring, double liner systems with leachate collection, water balance, a preliminary closure plan for clean closure, seismic analysis, and financial assurances. Compliance with WDRs may require the installation of facilities such as tanks and containers to store and process the digestate, the use of filter presses, and implementation of other water quality protection practices.	Project Applicant/ Operator Regional Water Quality Control Board	Adhere to applicable WDRs for ponds or discharges to ponds. Enforce WDRs for ponds or discharges to ponds.	Prior to/during Operations Prior to/during Operations
	Measure 6.2e: This measure would reduce potential for the movement of nutrients and other pollutants to groundwater and surface water for individual projects that would employ land application for liquid digestate or residual solids. The operators of individual projects implemented under this Program EIR shall ensure that land application of liquid digestate and/or residual solids adheres to all requirements of applicable WDRs. WDR requirements include but are not limited to, groundwater monitoring, completion of an anti-degradation analysis, and in some cases best practicable treatment and control to achieve salinity reduction in materials prior to discharge to land. WDRs would be issued by the appropriate regional board, and would consider site-specific conditions and waste characteristics, in order to determine applicable control measures and procedures that	Project Applicant/ Operator Regional Water Quality Control Board	Adhere to requirements of WDRs for land application of liquid digestate and/or residual solids. Issue and enforce WDRs for land application of liquid digestate and/or residual solids.	Operations Prior to/during Operations

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LEA – Local Enforcement Agency

MITIGATION MONITORING AND REPORTING PLAN

Impact	Mitigation Measure	Responsibility for Compliance	Method for Compliance	Timing of Compliance
	protect water quality.			
	Measure 6.2f: This measure would reduce the potential for water quality degradation from projects that include discharge of liquid digestate to surface waters. The applicant for individual projects implemented under this Program EIR shall ensure that the discharge of liquid digestate to surface waters adheres to all NPDES permitting recommendations and requirements, as established by the appropriate regional board. Specific measures may include, but are not limited to, limitations on discharge volumes, seasonal discharge restrictions, limitations on loading rates and/or concentrations of specific constituents, and other facility-specific water quality control measures designed to protect receiving water quality and preserve beneficial uses identified in Basin Plans.	Project Applicant/ Operator Regional Water Quality Control Board	Adhere to NPDES permitting recommendations and requirements for discharge of liquid digestate to surface waters. Approve and enforce NPDES permits	Operations Prior to/during Operations
Impact 6.3: AD facilities could be exposed to flooding hazards.	**Measure 6.3:** Individual applicants seeking coverage under this Program EIR shall ensure that, for their proposed AD facilities including pre-processing areas, feedstock storage areas, and digestate handling facilities, are protected from FEMA-defined 100-year flood events. Design measures may include, but are not limited to: facility siting, access placement, grading, elevated foundations, and site protection such as installation of levees or other protective features.	Project applicant	Ensure facilities are protected from FEMA-defined 100-year flood events.	Local CEQA Review
Impact 6.4: Construction of AD facilities could change drainage and flooding patterns	**Measure 6.4:** In order to ensure that the AD facilities would not result in detrimental increases in stormwater flow or flooding on site or downstream, the Applicant for each AD facility project shall prepare a comprehensive drainage plan (prior to construction) and implement the plan during construction. The comprehensive drainage plan shall include engineered stormwater retention facility designs, such as retention basins, flood control channels, storm drainage facilities, and other features as needed to ensure that, at a minimum, no net increase in stormwater discharge would occur during a 10-year, 24-hour storm event, as a result of project implementation. Project related increases in stormwater flows shall be assessed based on proposed changes in impervious surface coverage on site, as well as proposed grading and related changes in site topography.	Project Applicant Local Lead Agency	Prepare and implement a comprehensive drainage plan. Review and acceptance of comprehensive drainage plan.	Local CEQA Review/during Construction Local CEQA Review
Impact 6.6: AD facilities could become inundated as a result of seiche, tsunami, or mudflow.	**Measure 6.6:** To ensure that proposed AD facilities would not incur impacts associated with seiche, tsunami, or mudflow, the applicant for each individual project shall ensure that all facilities are located outside of potential risk areas for seiche, tsunami, and mudflow. In the event that a proposed facility would be sited within a potential risk area for one of these hazards, the facility shall be raised above projected maximum base inundation elevations, or shall be protected from inundation by the installation of berms, levees, or other protective facilities.	Project Applicant Local Lead Agency	Ensure facilities are located outside of potential risk areas for seiche, tsunami and mudflow. Approve siting of facilities with respect to risk areas for seiche, tsunami and mudflow.	Local CEQA Review Local CEQA Review
Impact 6.7: AD facilities could contribute to	**Measure 6.7:** Implement Mitigation Measures 6.2 (a-f) and 6.3.	See Mitigation Measures 6.2 (a-f) and 6.3		

LEA – Local Enforcement Agency

Impact	Mitigation Measure	Responsibility for Compliance	Method for Compliance	Timing of Compliance
cumulative impacts to water quality.				
7. Noise				
Impact 7.1: Construction of AD facilities could temporarily increase noise levels at nearby sensitive receptor locations or result in noise levels in excess of standards in local general plans, noise ordinances, or other applicable standards.	**Measure 7.1a:** Construction activities shall be limited to the hours between 7 a.m. and 7 p.m., Monday through Saturday, or an alternative schedule established by the local jurisdiction, or other limits to construction hours normally enforced by the local jurisdiction (see Measure 7.1d below).	Construction Contractor	Limit construction hours as indicated by local jurisdiction.	Construction
		Local Lead Agency	Enforce construction hour limits.	Construction
	Measure 7.1b: Construction equipment noise shall be minimized by muffling and shielding intakes and exhaust on construction equipment to a level no less effective than the manufacture's specifications, and by shrouding or shielding impact tools.	Construction Contractor / Local Lead Agency	Minimize construction equipment noise.	Construction
	Measure 7.1c: Construction contractors within 750 feet of sensitive receptors shall locate fixed construction equipment, such as compressors and generators, and construction staging areas as far as possible from nearby sensitive receptors.	Construction Contractor / Local Lead Agency	Locate applicable construction equipment away from sensitive receptors.	Construction
	Measure 7.1d: Construction contractors shall comply with all local noise ordinances and regulations and other measures deemed necessary by the Lead Agency.	Construction Contractor	Comply with local noise ordinances and regulations.	Construction
		Local Lead Agency	Enforce local noise ordinances and regulations.	Construction
Impact 7.2: Noise from operation of AD facilities could substantially increase ambient noise levels at nearby land uses or result in noise levels in excess of standards in local general plans, local noise ordinances, or other applicable standards.	**Measure 7.2:** AD facilities located within 2,000 feet of a sensitive receptor shall conduct a site specific noise study. If operational sound levels would exceed local regulations, or 45 dBA at a sensitive receptor (if no regulations are available), additional sound-proofing such as enclosures, muffling, shielding, or other attenuation measures shall be installed to meet the required sound level.	Project Applicant/ Operator	Conduct site specific noise study and implement recommendations.	Prior to /during Operation
Impact 7.4: Development of AD facilities could result in a cumulative increase in noise levels.	**Measure 7.4:** Implement Mitigation Measures 7.1a through 7.1d and Measure 7.2.	See Mitigation Measures 7.1a through 7.1d and Measure 7.2.		
8. Public Services and Utilities				
Impact 8.1: The project could substantially increase demands on fire protection services	**Mitigation Measure 8.1:** Implement Mitigation Measures 10.1b, 10.3c, and 11.4a.	See Mitigation Measures 10.1b, 10.3c, and 11.4a.		
Impact 8.2: The project could potentially exceed wastewater treatment requirements of the Regional Water Quality Control Board (RWQCB).	**Measure 8.2a:** Implement Mitigation Measure 8.3b if the operator does not have an existing agreement, such as for co-located facilities.	See Mitigation Measure 8.3b		
	Measure 8.2b: In addition to an agreement for service, coordination with the wastewater treatment provider would be needed to determine if pre-treatment would be required to meet the RWQCB requirements for the	Project Applicant/ Operator	Coordinate with wastewater treatment provider.	Prior to Operation

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LEA – Local Enforcement Agency

Impact	Mitigation Measure	Responsibility for Compliance	Method for Compliance	Timing of Compliance
	existing wastewater treatment facility.			
Impact 8.3: The project could result in significant environmental effects from the construction and operation of new water and wastewater treatment facilities or expansion of existing facilities.	**Measure 8.3a:** If the project proposes to obtain water from a water supplier (municipal system or other public water entity), the developer would enter into an agreement for service with the supplier.	Project Applicant/ Operator	Enter into service agreement with water supplier.	Prior to Operation
	Measure 8.3b: If the project proposes to obtain wastewater service from a wastewater treatment provider (municipal or other public entity), the developer would enter into an agreement for service with the provider.	Project Applicant/ Operator	Enter into service agreement with wastewater supplier.	Prior to Operation
	Measure 8.3c: Alternate water sources, such as non-potable and recycled water, shall be used during the pre-processing and AD process phases where needed and as available.	Project Applicant/ Operator	Development and use of non-potable and recycled water sources during AD pre-processing and process phases.	Prior to/during Operation
Impact 8.6: The project could result in exceeding the capacity of a wastewater treatment provider.	**Measure 8.6:** If the project proposes to obtain wastewater service from a wastewater treatment provider (municipal or other public entity), implement Mitigation Measure 8.3b.	See Mitigation Measure 8.3b		
Impact 8.7: The project could result in the construction of new energy supplies and could require additional energy infrastructure.	**Measure 8.7:** Projects requiring off-site energy infrastructure must complete CEQA review for the proposed energy improvements as a separate project. Infrastructure improvements may qualify as a categorical exemption pursuant to CEQA.	Project Applicant/Lead Agency	Complete CEQA for off-site energy improvements if applicable.	Local CEQA Review
9. Transportation				
Impact 9.1: Construction of AD facilities would intermittently and temporarily increase traffic congestion due to vehicle trips generated by construction workers and construction vehicles on area roadways.	**Measure 9.1:** The contractor(s) will obtain any necessary road encroachment permits prior to installation of pipelines within the existing roadway right-of-way. As part of the road encroachment permit process, the contractor(s) will submit a traffic safety / traffic management plan (for work in the public right-of-way) to the agencies having jurisdiction over the affected roads. Elements of the plan will likely include, but are not necessarily limited to, the following: • Develop circulation and detour plans to minimize impacts to local street circulation. Use haul routes minimizing truck traffic on local roadways to the extent possible. Use flaggers and/or signage to guide vehicles through and/or around the construction zone. • To the extent feasible, and as needed to avoid adverse impacts on traffic flow, schedule truck trips outside of peak morning and evening commute hours. • Limit lane closures during peak traffic hours to the extent possible. Restore roads and streets to normal operation by covering trenches with steel plates outside of allowed working hours or when work is not in progress. • Limit, where possible, the pipeline construction work zone to a width that, at a minimum, maintains alternate one-way traffic	Construction Contractor Local Lead Agency(s)	Submit application for roadway encroachment permits. Prepare and submit traffic safety/traffic management plan. Review and approval of roadway encroachment permits and traffic safety/traffic management plan.	Prior to construction Prior to construction

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LEA – Local Enforcement Agency

Impact	Mitigation Measure	Responsibility for Compliance	Method for Compliance	Timing of Compliance
	flow past the construction zone. • Install traffic control devices as specified in Caltrans' Manual of Traffic Controls for Construction and Maintenance Work Zones where needed to maintain safe driving conditions. Use flaggers and/or signage to safely direct traffic through construction work zones. • Coordinate with facility owners or administrators of sensitive land uses such as police and fire stations, hospitals, and schools. Provide advance notification to the facility owner or operator of the timing, location, and duration of construction activities. • Coordinate with the local public transit providers so that bus routes or bus stops in work zones can be temporarily relocated as the service provider deems necessary.			
Impact 9.2: AD facility operations would not substantially increase on-going (operational) traffic volumes on roadways serving the facilities.	**Measure 9.2:** Measures will be imposed by applicable local agencies, as needed, to address site-specific significant traffic impacts identified during subsequent facility-specific analyses, implementation of which would reduce those impacts to a less-than-significant level.	Project Applicant	Implement traffic mitigation measures.	Ongoing
		Local Lead Agency	Enforce traffic mitigation measures.	Ongoing
Impact 9.3: AD facilities could potentially cause traffic safety hazards for vehicles, bicyclists, and pedestrians on public roadways, and could increase traffic hazards due to possible road wear or to accidental spills of digestate (liquids and solids).	**Measure 9.3a:** Implement Measure 9.1, which stipulates actions required of the contractor(s) to reduce potential traffic safety impacts to a less-than-significant level.	See Mitigation Measure 9.1		
	Measure 9.3b: Prior to construction, the contractor(s), in cooperation with the agencies having jurisdiction over the affected roadways, will survey and describe the pre-construction roadway conditions on rural roadways and residential streets. Within 30 days after construction is completed, the affected agencies will survey these same roadways and residential streets in order to identify any damage that has occurred. Roads damaged by construction will be repaired to a structural condition equal to the condition that existed prior to construction activity.	Construction Contractor	Survey and document pre-construction roadway condition.	Prior to Construction
		Construction Contractor	Identify any damage to roadway from construction.	Following Construction
		Local Lead Agency	Review and approve pre-construction and post-construction roadway damage analysis.	Prior to and during Construction
	Measure 9.3c: Prior to initiation of project operations, the project sponsor(s) will submit a Spill Prevention Plan to the appropriate local agency. The Spill Prevention Plan will include, among other provisions, a requirement that each truck driver know how to carry out the emergency measures described in the Spill Prevention Plan (therefore reducing roadway hazards if an accidental spill were to occur).	Project Applicant/ Operator	Prepare and submit a Spill Prevention Plan.	Prior to Operations
		Local Lead Agency	Review and approve Spill Prevention Plan.	Prior to Operations
Impact 9.4: AD facilities could intermittently and temporarily impede access to local streets or adjacent uses (including access for emergency vehicles),	**Measure 9.4:** Implement Measure 9.1, which stipulates actions required of the contractor(s) to reduce potential access impacts to a less-than-significant level.	See Mitigation Measure 9.1		

LEA – Local Enforcement Agency

Impact	Mitigation Measure	Responsibility for Compliance	Method for Compliance	Timing of Compliance
as well as disruption to bicycle/pedestrian access and circulation.				
Impact 9.5: The project could contribute to cumulative impacts to traffic and transportation (traffic congestion, traffic safety, and emergency vehicle access).	**Measure 9.5a:** Prior to construction, the project sponsor will coordinate with the appropriate local government departments, Caltrans, and utility districts and agencies regarding the timing of construction projects that would occur near AD project sites. Specific measures to mitigate potential significant impacts will be determined as part of the interagency coordination, and could include measures such as employing flaggers during key construction periods, designating alternate haul routes, and providing more outreach and community noticing.	Project Applicant/ Construction Contractor	Coordinate with local agencies, State agencies and utility districts regarding construction.	Prior to construction
	Measure 9.5b: Implement Mitigation Measure 9.2.	See Mitigation Measure 9.2		
	Measure 9.5c: Implement Mitigation Measures 9.1, 9.3b and 9.3c.	See Mitigation Measure 9.1, 9.3b and 9.3c		
10. Aesthetics				
Impact 10.1: AD facilities could have adverse effects on a scenic vista and/or scenic resources.	**Measure 10.1a:** Avoid siting AD facilities near scenic vistas and corridors designated within an applicable land use plan and the State Scenic Highway Program.	Project Applicant	Avoid siting project near scenic vistas or corridors.	Local CEQA Review
	Measure 10.1b: Landscaping and/or vegetated berms should be used to minimize views of facilities from sensitive views.	Project Applicant/ Operator	Plan, develop and maintain landscaping/vegetated berms for sensitive views.	Ongoing
Impact 10.2: AD facilities could degrade the existing visual character/quality of the site and its surroundings.	**Measure 10.2a:** Implement Mitigation Measures 10.1a and 10.1b.	See Mitigation Measures 10.1a and 10.1b		
	Measure 10.2b: Facilities using truck tippers or other un-enclosed unloading should consider using litter fences to manage blowing litter. Facilities should educate haulers delivering materials to the AD facility through literature, web links, or provide training on the acceptance of waste at the facilities to minimize litter. Facility operators should develop a protocol to identify feedstocks that are severely contaminated with potential litter and reject unacceptable loads.	Operator LEA	Implement measures to reduce litter. Enforce litter reduction measures.	Operations Operations
	Measure 10.2c: Clean-up crews can be used as necessary to control litter.	Operator LEA	Implement measures to reduce litter. Enforce litter reduction measures.	Operations Operations
	Measure 10.2d: Feedstocks and digestate byproducts should be stored in enclosed facilities or processed in a timely manner to prevent visibly deteriorated site conditions.	Operator LEA	Store of feedstocks and digestate byproducts in enclosed facilities or process in a timely manner. Enforce storage measures.	Operations Operations
	Measure 10.2e: Project operators should consider enclosure of pre-processing operations if it provides an aesthetic and/or noise attenuating benefit.	Operator	Consider additional pre-processing measures.	Ongoing

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LEA – Local Enforcement Agency

Impact	Mitigation Measure	Responsibility for Compliance	Method for Compliance	Timing of Compliance
Impact 10.3: AD facilities could create a new source of light or glare with adverse affects to daytime and/or nighttime views.	**Measure 10.3a:** Implement 10.1b.	See Mitigation Measure 10.1b		
	Measure 10.3b: Any lighting (portable or permanent) should be hooded and directed onto the project site. This would reduce effects to nighttime skies from uplighting, reduce glare, and prevent light from spilling onto adjoining properties and roads.	Operator	Use hooded and directed lighting on site.	Operations
	Measure 10.3c: Flares may be enclosed to reduce the visibility of flames during operation.	Operator	Consider use of enclosed flares.	Operations
Impact 10.4: The project could result in cumulative impacts to visual resources.	**Measure 10.4:** Implement Mitigation Measures 10.1a, 10.1b, 10.2a, 10.2b, 10.2c, 10.2d, 10.2e, 10.3a, 10.3b, and 10.3c.	See Mitigation Measures 10.1a, 10.1b, 10.2a, 10.2b, 10.2c, 10.2d, 10.2e, 10.3a, 10.3b, and 10.3c.		
11. Hazards and Hazardous Materials				
Impact 11.1: Construction of AD facilities could result in the potential exposure of construction workers, the public and the environment to preexisting soil and/or groundwater contamination.	**Mitigation Measure 11.1:** Prior to final project design and any earth disturbing activities, the applicant or agency(ies) responsible shall conduct a Phase I Environmental Site Assessment (ESA). The Phase I ESA shall be prepared by a Registered Environmental Assessor (REA) or other qualified professional to assess the potential for contaminated soil or groundwater conditions at the project site; specifically in the area proposed for construction of AD facilities. The Phase I ESA shall include a review of appropriate federal, State and local hazardous materials databases to identify hazardous waste sites at on-site and off-site locations within a one quarter mile radius of the project location. This Phase I ESA shall also include a review of existing and past land uses through aerial photographs, historical records, interviews of owners and/or operators of the property, observations during a reconnaissance site visit, and review of other relevant existing information that could identify the potential existence of contaminated soil or groundwater. If no contaminated soil or groundwater is identified or if the Phase I ESA does not recommend any further investigation then the project applicant or agency(ies) responsible shall proceed with final project design and construction. OR If existing soil or groundwater contamination is identified, and if the Phase I ESA recommends further review, the applicant or agency(ies) responsible shall retain a REA to conduct follow-up sampling to characterize the contamination and to identify any required remediation that shall be conducted consistent with applicable regulations prior to any earth disturbing activities. The environmental professional shall prepare a report that includes, but is not limited to, activities performed for the assessment, summary of anticipated contaminants and contaminant concentrations at the proposed construction site, and recommendations	Project Applicant	Conduct Phase I ESA.	Local CEQA review
		Project Applicant	If applicable, conduct sampling and prepare report with summary and recommendations for contaminants. Integrate recommendations into project mitigation.	Local CEQA review
		Local Lead Agency	Review Phase I and follow-up report (if applicable).	Local CEQA review

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LEA – Local Enforcement Agency

Impact	Mitigation Measure	Responsibility for Compliance	Method for Compliance	Timing of Compliance
	for appropriate handling of any contaminated materials during construction.			
Impact 11.3: Transportation, use, disposal or accidental spill of hazardous materials during the operation and maintenance of AD facilities would not result in potential harmful exposures of the public or the environment to hazardous materials.	**Mitigation Measure 11.3:** Implement Mitigation Measures 5.1a and 6.2a-f.			
Impact 11.4: Operation of AD facilities could increase the risk of fire hazards due to the potential release of biogas.	**Mitigation Measure 11.4a:** Prior to project approval, AD facility operators shall prepare and implement a Fire Safety Plan that outlines fire hazards, describes facility operations procedures to prevent ignition of fires, requires regular inspection of fire suppression systems, and provides for worker training in safety procedures as well as protocols for responding to fire incidents. The Fire Safety Plan shall be reviewed and approved by the local fire enforcement agency.	Project Applicant Local Fire Agency/LEA Operator	Prepare a Fire Safety Plan. Review and approve Fire Safety Plan. Implement Fire Safety Plan.	Local CEQA Review Local CEQA Review Operations
	Mitigation Measure 11.4b: Implement Mitigation Measure 11.5.	See Mitigation Measure 11.5		
Impact 11.5: AD facilities could be located within one quarter mile of a school resulting in potential hazards associated with accidental release of hazardous materials, including biogas.	**Mitigation Measure 11.5:** AD facilities shall be sited at least one quarter mile from existing or proposed schools, daycare facilities, hospitals and other sensitive land uses.	Project applicant	Site facilities at least one quarter mile from existing or proposed schools, daycare facilities, hospitals and other sensitive land uses.	Local CEQA Review
Impact 11.7: AD facilities could be located within five miles of a public airport or private airstrip and create an aviation hazard.	**Mitigation Measure 11.7:** For any AD facility proposed within 5 statute miles of an airport's air operations area, the operator will notify the Federal Aviation Administration (FAA) Regional Airports Division office and the airport operator of the proposed facility as early in the process as possible. AD facilities with any open air (outdoor) activities must receive an FAA Determination of No Hazard prior to project approval.	Project applicant/ Operator FAA	Notify FAA if applicable. Review project and issue an FAA Determination of No Hazard.	Local CEQA Review Prior to Project Approval
Impact 11.8: Development of AD facilities could contribute to cumulative impacts related to hazardous materials.	**Mitigation Measure 11.8:** Implement Mitigation Measures 11.1, 11.4, 11.5, and 11.7.	See Mitigation Measures 11.1, 11.4, 11.5, and 11.7		

LEA – Local Enforcement Agency

Appendix E

CEQA Appendix G Matrix

APPENDIX E

CEQA Appendix G Matrix

Note to reader: Appendix E: "CEQA Appendix G Matrix" has been added to the Guidance Document in response to a comment from the County of San Diego during the Technical Advisory Group (TAG) review of the Guidance Document. Appendix E is a table that cross-references the mitigation measures and BMP's in the Program EIR to specific checklist items in Appendix G of the CEQA Guidelines. Local lead agencies may then easily review mitigation measures in the Program EIR for specific checklist items when completing the Initial Study for local projects. It should be noted that local land use agencies will still be required to analyze all site specific environmental impacts projects and determine whether mitigation measures in the Program EIR fully mitigate local environmental impacts (as local projects may have features that are unique from what was analyzed in the Program EIR). The local lead agency would have sole responsibility for analyzing Appendix G checklist items that do not have mitigation measures identified from the Program EIR.

APPENDIX E: CEQA APPENDIX G MATRIX

Subject	Mitigation Measure	Best Management Practice (BMP)
Air Quality		
a) Conflict with or obstruct implementation of the applicable air quality plan?	5.1a, 5.1b, 5.3b, 5.3c	
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	5.1a, 5.1b	
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	5.1a, 5.1b	
d) Expose sensitive receptors to substantial pollutant concentrations?	5.1a, 5.1b, 5.3b, 5.3c	
e) Create objectionable odors affecting a substantial number of people?	5.2 a, 5.2b	
Greenhouse Gas Emissions		
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	5.1a	
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	Need local review for consistency with local GHG plans, policies and regulations.	
Hydrology And Water Quality		
a) Violate any water quality standards or waste discharge requirements?	6.2a, 6.2b, 6.2c, 6.2d, 6.2e, 6.2f	
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	See Program EIR discussion of Impact 6.5	
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	6.4	
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	6.4	
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	6.4	Construct physical barriers to prevent erosion and sedimentation, including setbacks and buffers, rooftop and impervious surface disconnection, rain gardens and cisterns, and other installations (page 6-13) Construct and maintain sedimentation basins (page 6-13 of the Program EIR) Limit construction work during storm events (page 6-13 of the Program EIR) Use swales and mechanical or chemical means of stormwater treatment during construction, including vegetated swales, bioretention cells, chemical treatments, and mechanical stormwater filters (page 6-13 of the Program EIR) Implement spill control, sediment control, and pollution

Subject	Mitigation Measure	Best Management Practice (BMP)
		control training. (page 6-13 of the Program EIR)
f) Otherwise substantially degrade water quality?	6.2a-f	Same as above
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	NA	
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	6.3	
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	6.3	
j) Inundation by seiche, tsunami, or mudflow?	6.6	
Noise		
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	7.1a-d, 7.2	
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	7.1a-d, 7.2	
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	7.2	
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	7.1a-d	
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	Needs local review.	
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	Needs local review.	
Public Services		
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:		
Fire protection?	10.1b, 10.3c, 11.4a	
Police protection?	Needs local review.	
Schools?	N/A	
Parks?	N/A	
Other public facilities?		

APPENDIX E: CEQA APPENDIX G MATRIX

Subject	Mitigation Measure	Best Management Practice (BMP)
Utilities and Service Systems		
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	8.2b, 8.3b	
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	8.2b, 8.3b	
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	6.4	
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	8.3a, 8.3c	
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	8.2b, 8.3b	
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	N/A, will reduce solid wastes.	
g) Comply with federal, state, and local statutes and regulations related to solid waste?	Solid waste permit will be required.	
Transportation/Traffic		
a) Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?	9.1, 9.2	
b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?	9.1, 9.2, Needs local review.	
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	N/A, Needs local review.	
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	9.1, 9.3a, 9.3b. 9.3c	
e) Result in inadequate emergency access?	9.1, 9.4	
f) Result in inadequate parking capacity?	9.1, N/A, Needs local review.	
g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	9.1, N/A, Needs local review.	
Aesthetics		
a) Have a substantial adverse effect on a scenic vista?	10.1a, 10.1b	
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	10.1a, 10.1b	
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	10.1b, 10.2a, 10.2b, 10.2c, 10.2d, 10.2e	
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	10.1b, 10.3a, 10.3b, 10.3c	

APPENDIX E: CEQA APPENDIX G MATRIX

Subject	Mitigation Measure	Best Management Practice (BMP)
Hazards And Hazardous Materials		
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	11.1, 11.3, 5.1a, 6.2a, 6.2b, 6.2c, 6.2d, 6.2e, 6.2f	(page 11-14 of the Program EIR) Install sediment barriers such as silt fence and fiber rolls along perimeter of construction area Maintain equipment and vehicles used for construction Develop and implement a spill prevention and cleanup plan Provide hazardous waste training for construction workers Sort mixed solid wastes prior to delivery to remove any household hazardous wastes (page 11-14 of the Program EIR) Segregate and sample hazardous wastes and appropriately dispose at licensed landfill facilities. (page 11-14 of the Program EIR) Store hazardous materials in containers according to the manufacturer's guidelines and label appropriately (page 11-14 of the Program EIR) Retain the Material Safety Data Sheet for each chemical (page 11-14 of the Program EIR) Inform workers of the hazards associated with the materials they handle and maintain records documenting training. (page 11-14 of the Program EIR) To control vector populations, implement best management practices such as enclosing waste storage areas within a building; routine cleaning; insect traps, rodent control services, chemical treatment; and minimize stagnant waters. (page 11-18 of the Program EIR)
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	11.1, 11.3, 5.1a, 6.2a, 6.2b, 6.2c, 6.2d, 6.2e, 6.2f	Same as above
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	11.5	Save as above
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	11.1	
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	11.7	
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	11.7	
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	11.4a, 9.1, 9.5a	
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	11.4a	

APPENDIX E: CEQA APPENDIX G MATRIX

Subject	Mitigation Measure	Best Management Practice (BMP)
Agriculture and Forestry Resources		
a, b, c Needs local review. See PEIR discussion on page 12-1		
Biological Resources		
a, b, c, d, e,f Needs local review. See PEIR discussion on page 12-1		
Cultural Resources		
a, b, c, d, Needs local review. See PEIR discussion on page 12-2		
Geology And Soils		
a, b, c, d, e Needs local review. See PEIR discussion on page 12-1		
Land Use And Planning		
a, b, c Needs local review. See PEIR discussion on page 12-2		
Mineral Resources		
a, b Needs local review. See PEIR discussion on page 12-2		
Population And Housing		
a, b, c Needs local review. See PEIR discussion on page 12-3		
Recreation		
a, b Needs local review. See PEIR discussion on page 12-3		
Mandatory Findings Of Significance		
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	Needs local review.	
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	Needs local review. See discussion in the final impact in the PEIR Chapters 5-11.	
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	Needs local review.	

N/A = Generally Not Applicable to AD projects

CalRecycle Staff Report

Anaerobic Digestion Initiative and Statewide Anaerobic Digester Facilities For The Treatment of Municipal Organic Solid Waste

June 21, 2011

Anaerobic Digestion Initiative

Under its Strategic Directive 6.1, CalRecycle seeks to reduce by 50 percent the amount of organic waste disposed in the state's landfills by 2020. In addition to helping conserve limited landfill capacity, this CalRecycle policy recognizes that organic wastes are a resource, not just solid wastes that must be disposed. Organic wastes have an energy value that can be captured and utilized and are also a necessary component of compost, soil amendments, and other useful products. Directive 6.1 also encompasses one of CalRecycle's actions to help California significantly reduce its generation of greenhouse gases that contribute to global warming. Under the State's "Climate Change Scoping Plan, a Framework for Change" (California Air Resources Board, December 2008), CalRecycle is responsible for taking actions to reduce the emission of methane, a potent greenhouse gas, from landfills. Anaerobic digestion facilities utilize organic wastes as a feedstock from which to produce biogas (which is captured), and the methane in the biogas is converted to other forms of energy, such as liquid natural gas and compressed natural gas. The development of such facilities is one of CalRecycle's charges under the AB 32 Climate Change Scoping Plan. The plan anticipates that anaerobic digestion facilities can reduce landfill methane emissions by 2 million metric tons of equivalent gases per year by the year 2020. Anaerobic digestion also can contribute to meeting the State's Renewable Portfolio Standard and Low Carbon Fuel Standard. To assist in achieving those objectives, CalRecycle intends to adopt the Anaerobic Digestion Initiative, a comprehensive program to foster the development of anaerobic digestion facilities which convert organic solid wastes into sources of energy and can produce valuable compost feedstocks, soil amendments, and other products.

The Anaerobic Digestion Initiative consists of CalRecycle's adoption of a policy and a series of discrete actions to implement the policy, together with additional actions that will be developed and implemented in the future:

- It is the policy of CalRecycle to encourage the development of anaerobic digestion facilities in California as an alternative to the landfill disposal of organic solid waste. Specifically, as an initial measure, CalRecycle will encourage the establishment of in-vessel digesters located at existing or new solid waste facilities and in areas zoned for industrial or solid waste handling activities.

- CalRecycle shall, not later than January 1, 2012, establish programs to implement the above policy, including without limitation:
    - Provide research grants, loans, and contracts (dependent on funding availability) to develop anaerobic digestion facilities and for activities that advance the state of knowledge about anaerobic digestion and its applications and the uses of products and by-products, including anaerobic digestion demonstration projects that use the organic fraction of municipal solid waste as a feedstock

  - Develop guidance publications to assist operators who seek to establish anaerobic digestion facilities
  - Develop guidance publications to assist LEAs and other local and regional government agencies that permit and regulate anaerobic digestion facilities, specifically guidance for co-location at solid waste facilities.
  - Draft revised regulations for aspects of specific design, operation and permitting of anaerobic digestion facilities within the authority and responsibility of CalRecycle
  - Promote anaerobic digestion through CalRecycle's participation with the California Energy Commission in implementing AB 118 (Alternative and Renewable Fuel and Vehicle Technology Program), the Bioenergy Interagency Working Group, and with the Air Resources Board in implementing the Anaerobic Digestion and Low Carbon Fuel Standard measures in the AB 32 Climate Change Scoping Plan.
  - Work with the California Pollution Control Financing Authority and California Alternative Energy and Advanced Transportation Financing Authority to help anaerobic digestion project proposals obtain funding
  - Participate on technical workgroups convened by the Climate Action Reserve to develop or modify protocols, such as the Organic Waste Digestion Project Protocol, for projects that divert and anaerobically digest organic waste that otherwise would have gone to solid waste landfills

CEQA Compliance

The proposed adoption of the Anaerobic Digestion Initiative is a "project" that has potential environmental effects that must be evaluated under the California Environmental Quality Act (CEQA). CalRecycle has prepared a Program Environmental Impact Report for the Anaerobic Digestion Initiative.

The California Integrated Waste Management Board (now CalRecycle) awarded a $250,000 contract to Environmental Science Associates (ESA) in 2009 to assist in the preparation and circulation of a Program Environmental Impact Report (EIR) to assess the environmental impacts for anaerobic digestion (AD) in California.

A technical advisory group (TAG) was formed to help identify the potential environmental impacts to be considered in the Program EIR, the types of anaerobic projects being considered statewide, and the regulatory, technological and economic barriers to implementing potential AD projects. Over 55 stakeholders participated in the three TAG meetings held in 2010.

A Notice of Preparation (NOP) was prepared and filed with the State Clearinghouse on April 30, 2010. The NOP provided responsible and trustee agencies and the public with information describing the project and its potential environmental effects. Nine written comment letters were received during the 30 day public comment period.

A draft Program EIR document consistent with CEQA statutes and guidelines was developed in February 2011. The Draft Program EIR assessed the potential environmental effects that may result from the adoption of an Anaerobic Digestion Initiative and subsequent development of AD facilities in California. The Draft Program EIR examined the following potentially significant environmental impacts: *Air Quality and Greenhouse Gas*, *Hydrology and Water Quality*, *Noise*, *Public Services and Utilities*, *Transportation*, *Aesthetics*, *Hazards and Hazardous Materials*, *and Other CEQA Considerations* (such as Cumulative and Growth-Inducing Impacts, Significant and Unavoidable Environmental Impacts, etc.). The Draft Program EIR also examined Alternatives to the AD Initiative: *Alternatives that Were Considered but Not Further Analyzed* (Bioreactor Landfill, Thermal Conversion, Source Reduction) and *Alternatives Selected for Further Consideration* (No Project, Co-Digestion at Wastewater Treatment Plants, Co-Digestion and Dairy Manure Digesters, Increased Aerobic Composting, and Landfill In-Ground Digester Cell).

The Draft Program EIR was circulated for comment on February 11, 2011 through April 4, 2011. Comments were also accepted at the CalRecycle Monthly Public Meeting on March 15, 2011 in Sacramento and on March 30, 2011 in Lakewood. CalRecycle received 19 comment letters/emails on the Draft Program EIR. The comments and responses to comments have been incorporated into the Draft Program EIR to form a Final Program EIR.

CEQA Findings

As required by CEQA, CalRecycle has made specific findings regarding the environmental effects of the project. Those findings are presented below, along with facts and evidence to support each finding.

CalRecycle has prepared a Final Program Environmental Impact Report (EIR) for the proposed Anaerobic Digestion Initiative (the “proposed project”). The Final Program EIR is comprised of two documents. These documents are identified below:

1. Draft Program EIR, Statewide Anaerobic Digester Facilities for the Treatment of Municipal Organic Solid Waste, February 2011 (Revised June 2011) (State Clearinghouse Number 2010042100); and
2. Comments and Responses Document (June 2011)

These documents were prepared as a consolidated report that was released to the public on June 10, 2011 on the CalRecycle website. The Final Program EIR documents described above can be reviewed on-line at:
http://www.calrecycle.ca.gov/swfacilities/Compostables/AnaerobicDig/default.htm

Or reviewed at:

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For access to any additional background materials related to the Program EIR, please contact Ken Decio at (916) 341-6313 or Ken.Decio@CalRecycle.ca.gov

This information is provided in compliance with Public Resources Code Section 21081.6(a) (2).

Certification of EIR

Before adopting the Anaerobic Digestion Initiative, CalRecycle must certify the Final Program EIR. CalRecycle has completed the Final Program EIR in compliance with CEQA. (CEQA Guidelines, Section 15090[a][1]) The Final Program EIR reflects CalRecycle's independent judgment and analysis. (CEQA Guidelines, Section 15090[a][3]) The Final Program EIR will be presented to the Acting Director of CalRecycle, who will review and consider the information in it prior to adopting the Anaerobic Digestion Initiative. (CEQA Guidelines, Section 15090[a][2]) CalRecycle staff recommends that the Acting Director of CalRecycle make these findings and certify the Final Program EIR.

Reduce or Avoid Potentially Significant Impacts

Under the CEQA Guidelines, public agencies are required to make written findings for each significant effect associated with a project prior to approval of the project. The possible findings are:

- Changes or alterations have been required in, or incorporated into, the project which avoid or substantially lessen the significant environmental effect as identified in the final EIR. (CEQA Guidelines, Section 15091[a][1])
- Such changes or alterations are within the responsibility and jurisdiction of another public agency and not the agency making the finding. Such changes have been adopted by such other agency or can and should be adopted by such other agency. (CEQA Guidelines, Section 15091[a][2])
- Specific economic, legal, social, technological, or other considerations, including provision of employment opportunities for highly trained workers, make infeasible the mitigation measures or project alternatives identified in the final EIR. (CEQA Guidelines, Section 15091[a][3])

Each of these findings must be supported by substantial evidence in the record. In this case the evidence is embedded in the Final Program EIR.

CalRecycle finds that the proposed AD Initiative will have potentially significant impacts, as identified in the Final Program EIR (Table 1-1 Revised) but which can be mitigated to less than significant. Those impacts will occur only upon the construction and operation of specific anaerobic digestion facilities, if and when that occurs. Table 1-1 Revised specifies mitigation measures (that is, "changes or alterations" required in the project to avoid or substantially lessen each significant environmental effect) which will have the desired effect of avoiding or substantially lessening the potentially significant impacts identified in the Final Program EIR. When an anaerobic digestion facility is constructed in the future, it will be subject to numerous governmental approvals, primarily at the local level, and will be a "project" subject to CEQA. In most cases, the Lead Agency will be the local land use authority or the Local Enforcement Agency (LEA). In considering a specific anaerobic digestion facility, and based on site-specific conditions and circumstances, the Lead Agency will adopt the appropriate mitigation measures among those specified in the Final Program EIR and others as necessary to avoid or substantially lessen the significant environmental effects of the project. Therefore, with respect to CalRecycle in its certification of this Final Program EIR and adoption of this project, the Anaerobic Digestion Initiative, all of the changes or alterations (i.e., Final Program EIR Mitigation Measures) to specific projects which are constructed and operated in the future will be within the responsibility and jurisdiction of other public agencies and not CalRecycle. In its concurrence/objection role, set out in Public Resources Code, Section 44009, CalRecycle does not have the authority to impose conditions on, or "changes or alterations" to, the anaerobic digestion facilities that local Lead Agencies will consider in the future. Such changes and alterations should be adopted by the local Lead Agencies for specific projects (CEQA Guidelines, Section 15091[a][2]). These mitigation measures will be fully enforceable through permit conditions to be imposed by the Lead Agency and other Responsible Agencies, agreements with project proponents, and similar means.

Mitigation Monitoring and Reporting Program

CalRecycle staff has prepared, and recommends that the Acting Director adopt, the Mitigation Monitoring and Reporting Plan (MMRP) prepared in conjunction with the Final Program EIR. A copy is available at this website:
http://www.calrecycle.ca.gov/Actions/PublicNoticeDetail.aspx?id=455&aiid=438
The mitigation measures specified in the MMRP are fully enforceable through permit conditions to be imposed by the Lead Agency and other Responsible Agencies, agreements with project proponents, and similar means.

Custodian of Records

The record of CalRecycle's proceedings in certifying the Final Program EIR and adopting the Anaerobic Digestion Initiative is maintained by CalRecycle's custodian of records: Ms. Dona Sturgess, Legal Office, Department of Resources Recycling and Recovery, 1001 I Street, P.O. Box 4025, Sacramento, CA 95812-4025.

Staff Recommendations

Staff recommends the Acting Director certify the Final Program EIR, adopt the above findings respecting the avoidance or lessening of significant environmental effects, adopt the Mitigation Monitoring and Reporting Program, and adopt the Anaerobic Digestion Initiative.

MITIGATION MONITORING AND REPORTING PLAN

Impact	Mitigation Measure	Responsibility for Compliance	Method for Compliance	Timing of Compliance
5. Air Quality and Greenhouse Gas				
Impact 5.1: Construction and operations of AD facilities within California would result in emissions of criteria air pollutants at levels that could substantially contribute to a potential violation of applicable air quality standards or to nonattainment conditions.	**Measure 5.1a:** Applicants shall prepare and submit an Air Quality Technical Report as part of the environmental assessments for the development of future AD facilities on a specific project-by-project basis. The technical report shall include an analysis of potential air quality impacts for all steps of the project (including a screening level analysis to determine if construction and operation [for all on-site processes, including any end-use and disposal methods] related criteria air pollutant emissions would exceed applicable air district thresholds, as well as greenhouse gas (GHG) emissions and any health risk associated with toxic air contaminants (TACs) from all AD facility sources) and reduction measures. Preparation of the technical report should be coordinated with the appropriate air district and shall identify compliance with all applicable New Source Review and Best Available Control Technology (BACT) requirements. The technical report shall identify all project emissions from permitted (stationary) and non-permitted (mobile and area) sources and mitigation measures (as appropriate) designed to reduce significant emissions to below the applicable air district thresholds of significance, and if these thresholds cannot be met with mitigation, then the individual AD facility project could require additional CEQA review or additional mitigation measures.	Project Applicant Local Lead Agency	Submit Air Quality Technical Report. Review and acceptance of Air Quality Technical Report.	Local CEQA Review Local CEQA Review
	Measure 5.1b: Applicants shall require construction contractors and system operators to implement the following Best Management Practices (BMPs) as applicable during construction and operations: • Facilities shall be required to comply with the rules and regulations from the applicable Air Quality Management District (AQMD) or Air Pollution Control District (APCD). • Facilities shall require substrate unloading and pre-processing activities to occur indoors within enclosed, negative pressure buildings. Collected foul air (including volatile organic compounds (VOCs) off-gassed from undigested substrates) should be treated via biofilter or air scrubbing system. • Use equipment meeting, at a minimum, Tier II emission standards. • Minimize idling time either by shutting equipment off when not in use or reducing the time of idling to 5 minutes (as required by the state airborne toxics control measure [Title 13, §2485 of the California Code of Regulations]). Provide clear signage that posts this requirement for workers at the entrances to the site. • Maintain all equipment in proper working condition according to manufacturer's specifications. • Use electric equipment when possible.	Project Applicant/ Operator Construction Contractor Local Air District	Implement BMPs during construction and operations. Enforce construction and operation air quality rules and regulations and compliance.	Construction and Operations Construction and Operations

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LEA – Local Enforcement Agency

Impact	Mitigation Measure	Responsibility for Compliance	Method for Compliance	Timing of Compliance
	For projects that are unable to use internal combustion engines due to air district regulations (i.e., NOx emission limits), other options for generating renewable energy from biogas should be considered. Other options that should be evaluated for using biogas or biomethane as an energy source include: use as a transportation fuel (compressed biomethane), use in fuel cells to generate clean electricity, use for on-site heating, or injection of biomethane into the utility gas pipeline system. If there are other lower NOx alternative technologies available at the time of AD facility development, these should be considered as well during the facility design process.			
Impact 5.2: Operation of AD facilities in California could create objectionable odors affecting a substantial number of people.	**Measure 5.2a:** Applicants for the development of AD facilities shall comply with appropriate local land use plans, policies, and regulations, including applicable setbacks and buffer areas from sensitive land uses for potentially odoriferous processes.	Project Applicant	Comply with local land use plans, policies and regulations related to odor and sensitive receptors.	Local CEQA Review
	Measure 5.2b: If an AD facility handles compostable material and is classified as a compostable material handling facility, the facility must develop an Odor Impact Minimization Plan (OIMP) pursuant to 14 CCR 17863.4. Otherwise, applicants shall develop and implement an Odor Management Plan (OMP) that incorporates equivalent odor reduction controls for digester operations and is consistent with local air district odor management requirements. These plans shall identify and describe potential odor sources, as well as identify the potential, intensity, and frequency of odor from these likely sources. In addition, the plans will specify odor control technologies and management practices that if implemented, would mitigate odors associated with the majority of facilities to less than significant. However, less or more control measures may be required for individual projects. Odor control strategies and management practices that can be incorporated into these plans include, but are not limited to, the following: - Require substrate haulage to the AD facility within covered, liquid leak-proof containers. - Establish time limit for on-site retention of undigested substrates (i.e., feedstocks should be processed and placed into the portion of the system where liquid discharge and air emissions can be controlled within 24 or 48 hours of receipt). - Provide enclosed, negative pressure buildings for indoor receiving and pre-processing. Treat collected foul air in a biofilter or air scrubbing system. - Establish contingency plans for operating downtime (e.g., equipment malfunction, power outage).	Project Applicant/ Operator LEA (composting permit) and/or Local Air District (other facilities)	Develop and implement an OIMP or Odor Management Plan. Enforce OIMP or Odor Management Plan.	Operations Operations

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LEA – Local Enforcement Agency

Impact	Mitigation Measure	Responsibility for Compliance	Method for Compliance	Timing of Compliance
	- Manage delivery schedule to facilitate prompt handling of odorous substrates. - Handle fresh unstable digestate within enclosed building, or mix with green waste and incorporate into a composting operation within the same business day, and/or directly pump to covered, liquid leak-proof containers for transportation. - Protocol for monitoring and recording odor events. - Protocol for reporting and responding to odor events.			
Impact 5.3: Construction and operation of AD facilities in California could lead to increases in chronic exposure of sensitive receptors in the vicinity to certain toxic air contaminants from stationary and mobile sources.	**Measure 5.3a:** Implement Mitigation Measures 5.1a and 5.1b.	See Mitigation Measures 5.1a and 5.1b		
	Measure 5.3b: Based on the Air Quality Technical Report (specified in Measure 5.1a), if the health risk is determined to be significant on a project-by-project basis with diesel particulate matter (DPM) as a major contributor, then the applicants shall implement control measures such that the AD facility health risk would be below the applicable air district threshold, which may include implementation of one or more of the following requirements, where feasible and appropriate: • Use either new diesel engines that are designed to minimize DPM emissions (usually through the use of catalyzed particulate filters in the exhaust) or retrofit older engines with catalyzed particulate filters (which will reduce DPM emissions by 85%); • Use electric equipment to be powered from the grid, which would eliminate local combustion emissions; Use alternative fuels, such as compressed natural gas (CNG) or liquefied natural gas (LNG).	Project Applicant/ Operator	Implement measures to reduce DPM.	Local CEQA Review/during Operations
	Measure 5.3c: Hydrogen sulfide (H2S) contained in the biogas shall be scrubbed (i.e., via iron sponge or other technology) before emission to air can occur.	Operator	Scrub H_2S as required.	Operations
Impact 5.4: Development of AD facilities in California could increase GHG emissions.	**Measure 5.4:** Implement Mitigation Measure 5.1a.	See Mitigation Measure 5.1a		
Impact 5.5: Development of AD facilities in California, together with anticipated cumulative development in the area, would contribute to regional criteria pollutants.	**Measure 5.5:** Implement Mitigation Measures 5.1a and 5.1b.	See Mitigation Measures 5.1a and 5.1b		

LEA – Local Enforcement Agency

Impact	Mitigation Measure	Responsibility for Compliance	Method for Compliance	Timing of Compliance
6. Hydrology and Water Quality				
Impact 6.2: The operation of AD facilities could adversely affect surface and groundwater quality.	**Measure 6.2a:** During pre-processing, all water that contacts digester feedstock, including stormwater from feedstock handling and storage facilities and water from equipment washdown and feedstock wetting, shall be contained until appropriately disposed or utilized. Best Management Practices (BMPs) may be used to reduce loading of sediment, nutrients, trash, organic matter, and other pollutants. These BMPs may include, but are not limited to, trash grates and filters, oil-water separators, mechanical filters such as sand filters, vegetated swales, engineered wastewater treatment wetlands, settling ponds, and other facilities to reduce the potential loading of pollutants into surface waters or groundwater. All discharges of stormwater are prohibited unless covered under the General Industrial Stormwater Permit, other National Pollutant Discharge Elimination System (NPDES) permit, or are exempted from NPDES permitting requirements. The NPDES permits will generally require implementation of management measures to achieve a performance standard of best available technology economically achievable (BAT) and best conventional pollutant control technology (BCT), as appropriate. The General Industrial Stormwater Permit also requires the development of a storm water pollution prevention plan (SWPPP) and a monitoring plan, in compliance with permit requirements.[1] Other liquid and solid wastes may only be discharged pursuant to an NPDES permit or waste discharge requirement (WDR) order.	Operator Regional Water Quality Control Board	Contain water during pre-processing activities. Enforce water quality regulations.	Operations Operations
	Measure 6.2b: In order to minimize the amount of fugitive trash or feedstock released to surface waters, the following measures shall be implemented. When feasible, the project proponent shall preferentially select feedstocks that contain minimal amounts of trash that could become entrained in surface water, either via direct contact with stormwater flows or via other accidental release, such as due to wind. Processing of such feedstocks may, however, be unavoidable, such as in support of an AD facility that processes MSW. Therefore, the project applicant shall ensure that (1) drainage from all feedstock loading, unloading, and storage areas is contained onsite or treated to remove trash and stray feedstock, and sediment prior to release as permitted; (2) in all feedstock loading and unloading areas, and all areas where feedstock is moved by front loaders or other uncovered or uncontained transport machinery, the applicant shall ensure that mechanical sweeping and/or equivalent trash control operational procedures are performed at least daily, during operations; and (3) the facility operator shall train all employees involved in feedstock handling so as to discourage, avoid, and minimize the release of feedstock or trash during operations.	Project Applicant/ Operator Regional Water Quality Control Board	Implement measures to minimize fugitive trash/feedstock release to surface waters. Enforce water quality regulations.	Operations Operations

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[1] For more information, please refer to: http://www.swrcb.ca.gov/water_issues/programs/stormwater/industrial.shtml

LEA – Local Enforcement Agency

Impact	Mitigation Measure	Responsibility for Compliance	Method for Compliance	Timing of Compliance
	Measure 6.2c: In order to minimize water quality degradation associated with accidental spills at AD facilities, the applicant for individual projects that would be implemented under the Program EIR shall require project proponents to complete and adhere to the requirements of a Spill Prevention, Control, and Countermeasure (SPCC) Plan, which is based on the federal SPCC rule. Notification of the SPCC Plan shall be provided to the local Certified Unified Program Agency (CUPA). The SPCC Plan shall contain measures to prevent, contain, and otherwise minimize potential spills of pollutants during facility operation, in accordance with U.S. EPA requirements. For individual projects that would utilize wet digestion systems, in which processing and holding tanks would contain the (aqueous) digestion reaction and liquid digestate containing fats and oils, the SPCC Plan shall provide for installation and monitoring of secondary containment and/or leak detection systems to ensure that AD liquids are not accidentally discharged to navigable waters or adjoining shorelines. Monitoring of these systems shall be in accordance with SPCC Plan requirements.	Project Applicant/ Operator	Complete and adhere to SPCC Plan.	Operations
		Local Lead Agency	Review and accept SPCC Plan.	Local CEQA Review
		CUPA	Review implementation of SPCC Plan.	Prior to/during Operations
	Measure 6.2d: Any proposed discharge to a pond for an individual project would require the project applicant to acquire WDRs from the appropriate regional board. The project applicant shall ensure that all ponds and discharges to such ponds adhere to all requirements under applicable WDRs. The need for pond liners in order to protect groundwater quality would be assessed during the regional board's review of the project, and requirements for pond liners would be included in the WDRs, as warranted. If appropriate, the WDRs would impose requirements for Class II surface impoundments as presented in Title 27 of the California Code of Regulations. Requirements include, but are not limited to, groundwater monitoring, double liner systems with leachate collection, water balance, a preliminary closure plan for clean closure, seismic analysis, and financial assurances. Compliance with WDRs may require the installation of facilities such as tanks and containers to store and process the digestate, the use of filter presses, and implementation of other water quality protection practices.	Project Applicant/ Operator	Adhere to applicable WDRs for ponds or discharges to ponds.	Prior to/during Operations
		Regional Water Quality Control Board	Enforce WDRs for ponds or discharges to ponds.	Prior to/during Operations
	Measure 6.2e: This measure would reduce potential for the movement of nutrients and other pollutants to groundwater and surface water for individual projects that would employ land application for liquid digestate or residual solids. The operators of individual projects implemented under this Program EIR shall ensure that land application of liquid digestate and/or residual solids adheres to all requirements of applicable WDRs. WDR requirements include but are not limited to, groundwater monitoring, completion of an anti-degradation analysis, and in some cases best practicable treatment and control to achieve salinity reduction in materials prior to discharge to land. WDRs would be issued by the appropriate regional board, and would consider site-specific conditions and waste characteristics, in order to determine applicable control measures and procedures that	Project Applicant/ Operator	Adhere to requirements of WDRs for land application of liquid digestate and/or residual solids.	Operations
		Regional Water Quality Control Board	Issue and enforce WDRs for land application of liquid digestate and/or residual solids.	Prior to/during Operations

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LEA – Local Enforcement Agency

Impact	Mitigation Measure	Responsibility for Compliance	Method for Compliance	Timing of Compliance
	protect water quality.			
	Measure 6.2f: This measure would reduce the potential for water quality degradation from projects that include discharge of liquid digestate to surface waters. The applicant for individual projects implemented under this Program EIR shall ensure that the discharge of liquid digestate to surface waters adheres to all NPDES permitting recommendations and requirements, as established by the appropriate regional board. Specific measures may include, but are not limited to, limitations on discharge volumes, seasonal discharge restrictions, limitations on loading rates and/or concentrations of specific constituents, and other facility-specific water quality control measures designed to protect receiving water quality and preserve beneficial uses identified in Basin Plans.	Project Applicant/ Operator Regional Water Quality Control Board	Adhere to NPDES permitting recommendations and requirements for discharge of liquid digestate to surface waters. Approve and enforce NPDES permits	Operations Prior to/during Operations
Impact 6.3: AD facilities could be exposed to flooding hazards.	**Measure 6.3:** Individual applicants seeking coverage under this Program EIR shall ensure that, for their proposed AD facilities including pre-processing areas, feedstock storage areas, and digestate handling facilities, are protected from FEMA-defined 100-year flood events. Design measures may include, but are not limited to: facility siting, access placement, grading, elevated foundations, and site protection such as installation of levees or other protective features.	Project applicant	Ensure facilities are protected from FEMA-defined 100-year flood events.	Local CEQA Review
Impact 6.4: Construction of AD facilities could change drainage and flooding patterns	**Measure 6.4:** In order to ensure that the AD facilities would not result in detrimental increases in stormwater flow or flooding on site or downstream, the Applicant for each AD facility project shall prepare a comprehensive drainage plan (prior to construction) and implement the plan during construction. The comprehensive drainage plan shall include engineered stormwater retention facility designs, such as retention basins, flood control channels, storm drainage facilities, and other features as needed to ensure that, at a minimum, no net increase in stormwater discharge would occur during a 10-year, 24-hour storm event, as a result of project implementation. Project related increases in stormwater flows shall be assessed based on proposed changes in impervious surface coverage on site, as well as proposed grading and related changes in site topography.	Project Applicant Local Lead Agency	Prepare and implement a comprehensive drainage plan. Review and acceptance of comprehensive drainage plan.	Local CEQA Review/during Construction Local CEQA Review
Impact 6.6: AD facilities could become inundated as a result of seiche, tsunami, or mudflow.	**Measure 6.6:** To ensure that proposed AD facilities would not incur impacts associated with seiche, tsunami, or mudflow, the applicant for each individual project shall ensure that all facilities are located outside of potential risk areas for seiche, tsunami, and mudflow. In the event that a proposed facility would be sited within a potential risk area for one of these hazards, the facility shall be raised above projected maximum base inundation elevations, or shall be protected from inundation by the installation of berms, levees, or other protective facilities.	Project Applicant Local Lead Agency	Ensure facilities are located outside of potential risk areas for seiche, tsunami and mudflow. Approve siting of facilities with respect to risk areas for seiche, tsunami and mudflow.	Local CEQA Review Local CEQA Review
Impact 6.7: AD facilities could contribute to	**Measure 6.7:** Implement Mitigation Measures 6.2 (a-f) and 6.3.	See Mitigation Measures 6.2 (a-f) and 6.3		

LEA – Local Enforcement Agency

Impact	Mitigation Measure	Responsibility for Compliance	Method for Compliance	Timing of Compliance
cumulative impacts to water quality.				
7. Noise				
Impact 7.1: Construction of AD facilities could temporarily increase noise levels at nearby sensitive receptor locations or result in noise levels in excess of standards in local general plans, noise ordinances, or other applicable standards.	**Measure 7.1a:** Construction activities shall be limited to the hours between 7 a.m. and 7 p.m., Monday through Saturday, or an alternative schedule established by the local jurisdiction, or other limits to construction hours normally enforced by the local jurisdiction (see Measure 7.1d below).	Construction Contractor Local Lead Agency	Limit construction hours as indicated by local jurisdiction. Enforce construction hour limits.	Construction Construction
	Measure 7.1b: Construction equipment noise shall be minimized by muffling and shielding intakes and exhaust on construction equipment to a level no less effective than the manufacture's specifications, and by shrouding or shielding impact tools.	Construction Contractor / Local Lead Agency	Minimize construction equipment noise.	Construction
	Measure 7.1c: Construction contractors within 750 feet of sensitive receptors shall locate fixed construction equipment, such as compressors and generators, and construction staging areas as far as possible from nearby sensitive receptors.	Construction Contractor / Local Lead Agency	Locate applicable construction equipment away from sensitive receptors.	Construction
	Measure 7.1d: Construction contractors shall comply with all local noise ordinances and regulations and other measures deemed necessary by the Lead Agency.	Construction Contractor Local Lead Agency	Comply with local noise ordinances and regulations. Enforce local noise ordinances and regulations.	Construction Construction
Impact 7.2: Noise from operation of AD facilities could substantially increase ambient noise levels at nearby land uses or result in noise levels in excess of standards in local general plans, local noise ordinances, or other applicable standards.	**Measure 7.2:** AD facilities located within 2,000 feet of a sensitive receptor shall conduct a site specific noise study. If operational sound levels would exceed local regulations, or 45 dBA at a sensitive receptor (if no regulations are available), additional sound-proofing such as enclosures, muffling, shielding, or other attenuation measures shall be installed to meet the required sound level.	Project Applicant/ Operator	Conduct site specific noise study and implement recommendations.	Prior to /during Operation
Impact 7.4: Development of AD facilities could result in a cumulative increase in noise levels.	**Measure 7.4:** Implement Mitigation Measures 7.1a through 7.1d and Measure 7.2.	See Mitigation Measures 7.1a through 7.1d and Measure 7.2.		
8. Public Services and Utilities				
Impact 8.1: The project could substantially increase demands on fire protection services	**Mitigation Measure 8.1:** Implement Mitigation Measures 10.1b, 10.3c, and 11.4a.	See Mitigation Measures 10.1b, 10.3c, and 11.4a.		
Impact 8.2: The project could potentially exceed wastewater treatment requirements of the Regional Water Quality Control Board (RWQCB).	**Measure 8.2a:** Implement Mitigation Measure 8.3b if the operator does not have an existing agreement, such as for co-located facilities.	See Mitigation Measure 8.3b		
	Measure 8.2b: In addition to an agreement for service, coordination with the wastewater treatment provider would be needed to determine if pre-treatment would be required to meet the RWQCB requirements for the	Project Applicant/ Operator	Coordinate with wastewater treatment provider.	Prior to Operation

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LEA – Local Enforcement Agency

Impact	Mitigation Measure	Responsibility for Compliance	Method for Compliance	Timing of Compliance
	existing wastewater treatment facility.			
Impact 8.3: The project could result in significant environmental effects from the construction and operation of new water and wastewater treatment facilities or expansion of existing facilities.	**Measure 8.3a:** If the project proposes to obtain water from a water supplier (municipal system or other public water entity), the developer would enter into an agreement for service with the supplier.	Project Applicant/ Operator	Enter into service agreement with water supplier.	Prior to Operation
	Measure 8.3b: If the project proposes to obtain wastewater service from a wastewater treatment provider (municipal or other public entity), the developer would enter into an agreement for service with the provider.	Project Applicant/ Operator	Enter into service agreement with wastewater supplier.	Prior to Operation
	Measure 8.3c: Alternate water sources, such as non-potable and recycled water, shall be used during the pre-processing and AD process phases where needed and as available.	Project Applicant/ Operator	Development and use of non-potable and recycled water sources during AD pre-processing and process phases.	Prior to/during Operation
Impact 8.6: The project could result in exceeding the capacity of a wastewater treatment provider.	**Measure 8.6:** If the project proposes to obtain wastewater service from a wastewater treatment provider (municipal or other public entity), implement Mitigation Measure 8.3b.	See Mitigation Measure 8.3b		
Impact 8.7: The project could result in the construction of new energy supplies and could require additional energy infrastructure.	**Measure 8.7:** Projects requiring off-site energy infrastructure must complete CEQA review for the proposed energy improvements as a separate project. Infrastructure improvements may qualify as a categorical exemption pursuant to CEQA.	Project Applicant/Lead Agency	Complete CEQA for off-site energy improvements if applicable.	Local CEQA Review
9. Transportation				
Impact 9.1: Construction of AD facilities would intermittently and temporarily increase traffic congestion due to vehicle trips generated by construction workers and construction vehicles on area roadways.	**Measure 9.1:** The contractor(s) will obtain any necessary road encroachment permits prior to installation of pipelines within the existing roadway right-of-way. As part of the road encroachment permit process, the contractor(s) will submit a traffic safety / traffic management plan (for work in the public right-of-way) to the agencies having jurisdiction over the affected roads. Elements of the plan will likely include, but are not necessarily limited to, the following: • Develop circulation and detour plans to minimize impacts to local street circulation. Use haul routes minimizing truck traffic on local roadways to the extent possible. Use flaggers and/or signage to guide vehicles through and/or around the construction zone. • To the extent feasible, and as needed to avoid adverse impacts on traffic flow, schedule truck trips outside of peak morning and evening commute hours. • Limit lane closures during peak traffic hours to the extent possible. Restore roads and streets to normal operation by covering trenches with steel plates outside of allowed working hours or when work is not in progress. • Limit, where possible, the pipeline construction work zone to a width that, at a minimum, maintains alternate one-way traffic	Construction Contractor Local Lead Agency(s)	Submit application for roadway encroachment permits. Prepare and submit traffic safety/traffic management plan. Review and approval of roadway encroachment permits and traffic safety/traffic management plan.	Prior to construction Prior to construction

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LEA – Local Enforcement Agency

Impact	Mitigation Measure	Responsibility for Compliance	Method for Compliance	Timing of Compliance
	flow past the construction zone. • Install traffic control devices as specified in Caltrans' Manual of Traffic Controls for Construction and Maintenance Work Zones where needed to maintain safe driving conditions. Use flaggers and/or signage to safely direct traffic through construction work zones. • Coordinate with facility owners or administrators of sensitive land uses such as police and fire stations, hospitals, and schools. Provide advance notification to the facility owner or operator of the timing, location, and duration of construction activities. • Coordinate with the local public transit providers so that bus routes or bus stops in work zones can be temporarily relocated as the service provider deems necessary.			
Impact 9.2: AD facility operations would not substantially increase on-going (operational) traffic volumes on roadways serving the facilities.	**Measure 9.2:** Measures will be imposed by applicable local agencies, as needed, to address site-specific significant traffic impacts identified during subsequent facility-specific analyses, implementation of which would reduce those impacts to a less-than-significant level.	Project Applicant Local Lead Agency	Implement traffic mitigation measures. Enforce traffic mitigation measures.	Ongoing Ongoing
Impact 9.3: AD facilities could potentially cause traffic safety hazards for vehicles, bicyclists, and pedestrians on public roadways, and could increase traffic hazards due to possible road wear or to accidental spills of digestate (liquids and solids).	**Measure 9.3a:** Implement Measure 9.1, which stipulates actions required of the contractor(s) to reduce potential traffic safety impacts to a less-than-significant level.	See Mitigation Measure 9.1		
	Measure 9.3b: Prior to construction, the contractor(s), in cooperation with the agencies having jurisdiction over the affected roadways, will survey and describe the pre-construction roadway conditions on rural roadways and residential streets. Within 30 days after construction is completed, the affected agencies will survey these same roadways and residential streets in order to identify any damage that has occurred. Roads damaged by construction will be repaired to a structural condition equal to the condition that existed prior to construction activity.	Construction Contractor Construction Contractor Local Lead Agency	Survey and document pre-construction roadway condition. Identify any damage to roadway from construction. Review and approve pre-construction and post-construction roadway damage analysis.	Prior to Construction Following Construction Prior to and during Construction
	Measure 9.3c: Prior to initiation of project operations, the project sponsor(s) will submit a Spill Prevention Plan to the appropriate local agency. The Spill Prevention Plan will include, among other provisions, a requirement that each truck driver know how to carry out the emergency measures described in the Spill Prevention Plan (therefore reducing roadway hazards if an accidental spill were to occur).	Project Applicant/ Operator Local Lead Agency	Prepare and submit a Spill Prevention Plan. Review and approve Spill Prevention Plan.	Prior to Operations Prior to Operations
Impact 9.4: AD facilities could intermittently and temporarily impede access to local streets or adjacent uses (including access for emergency vehicles),	**Measure 9.4:** Implement Measure 9.1, which stipulates actions required of the contractor(s) to reduce potential access impacts to a less-than-significant level.	See Mitigation Measure 9.1		

LEA – Local Enforcement Agency

Impact	Mitigation Measure	Responsibility for Compliance	Method for Compliance	Timing of Compliance
as well as disruption to bicycle/pedestrian access and circulation.				
Impact 9.5: The project could contribute to cumulative impacts to traffic and transportation (traffic congestion, traffic safety, and emergency vehicle access).	**Measure 9.5a:** Prior to construction, the project sponsor will coordinate with the appropriate local government departments, Caltrans, and utility districts and agencies regarding the timing of construction projects that would occur near AD project sites. Specific measures to mitigate potential significant impacts will be determined as part of the interagency coordination, and could include measures such as employing flaggers during key construction periods, designating alternate haul routes, and providing more outreach and community noticing.	Project Applicant/ Construction Contractor	Coordinate with local agencies, State agencies and utility districts regarding construction.	Prior to construction
	Measure 9.5b: Implement Mitigation Measure 9.2.	See Mitigation Measure 9.2		
	Measure 9.5c: Implement Mitigation Measures 9.1, 9.3b and 9.3c.	See Mitigation Measure 9.1, 9.3b and 9.3c		
10. Aesthetics				
Impact 10.1: AD facilities could have adverse effects on a scenic vista and/or scenic resources.	**Measure 10.1a:** Avoid siting AD facilities near scenic vistas and corridors designated within an applicable land use plan and the State Scenic Highway Program.	Project Applicant	Avoid siting project near scenic vistas or corridors.	Local CEQA Review
	Measure 10.1b: Landscaping and/or vegetated berms should be used to minimize views of facilities from sensitive views.	Project Applicant/ Operator	Plan, develop and maintain landscaping/vegetated berms for sensitive views.	Ongoing
Impact 10.2: AD facilities could degrade the existing visual character/quality of the site and its surroundings.	**Measure 10.2a:** Implement Mitigation Measures 10.1a and 10.1b.	See Mitigation Measures 10.1a and 10.1b		
	Measure 10.2b: Facilities using truck tippers or other un-enclosed unloading should consider using litter fences to manage blowing litter. Facilities should educate haulers delivering materials to the AD facility through literature, web links, or provide training on the acceptance of waste at the facilities to minimize litter. Facility operators should develop a protocol to identify feedstocks that are severely contaminated with potential litter and reject unacceptable loads.	Operator LEA	Implement measures to reduce litter. Enforce litter reduction measures.	Operations Operations
	Measure 10.2c: Clean-up crews can be used as necessary to control litter.	Operator LEA	Implement measures to reduce litter. Enforce litter reduction measures.	Operations Operations
	Measure 10.2d: Feedstocks and digestate byproducts should be stored in enclosed facilities or processed in a timely manner to prevent visibly deteriorated site conditions.	Operator LEA	Store of feedstocks and digestate byproducts in enclosed facilities or process in a timely manner. Enforce storage measures.	Operations Operations
	Measure 10.2e: Project operators should consider enclosure of pre-processing operations if it provides an aesthetic and/or noise attenuating benefit.	Operator	Consider additional pre-processing measures.	Ongoing

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LEA – Local Enforcement Agency

Impact	Mitigation Measure	Responsibility for Compliance	Method for Compliance	Timing of Compliance
Impact 10.3: AD facilities could create a new source of light or glare with adverse affects to daytime and/or nighttime views.	**Measure 10.3a:** Implement 10.1b.	See Mitigation Measure 10.1b		
	Measure 10.3b: Any lighting (portable or permanent) should be hooded and directed onto the project site. This would reduce effects to nighttime skies from uplighting, reduce glare, and prevent light from spilling onto adjoining properties and roads.	Operator	Use hooded and directed lighting on site.	Operations
	Measure 10.3c: Flares may be enclosed to reduce the visibility of flames during operation.	Operator	Consider use of enclosed flares.	Operations
Impact 10.4: The project could result in cumulative impacts to visual resources.	**Measure 10.4:** Implement Mitigation Measures 10.1a, 10.1b, 10.2a, 10.2b, 10.2c, 10.2d, 10.2e, 10.3a, 10.3b, and 10.3c.	See Mitigation Measures 10.1a, 10.1b, 10.2a, 10.2b, 10.2c, 10.2d, 10.2e, 10.3a, 10.3b, and 10.3c.		
11. Hazards and Hazardous Materials				
Impact 11.1: Construction of AD facilities could result in the potential exposure of construction workers, the public and the environment to preexisting soil and/or groundwater contamination.	**Mitigation Measure 11.1:** Prior to final project design and any earth disturbing activities, the applicant or agency(ies) responsible shall conduct a Phase I Environmental Site Assessment (ESA). The Phase I ESA shall be prepared by a Registered Environmental Assessor (REA) or other qualified professional to assess the potential for contaminated soil or groundwater conditions at the project site; specifically in the area proposed for construction of AD facilities. The Phase I ESA shall include a review of appropriate federal, State and local hazardous materials databases to identify hazardous waste sites at on-site and off-site locations within a one quarter mile radius of the project location. This Phase I ESA shall also include a review of existing and past land uses through aerial photographs, historical records, interviews of owners and/or operators of the property, observations during a reconnaissance site visit, and review of other relevant existing information that could identify the potential existence of contaminated soil or groundwater. If no contaminated soil or groundwater is identified or if the Phase I ESA does not recommend any further investigation then the project applicant or agency(ies) responsible shall proceed with final project design and construction. OR If existing soil or groundwater contamination is identified, and if the Phase I ESA recommends further review, the applicant or agency(ies) responsible shall retain a REA to conduct follow-up sampling to characterize the contamination and to identify any required remediation that shall be conducted consistent with applicable regulations prior to any earth disturbing activities. The environmental professional shall prepare a report that includes, but is not limited to, activities performed for the assessment, summary of anticipated contaminants and contaminant concentrations at the proposed construction site, and recommendations	Project Applicant Project Applicant Local Lead Agency	Conduct Phase I ESA. If applicable, conduct sampling and prepare report with summary and recommendations for contaminants. Integrate recommendations into project mitigation. Review Phase I and follow-up report (if applicable).	Local CEQA review Local CEQA review Local CEQA review

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LEA – Local Enforcement Agency

Impact	Mitigation Measure	Responsibility for Compliance	Method for Compliance	Timing of Compliance
	for appropriate handling of any contaminated materials during construction.			
Impact 11.3: Transportation, use, disposal or accidental spill of hazardous materials during the operation and maintenance of AD facilities would not result in potential harmful exposures of the public or the environment to hazardous materials.	**Mitigation Measure 11.3:** Implement Mitigation Measures 5.1a and 6.2a-f.			
Impact 11.4: Operation of AD facilities could increase the risk of fire hazards due to the potential release of biogas.	**Mitigation Measure 11.4a:** Prior to project approval, AD facility operators shall prepare and implement a Fire Safety Plan that outlines fire hazards, describes facility operations procedures to prevent ignition of fires, requires regular inspection of fire suppression systems, and provides for worker training in safety procedures as well as protocols for responding to fire incidents. The Fire Safety Plan shall be reviewed and approved by the local fire enforcement agency.	Project Applicant Local Fire Agency/LEA Operator	Prepare a Fire Safety Plan. Review and approve Fire Safety Plan. Implement Fire Safety Plan.	Local CEQA Review Local CEQA Review Operations
	Mitigation Measure 11.4b: Implement Mitigation Measure 11.5.	See Mitigation Measure 11.5		
Impact 11.5: AD facilities could be located within one quarter mile of a school resulting in potential hazards associated with accidental release of hazardous materials, including biogas.	**Mitigation Measure 11.5:** AD facilities shall be sited at least one quarter mile from existing or proposed schools, daycare facilities, hospitals and other sensitive land uses.	Project applicant	Site facilities at least one quarter mile from existing or proposed schools, daycare facilities, hospitals and other sensitive land uses.	Local CEQA Review
Impact 11.7: AD facilities could be located within five miles of a public airport or private airstrip and create an aviation hazard.	**Mitigation Measure 11.7:** For any AD facility proposed within 5 statute miles of an airport's air operations area, the operator will notify the Federal Aviation Administration (FAA) Regional Airports Division office and the airport operator of the proposed facility as early in the process as possible. AD facilities with any open air (outdoor) activities must receive an FAA Determination of No Hazard prior to project approval.	Project applicant/ Operator FAA	Notify FAA if applicable. Review project and issue an FAA Determination of No Hazard.	Local CEQA Review Prior to Project Approval
Impact 11.8: Development of AD facilities could contribute to cumulative impacts related to hazardous materials.	**Mitigation Measure 11.8:** Implement Mitigation Measures 11.1, 11.4, 11.5, and 11.7.	See Mitigation Measures 11.1, 11.4, 11.5, and 11.7		

LEA – Local Enforcement Agency

Anaerobic Digestion Initiative
CalRecycle
June 2011

Under its Strategic Directive 6.1, CalRecycle seeks to reduce by 50 percent the amount of organic waste disposed in the state's landfills by 2020. In addition to helping conserve limited landfill capacity, this CalRecycle policy recognizes that organic wastes are a resource, not just solid wastes that must be disposed. Organic wastes have an energy value that can be captured and utilized and are also a necessary component of compost, soil amendments, and other useful products. Directive 6.1 also encompasses one of CalRecycle's actions to help California significantly reduce its generation of greenhouse gases that contribute to global warming. Under the State's "Climate Change Scoping Plan, a Framework for Change" (California Air Resources Board, December 2008), CalRecycle is responsible for taking actions to reduce the emission of methane, a potent greenhouse gas, from landfills. Anaerobic digestion facilities utilize organic wastes as a feedstock from which to produce biogas (which is captured), and the methane in the biogas is converted to other forms of energy, such as liquid natural gas and compressed natural gas. The development of such facilities is one of CalRecycle's charges under the AB 32 Climate Change Scoping Plan. The plan anticipates that anaerobic digestion facilities can reduce landfill methane emissions by 2 million metric tons of equivalent gases per year by the year 2020. Anaerobic digestion also can contribute to meeting the State's Renewable Portfolio Standard and Low Carbon Fuel Standard. To assist in achieving those objectives, CalRecycle intends to adopt the Anaerobic Digestion Initiative, a comprehensive program to foster the development of anaerobic digestion facilities which convert organic solid wastes into sources of energy and can produce valuable compost feedstocks, soil amendments, and other products.

The Anaerobic Digestion Initiative consists of CalRecycle's adoption of a policy and a series of discrete actions to implement the policy, together with additional actions that will be developed and implemented in the future:

- It is the policy of CalRecycle to encourage the development of anaerobic digestion facilities in California as an alternative to the landfill disposal of organic solid waste. Specifically, as an initial measure, CalRecycle will encourage the establishment of in-vessel digesters located at existing or new solid waste facilities and in areas zoned for industrial or solid waste handling activities.

- CalRecycle shall, not later than January 1, 2012, establish programs to implement the above policy, including without limitation:
  - Provide research grants, loans, and contracts (dependent on funding availability) to develop anaerobic digestion facilities and for activities that advance the state of knowledge about anaerobic digestion and its applications and the uses of products

  and by-products, including anaerobic digestion demonstration projects that use the organic fraction of municipal solid waste as a feedstock
  - Develop guidance publications to assist operators who seek to establish anaerobic digestion facilities
  - Develop guidance publications to assist LEAs and other local and regional government agencies that permit and regulate anaerobic digestion facilities, specifically guidance for co-location at solid waste facilities.
  - Draft revised regulations for aspects of specific design, operation and permitting of anaerobic digestion facilities within the authority and responsibility of CalRecycle
  - Promote anaerobic digestion through CalRecycle's participation with the California Energy Commission in implementing AB 118 (Alternative and Renewable Fuel and Vehicle Technology Program), the Bioenergy Interagency Working Group, and with the Air Resources Board in implementing the Anaerobic Digestion and Low Carbon Fuel Standard measures in the AB 32 Climate Change Scoping Plan.
  - Work with the California Pollution Control Financing Authority and California Alternative Energy and Advanced Transportation Financing Authority to help anaerobic digestion project proposals obtain funding
  - Participate on technical workgroups convened by the Climate Action Reserve to develop or modify protocols, such as the Organic Waste Digestion Project Protocol, for projects that divert and anaerobically digest organic waste that otherwise would have gone to solid waste landfills

REQUEST FOR ACTION

To: Mark Leary
Acting Director
Department of Resources Recycling and Recovery

From: Mark de Bie
Branch Chief
Permitting and Assistance Branch

Request Date: June 21, 2011

Decision Subject: Request for Certification of the Anaerobic Digestion Final Program Environmental Impact Report (EIR) and Approve Anaerobic Digestion Initiative

Request Action By: June 23, 2011

Summary of Request: This is a request that the Acting Director certify the Anaerobic Digestion Final Program EIR, make required CEQA Findings, adopt the Mitigation Monitoring and Reporting Plan and approve the Anaerobic Digestion Initiative. Staff's detailed findings and recommendations are provided in the attached Staff Report.

The Draft Program EIR was circulated for comment on February 11, 2011 through April 4, 2011. Comments were also accepted at the CalRecycle Monthly Public Meeting on March 15, 2011 in Sacramento and on March 30, 2011 in Lakewood. CalRecycle received 19 comment letters/emails on the Draft Program EIR, and responses to comments have been incorporated into the Draft Program EIR to form the Final Program EIR (FPEIR). A Mitigation Monitoring and Reporting Plan has been developed and posted.

The Anaerobic Digestion Initiative consists of adoption of a policy and a series of discrete actions to implement the policy to advance anaerobic digestion technology as described in the FPEIR and the staff report.

Recommendation: Staff recommends the Acting Director certify the Anaerobic Digestion Final Program EIR and approve the Anaerobic Digestion Initiative. The proposed AD Initiative will have potentially significant impacts, as identified in the Final Program EIR (Table 1-1 Revised) but which can be mitigated to less than significant. Those impacts will occur only upon the construction and operation of specific anaerobic digestion facilities, if and when that occurs. Table 1-1 Revised specifies mitigation measures (that is, "changes or alterations" required in the project to avoid or substantially lessen each significant environmental effect) which will have the desired effect of avoiding or substantially lessening the potentially significant impacts identified in the Final Program EIR. Therefore, with respect to the Acting Director's certification of the Final Program EIR and adoption of this project, the Anaerobic Digestion Initiative, all of the changes or alterations (i.e., Final Program EIR Mitigation Measures) to specific projects which are constructed and operated in the future will be within the responsibility and jurisdiction of other public agencies and not CalRecycle. Staff has prepared, and recommends that the Acting Director adopt, the Mitigation Monitoring and Reporting Plan (MMRP) prepared in conjunction with the Final Program EIR. The mitigation measures specified in the MMRP are fully enforceable through permit conditions to be imposed by the Lead Agency and other Responsible Agencies, agreements with project proponents, and similar means.

Acting Director Findings:

- I adopt the findings as recommended by CalRecycle staff in the staff report attached to this Request for Action.
- I have reviewed the FPEIR and have considered the information in it.

Acting Director Action:
On the basis of the information above, the staff report attached to this Request for Action and on staff's recommendation, and the findings set out in the attached staff report and stated above, I hereby certify the Anaerobic Digestion Final Program EIR, adopt the Mitigation Monitoring and Reporting Plan, and approve the Anaerobic Digestion Initiative.

Dated: June 22, 2011

Mark Leary, Acting Director
Department of Resources Recycling and Recovery

Attachments: Staff Report; AD Initiative; AD Program EIR; Mitigation Monitoring and Reporting Plan

NOTICE OF DETERMINATION

TO: Office of Planning and Research
P.O. Box 3044
Sacramento, CA 95812-3044

FROM: Department of Resources Recycling and Recovery (CalRecycle)
P.O. Box 4025
Sacramento, CA, 95812-4025

SUBJECT: Filing Notice of Determination in Compliance with Public Resource Code § 21108(a) and Title 14, California Code of Regulations § 15094.

Project Title: **Anaerobic Digestion Initiative and Statewide Anaerobic Digester Facilities for the Treatment of Municipal Organic Solid Waste**

State Clearinghouse Number: 2010042100 Project Contact Person: Ken Decio 916 341-6313

Project Location: Statewide

Project Description: Adoption by CalRecycle of the Anaerobic Digestion Initiative which includes the adoption of a policy and a series of discrete actions to implement the policy which includes:
It is CalRecycle policy to encourage the development of AD facilities in California as an alternative to the landfill disposal of organic solid waste. Specifically, as an initial measure, CalRecycle will encourage the establishment of in-vessel digesters located at existing or new solid waste facilities and in areas zoned for industrial or solid waste handling activities.
CalRecycle shall, not later than January 1, 2012, establish programs to implement the above policy including without limitation:

- Provide research grants, loans, and contracts (dependent on funding availability) to develop AD facilities and for activities that advance the state of knowledge about anaerobic digestion and its applications and the uses of products and by-products, including anaerobic digestion demonstration projects that use the organic fraction of municipal solid waste as a feedstock.
- Develop guidance publications to assist operators who seek to establish AD facilities.
- Develop guidance publications to assist LEAs and other local and regional government agencies that permit and regulate AD facilities, specifically guidance for co-location at solid waste facilities.
- Draft revised regulations for aspects of specific design, operation and permitting of AD facilities within the authority and responsibility of CalRecycle.
- Promote anaerobic digestion through CalRecycle's participation with the California Energy Commission in implementing AB 118 (Alternative and Renewable Fuel and Vehicle Technology Program), the Bioenergy Interagency Working Group, and with the Air Resources Board in implementing the Anaerobic Digestion and Low Carbon Fuel Standard measures in the AB 32 Climate Change Scoping Plan.
- Work with the California Pollution Control Financing Authority and California Alternative Energy and Advanced Transportation Financing Authority to help anaerobic digestion project proposals obtain funding.
- Participate on technical workgroups convened by the Climate Action Reserve to develop or modify protocols, such as the Organic Waste Digestion Project Protocol, for projects that divert and anaerobically digest organic waste that otherwise would have gone to solid waste landfills.

This is to advise that the CalRecycle acting as a Lead Agency approved the above named project on June 22, 2011, and has made the following determinations regarding the above described project:

1. The project will not have a significant effect on the environment.
2. An Environmental Impact Report for this project was prepared and certified pursuant to the provisions of CEQA.
3. Mitigation measures were made a condition of the approval of the project and CalRecycle adopted a Mitigation Monitoring and Reporting Plan.
4. The Lead Agency did not adopt a Statement of Overriding Considerations.
5. Findings were made pursuant to the provisions of CEQA.

This is to certify that the Final Program EIR with comments and responses to comments and the record of project approval by CalRecycle is available to the general public at: Custodian of Records, CalRecycle, Attn: Legal Office, 1001 I Street, P.O. Box 4025, Sacramento, CA 95812-4025

Mark de Bie
Permits and Certification Division
Permitting and Assistance Branch
CalRecycle

Date 6/22/2011

RECEIVED
JUN 22 2011
STATE CLEARING HOUSE

State of California –The Natural Resources Agency
DEPARTMENT OF FISH AND GAME.
1416 9th Street, 12th Floor
Sacramento, CA 95814
www.dfg.ca.gov

***EDMUND G. BROWN, Jr.**, Governor*
***JOHN McCAMMAN**, Director*

CEQA Filing Fee No Effect Determination Form

Applicant Name: California Department of Resources Recycling and Recovery
Date Submitted: April 4, 2011
Applicant Address: 801 K Street, Sacramento, CA 95814

Project Name: Statewide Anaerobic Digester Facilities for the Treatment of Municipal Organic Solid Waste

CEQA Lead Agency: California Department of Resources Recycling and Recovery
CEQA Document Type: (ND, MND, EIR) Environmental Impact Report
SCH Number and/or local agency ID number: SCH#2010042100

Project Location: Statewide

Brief Project Description: CalRecycle proposes to adopt the "Anaerobic Digestion Initiative," a collection of policies and actions intended to reduce the landfill disposal of organic solid waste in California and to reduce the release of methane, a potent greenhouse gas, from the state's landfills into the atmosphere. To support the efforts of local governments to site anaerobic digestion (AD) facilities and the efforts of solid waste facility operators to develop such facilities, CalRecycle has prepared a draft programmatic EIR to identify and evaluate the potential generic environmental effects of a certain type of AD facilities that CalRecycle believes can most readily be developed, namely, in-vessel digesters located at existing or new solid waste facilities in areas zoned for industrial or solid waste handling activities. Any such facility developed in the future may, of course, have different environmental effects than those addressed in the PEIR and will have site-specific impacts which must be considered by appropriate local, regional and state agencies which will require additional analysis as required by CEQA.

Determination: Based on a review of the Project as proposed, the Department of Fish and Game has determined that for purposes of the assessment of CEQA filing fees [F&G Code 711.4(c)] the project has no potential effect on fish, wildlife and habitat and the project as described does not require payment of a CEQA filing fee. This determination does not in any way imply that the project is exempt from CEQA and does not determine the significance of any potential project effects evaluated pursuant to CEQA.

Please retain this original determination for your records; you are required to file a copy of this determination with the County Clerk after your project is approved and at the time of filing of the CEQA lead agency's Notice of Determination (NOD). If you do not file a copy of this determination with the County Clerk at the time of filing of the NOD, the appropriate CEQA filing fee will be due and payable.

Without a valid No Effect Determination Form or proof of fee payment, the project will not be operative, vested, or final and any local permits issued for the project will be invalid, pursuant to Fish and Game Code Section 711.4(c)(3).

RECEIVED
JUN 22 2011
STATE CLEARING HOUSE

DFG Approval By: Leslie Newton-Reed Date: 4-7-2011

Title: Environmental Scientist

RECEIVED
APR 12 2011
nc/K. Decio

CALIFORNIA DEPT. OF FISH AND GAME
SOUTH COAST REGION
4949 VIEWRIDGE AVENUE
SAN DIEGO, CA 92123-1662

Conserving California's Wildlife Since 1870

STATEWIDE ANAEROBIC DIGESTER FACILITIES FOR THE TREATMENT OF MUNICIPAL ORGANIC SOLID WASTE

Draft Program Environmental Impact Report
SCH No. 2010042100

Prepared for the
California Department of Resources
Recycling and Recovery (CalRecycle)

February 2011

ESA

STATEWIDE ANAEROBIC DIGESTER FACILITIES FOR THE TREATMENT OF MUNICIPAL ORGANIC SOLID WASTE

Draft Program Environmental Impact Report
SCH No. 2010042100

Prepared for the
California Department of Resources
Recycling and Recovery (CalRecycle)

February 2011

ESA

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Natural Resources Agency Edmund G. Brown, Jr, Governor

CalRecycle

DEPARTMENT OF RESOURCES RECYCLING AND RECOVERY

801 K STREET, MS 19-01, SACRAMENTO, CALIFORNIA 95814• (916) 322-4027 • WWW.CALRECYCLE.CA.GOV

NOTICE OF COMPLETION OF DRAFT EIR

Opportunity for Public Comment on Draft Program Environmental Impact Report for Statewide Anaerobic Digester Facilities for the Treatment of Municipal Organic Solid Waste (SCH #2010042100)

NOTICE IS HEREBY GIVEN that the California Department of Resources Recycling and Recovery (CalRecycle), as the lead agency, has released a Draft Program Environmental Impact Report (EIR) for Statewide Anaerobic Digester (AD) Facilities for the Treatment of Municipal Organic Solid Waste. The public review and comment period for the Draft Program EIR has started and will end on April 4, 2011. During the review period, CalRecycle will hold a public meeting on March 15, 2011 (see meeting information below) to discuss the Draft Program EIR and receive comments. In addition, the public may provide written comments on the Draft Program EIR during the review period.

BACKGROUND

The Draft Program EIR provides a programmatic analysis of potential environmental effects that may result from the adoption of an Anaerobic Digestion (AD) Initiative and subsequent development of AD facilities in the State of California, in accordance with the California Environmental Quality Act (CEQA).

CalRecycle plans to adopt an Anaerobic Digestion Initiative (the AD Initiative) in 2011, which will be a set of comprehensive program elements to foster the development of AD facilities that convert organic solid wastes into sources of energy and can produce valuable compost feedstocks, soil amendments, and other products. Implementation of the AD Initiative will assist in meeting the following objectives:

- Support CalRecycle Strategic Directive 6.1: to reduce the amount of organics in the waste stream by 50 percent by 2020.
- Support Assembly Bill 32 (AB 32), the California Global Warming Solutions Act of 2006, greenhouse gas reduction measures related to the use of anaerobic digestion.
- Assist local governments and state agencies (both lead and responsible agencies) by providing program-level analyses that will identify potential environmental effects of AD facilities and discuss mitigation measures or best management practices that can reduce or eliminate the environmental effects.

SIGNIFICANT ENVIRONMENTAL EFFECTS

The Draft EIR evaluates and describes, on a statewide, program-level basis, the potential environmental impacts associated with the construction and operation of AD facilities, identifies those impacts that could be significant, and presents mitigation measures, which, if adopted by CalRecycle or other responsible agencies, could avoid or minimize these impacts. There are no significant and unavoidable impacts identified in the Draft Program EIR.

DOCUMENT AVAILABILITY

The Draft Program EIR will be available for public review at the CalEPA Library during the review period:

CalEPA Building, 2nd Floor
1001 I Street
P.O. Box 2815
Sacramento, CA
95812-2815
Phone: (916) 322-4027

Electronic copies of the Draft Program EIR can be downloaded in PDF format from the CalRecycle website at:

http://www.calrecycle.ca.gov/SWFacilities/Compostables/AnaerobicDig

Additional access to copies may also be accomplished by contacting Paul Miller, by phone at (916) 564-4500 or by e-mail (PMiller@esassoc.com); there will be a reasonable fee charged for a hardcopy or CD version.

CONTACT PERSON

Ken Decio, CalRecycle – (916) 341-6313 (ken.decio@calrecycle.ca.gov)

PUBLIC MEETING AND SCHEDULE

The public will have an opportunity to provide comments on the Draft Program EIR during the following CalRecycle Monthly Public Meeting:

Date: Tuesday, March 15, 2011

Time: 10:00 AM

Address: CalEPA building
1001 I Street
Byron Sher Auditorium (2nd floor)
Sacramento, CA 95814

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Statewide Anaerobic Digester Facilities DPEIR

CHAPTER 1

Executive Summary

1.1 Introduction

CalRecycle has prepared this Draft Program Environmental Impact Report (EIR) to assess the potential environmental effects that may result from the adoption of an Anaerobic Digestion (AD) Initiative, a comprehensive program to foster the development of AD facilities to process the organic fraction of municipal solid waste and other organic wastes throughout the State of California. Throughout the document, the adoption of the AD Initiative and subsequent development of AD facilities in California will be referred to as the “project”.

This Draft Program EIR will inform future policy considerations related to AD facilities and assist state and local agencies in preparing site-specific environmental documentation that may be required for AD facility applications and/or permits submitted to CalRecycle, regulatory agencies and local jurisdictions. In the event CalRecycle or other public agencies adopt regulations or ordinances relating to regulating or permitting AD facilities, the Draft Program EIR provides useful information and can serve as the basis for analyzing the environmental effects of individual projects.

By preparing this Program EIR, CalRecycle is providing additional focus in California on the potential development of AD facilities. While there has been considerable discussion and interest in AD facilities in California, to date there has not been a broad review of the potential environmental impacts of developing AD facilities. This Program EIR responds to the need for such environmental review. Some members of the Technical Advisory Group (TAG) have a concern that, by preparing the Program EIR, CalRecycle is indicating a preference for AD technologies over other technologies, or that it will appear that way to the public. CalRecycle emphasizes that the intent of this document is not to identify AD facilities as preferred to alternative waste management options, or to identify preferred AD facility systems or vendors. CalRecycle has previously provided RMDZ loans, permitting guidance, and technical assistance for projects using a range of technologies including biochemical and thermochemical conversion technologies. This effort should best be understood as an effort by CalRecycle to use its very limited funding to analyze the potential environmental impacts of AD facilities, which is but one of the conversion technologies available to reduce the level of organics going to landfills in California. The Program EIR is a starting point for the environmental review of AD facilities proposed in local jurisdictions. By tapping into the considerable California specific knowledge and experience of CalRecycle staff and the TAG, this effort provides a technical outreach and overview that would not otherwise be available to local jurisdictions considering a specific AD facility proposal.

1.2 Anaerobic Digestion Initiative

Under its Strategic Directive 6.1, CalRecycle seeks to reduce by 50 percent the amount of organic waste disposed in the state's landfills by 2020. In addition to helping conserve limited landfill capacity, this CalRecycle policy recognizes that organic wastes are a resource, not just solid wastes that must be disposed. Organic wastes have an energy value that can be captured and utilized and are also a necessary component of compost, soil amendments, and other useful products. Directive 6.1 also encompasses one of CalRecycle's actions to help California significantly reduce its generation of greenhouse gases. Under the State's *Climate Change Scoping Plan* (CARB, 2008), CalRecycle is responsible for taking actions to reduce the emission of methane, a potent greenhouse gas, from landfills. AD facilities utilize organic wastes as a feedstock from which to produce biogas (which is captured and contains a high percentage of methane). Typically the methane gas produced by the anaerobic digestion process is converted to liquefied natural gas (LNG), compressed natural gas (CNG), or electricity (using internal combustion engines or fuel cells) for on-site energy needs and export to the energy grid (CARB, 2008). The development of AD facilities is one of CalRecycle's charges under the AB 32 Climate Change Scoping Plan. The AB 32 Climate Change Scoping Plan estimates that AD facilities in California could avoid methane emissions from landfills at a level of 2 million metric tons of carbon dioxide equivalents (CO_2e) per year by the year 2020 (CARB, 2008). Anaerobic digestion also can contribute to meeting the State's Renewable Portfolio Standard and Low Carbon Fuel Standard. To assist in achieving those objectives, CalRecycle intends to adopt the AD Initiative, a comprehensive program to foster the development of AD facilities to convert organic solid wastes into sources of energy, valuable compost feedstocks, soil amendments, and other products.

The AD Initiative consists of CalRecycle's adoption of a policy and a series of discrete actions to implement the policy, together with additional actions that will be developed and implemented in the future:

- It is the policy of CalRecycle to encourage the development of AD facilities in California as an alternative to the landfill disposal of organic solid waste. Specifically, as an initial measure, CalRecycle will encourage the establishment of in-vessel digesters located at existing or new solid waste facilities and in areas zoned for industrial or solid waste handling activities.
- CalRecycle shall, not later than January 1, 2012, establish programs to implement the above policy, including without limitation:
    - Provide research grants, loans, and contracts (dependent on funding availability) to develop AD facilities and for activities that advance the state of knowledge about anaerobic digestion and its applications and the uses of products and by-products, including anaerobic digestion demonstration projects that use the organic fraction of municipal solid waste as a feedstock.
    - Develop guidance publications to assist operators who seek to establish AD facilities.
    - Develop guidance publications to assist LEAs and other local and regional government agencies that permit and regulate AD facilities, specifically guidance for co-location at solid waste facilities.

  - Draft revised regulations for aspects of specific design, operation and permitting of AD facilities within the authority and responsibility of CalRecycle.
  - Promote anaerobic digestion through CalRecycle's participation with the California Energy Commission in implementing AB 118 (Alternative and Renewable Fuel and Vehicle Technology Program), the Bioenergy Interagency Working Group, and with the Air Resources Board in implementing the Anaerobic Digestion and Low Carbon Fuel Standard measures in the AB 32 Climate Change Scoping Plan.
  - Work with the California Pollution Control Financing Authority and California Alternative Energy and Advanced Transportation Financing Authority to help anaerobic digestion project proposals obtain funding.
  - Participate on technical workgroups convened by the Climate Action Reserve to develop or modify protocols, such as the Organic Waste Digestion Project Protocol, for projects that divert and anaerobically digest organic waste that otherwise would have gone to solid waste landfills.

1.3 Project Objectives

The project has several objectives including the following:

- Assist in meeting CalRecycle Strategic Directive 6.1: Reduce the amount of organics in the waste stream by 50 percent by 2020.
- Support Assembly Bill 32 (AB 32), the California Global Warming Solutions Act of 2006, greenhouse gas reduction measures related to the use of anaerobic digestion:
  - Measures E-3. Achieve a 33 percent renewable energy mix by 2020. (AD facilities produce biogas which is a renewable energy source.)
  - RW-3. High Recycling/Zero Waste. (Anaerobic digestion is one of five subcategories listed under this measure.)
- Assist local governments and state agencies (both lead and responsible agencies) by providing program-level analyses that will identify potential environmental effects of AD facilities and discuss mitigation measures or best management practices that can reduce or eliminate the environmental effects.

1.4 Proposed Facilities

The scope of proposed facility types has been focused by the objective of reducing the organic content of the solid wastes that are disposed in municipal solid waste landfills and to generate or recover energy from the solid wastes.

AD Facilities included in the scope: In-vessel AD facilities which are located at existing or new permitted solid waste facilities or stand-alone AD facilities in areas zoned for industrial or solid waste handling activities.

AD Facilities not included in the scope: Dairy manure digesters, dairy manure co-digesters and wastewater treatment plant digesters. In-ground digester cell technology (for example the landfill-based anaerobic digester-compost pilot project developed at the Yolo County Central Landfill), though not included in the project, is discussed and evaluated as an alternative in **Chapter 13**.

There are several variations of in-vessel digester technologies. This Draft Program EIR allows for flexibility in technology choices at the local level. Different in-vessel technologies have the same general processes which are discussed in the siting, construction and operational sections, below.

1.5 Feedstocks

The scope of this Draft Program EIR is focused on reducing organic portions of the municipal solid waste stream and feedstocks which enhance the efficiency of the AD process.

Feedstock materials included in the scope: Food waste, green material and mixed solid waste. The food and green material categories are intended to be inclusive and not limited by current regulatory definitions or collection methods – “food” includes cannery waste, meat, poultry, fish, cheese waste, food processing waste, fats, oils and greases (FOG), etc., and “green material” includes urban, agricultural, crop residues, contaminated green materials, etc. Use of manure will be considered as nitrogen nutrient amendment material for the purpose of increasing the growth of microorganisms and digester efficiency, but not as a primary waste stream to be evaluated.

Feedstock materials not included in the scope: Biosolids, untreated septage, waste co-digested with biosolids at wastewater treatment plants or dairy manure co-digesters, and hazardous waste.

1.6 Summary of Significant Impacts and Mitigation Measures

Potential environmental impacts of the project are summarized in **Table 1-1**, below. As indicated in the table, all the impacts could be mitigated to a less-than-significant level with implementation of the mitigation measures. Please refer to Chapters 5 through Chapter 11 in this Draft Program EIR for a complete discussion of each impact. As discussed in Chapter 2, a Mitigation Monitoring or Reporting Program (MMRP) will be prepared at the time of the Final Program EIR for this project.

Notably, the development of AD facilities would have substantial benefits in regards to diverting organic material from landfills and reducing greenhouse gas (GHG) emissions in comparison to existing practices.

1.7 Areas of Controversy and Other CEQA Considerations

For the most part, comments received from members of the Technical Advisory Group (TAG) (see the list of members in Chapter 14) and in response to the EIR Notice of Preparation (NOP) have been supportive of the goals of the Program EIR. There was general support from the TAG members that the Program EIR move forward quickly to provide information that can help AD facility projects that are in the early phases of planning and/or permitting. Also there was considerable support from the TAG for regulations to specifically address the permitting of AD facilities.

The inclusion of the Landfill In-Ground Digester Cell Alternative was a topic that raised some controversy in the TAG meetings. Some members (on one NOP comment letter) indicated that it should be included as part of the project. Other TAG members wanted it discussed as an alternative or not at all in the Program EIR. Ultimately the in-ground digester cell was considered as an alternative to the project (in the Program EIR) because, while it has similar target feedstocks, it is unique in comparison to the in-vessel systems considered in the Program EIR.

Some TAG members indicated that the Thermal Conversion Alternative is not an appropriate project alternative, because thermal conversion technologies have different target feedstock materials than AD facilities. Because of the differences in target feedstock materials, the Thermal Conversion Alternative was described in some detail in Chapter 13, but it was not directly compared as an alternative to the project.

1.8 Alternatives

The purpose of the alternatives analysis in an EIR is to describe a range of reasonable alternatives to the project that could feasibly attain the objectives of the project, and to evaluate the comparative merits of the alternatives (CEQA Guidelines §15126.6(a)). Additionally, CEQA Guidelines §15126.6(b) requires consideration of alternatives that could avoid or substantially lessen any significant adverse environmental effects of the proposed project, including alternatives that may be more costly or could otherwise impede the project's objectives. The range of alternatives considered must include those that offer substantial environmental advantages over the proposed project and may be feasibly accomplished in a successful manner considering economic, environmental, social, technological, and legal factors.

The following alternatives are fully analyzed and evaluated in Chapter 13, Alternatives:

- No Project Alternative. Under the No Project Alternative, CalRecycle would not undertake the AD Initiative. This would maintain the status quo for AD facilities with respect to CEQA and permitting. AD facilities would be required to comply with current CEQA and other regulatory requirements without the benefit of the project. Development of AD facilities would continue in its current form and would be regulated by CalRecycle, by other permits from responsible agencies (i.e., County Use Permits, air and water quality permits, etc.), and by local and regional governments through local ordinances and regulations. The potential for reducing disposal of organics at California landfills would be reduced.
- Co-Digestion at Wastewater Treatment Plants (WWTPs) Alternative. Under the Co-Digestion at WWTPs Alternative, the AD Initiative would apply to the construction and operation of co-digestion facilities at existing AD facilities at WWTPs for the diversion of organic materials from landfills and the production of biogas from organics in the waste stream.
- Co-Digestion at Dairy Manure Digesters Alternative. Under the Co-Digestion at Dairy Manure Digesters Alternative, the AD Initiative would apply to the construction and operation of co-digestion facilities at dairy manure digesters for the diversion of organic materials (as co-digestion feedstocks) from California landfills and the production of biogas from organics in the waste stream.
- Increased Aerobic Composting Alternative. Under the Increased Aerobic Composting Alternative, the AD Initiative would apply to the construction and/or operation

changes needed at existing or new compost facilities to divert more organic materials from California landfills.

- Landfill In-Ground Digester Cell Alternative. Under the Landfill In-Ground "Digester Cell" Alternative, the AD Initiative would apply to the construction and operation of in-ground digesters at a landfill that are limited to organic materials and which would utilize liquid injection and recirculation.

The analysis of the alternatives found that only the Increased Aerobic Composting Alternative and the Co-Digestion at Existing WWTPs Alternative are promising for being able to substantially assist in reducing the amount of organics in the waste stream by 2020, a key project objective. Between the two alternatives that could substantially reduce organics, the Increased Aerobic Composting Alternative would appear to have more flexibility in expanding existing facilities or adding new facilities to handle the increased organic materials. While WWTPs could use any current excess capacity they have to digest the additional organics, once that capacity is maximized, it would be a major step for a WWTP to add a new AD facility to their facility for the purpose of digesting municipal organic solid wastes, which is not the primary role of WWTPs. Therefore, compared to the alternatives analyzed in this chapter, the Aerobic Composting Alternative is the environmentally superior alternative because it is most likely to result in substantial reductions in organics in the waste stream by 2020. However, it should be noted that the proposed project (the AD Initiative) could substantially achieve all the project objectives and could be implemented with mitigation measures that would reduce most of the project impacts to a level that would be less than significant.

TABLE 1-1
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance	
		Before Mitigation	After Mitigation
5. Air Quality and Greenhouse Gas			
Impact 5.1: Construction and operations of AD facilities within California would result in emissions of criteria air pollutants at levels that could substantially contribute to a potential violation of applicable air quality standards or to nonattainment conditions.	**Measure 5.1a:** Applicants shall prepare and submit an Air Quality Technical Report as part of the environmental assessments for the development of future AD facilities on a specific project-by-project basis. The technical report shall include an analysis of potential air quality impacts (including a screening level analysis to determine if construction and operation related criteria air pollutant emissions would exceed applicable air district thresholds, as well as greenhouse gas (GHG) emissions and any health risk associated with toxic air contaminants (TACs) from all AD facility sources) and reduction measures. Preparation of the technical report should be coordinated with the appropriate air district and shall identify compliance with all applicable New Source Review and Best Available Control Technology (BACT) requirements. The technical report shall identify all project emissions from permitted (stationary) and non-permitted (mobile and area) sources and mitigation measures (as appropriate) designed to reduce significant emissions to below the applicable air district thresholds of significance, and if these thresholds cannot be met with mitigation, then the individual AD facility project could require additional CEQA review or additional mitigation measures. **Measure 5.1b:** Applicants shall require construction contractors and system operators to implement the following Best Management Practices (BMPs) as applicable during construction and operations: • Facilities shall be required to comply with the rules and regulations from the applicable Air Quality Management District (AQMD) or Air Pollution Control District (APCD). • Facilities shall require substrate unloading and pre-processing activities to occur indoors within enclosed, negative pressure buildings. Collected foul air (including volatile organic compounds (VOCs) off-gassed from undigested substrates) should be treated via biofilter or air scrubbing system. • Use equipment meeting, at a minimum, Tier II emission standards. • Minimize idling time either by shutting equipment off when not in use or reducing the time of idling to 5 minutes (as required by the state airborne toxics control measure [Title 13, §2485 of the California Code of Regulations]). Provide clear signage that posts this requirement for workers at the entrances to the site. • Maintain all equipment in proper working condition according to manufacturer's specifications. • Use electric equipment when possible. • Where feasible as an alternative to internal combustion engines, which generate nitrogen oxides (NOx) emissions, use biogas from AD facilities as a transportation fuel (compressed biomethane), in fuel cells to generate clean electricity, or inject biomethane into the utility gas pipeline system. If there are other low NOx technologies available at the time of AD facility development, these should be considered as well during the facility design process.	S	LSM
Impact 5.2: Operation of AD facilities in California could create objectionable odors affecting a substantial number of people.	**Measure 5.2a:** Applicants for the development of AD facilities shall comply with appropriate local land use plans, policies, and regulations, including applicable setbacks and buffer areas from sensitive land uses for potentially odoriferous processes.	S	LSM

LS – Less than Significant LSM – Less than Significant with Mitigation NI – No Impact S – Significant

TABLE 1-1
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance	
		Before Mitigation	After Mitigation
	Measure 5.2b: If an AD facility handles compostable material and is classified as a compostable material handling facility, the facility must develop an Odor Impact Minimization Plan (OIMP) pursuant to 14 CCR 17863.4. Otherwise, applicants shall develop and implement an Odor Management Plan (OMP) that incorporates equivalent odor reduction controls for digester operations. Odor control strategies that can be incorporated into these plans include, but are not limited to, the following: • A list of potential odor sources. • Identification and description of the most likely sources of odor. • Identification of potential, intensity, and frequency of odor from likely sources. • A list of odor control technologies and management practices that could be implemented to minimize odor releases. These management practices shall include the establishment of the following criteria: - Require substrate haulage to the AD facility within sealed containers. - Establish time limit for on-site retention of undigested substrates (i.e., substrates must be put into the digester within 24 hours of receipt). - Provide enclosed, negative pressure buildings for indoor receiving and pre-processing. Treat collected foul air in a biofilter or air scrubbing system. - Establish contingency plans for operating downtime (e.g., equipment malfunction, power outage). - Manage delivery schedule to facilitate prompt handling of odorous substrates. - Handle digestate within enclosed building and/or directly pump to sealed containers for transportation. - Protocol for monitoring and recording odor events. - Protocol for reporting and responding to odor events.		
Impact 5.3: Construction and operation of AD facilities in California could lead to increases in chronic exposure of sensitive receptors in the vicinity to certain toxic air contaminants from stationary and mobile sources.	**Measure 5.3a:** Implement Mitigation Measures 5.1a and 5.1b. **Measure 5.3b:** Based on the Air Quality Technical Report (specified in Measure 5.1a), if the health risk is determined to be significant on a project-by-project basis with diesel particulate matter (DPM) as a major contributor, then the applicants shall implement control measures such that the AD facility health risk would be below the applicable air district threshold, which may include implementation of one or more of the following requirements, where feasible and appropriate: • Use either new diesel engines that are designed to minimize DPM emissions (usually through the use of catalyzed particulate filters in the exhaust) or retrofit older engines with catalyzed particulate filters (which will reduce DPM emissions by 85%); • Use electric equipment to be powered from the grid, which would eliminate local combustion emissions; • Use alternative fuels, such as compressed natural gas (CNG) or liquefied natural gas (LNG).	S	LSM

LS – Less than Significant LSM – Less than Significant with Mitigation NI – No Impact S – Significant

TABLE 1-1
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance: Before Mitigation	Impact Significance: After Mitigation
	Measure 5.3c: Hydrogen sulfide (H2S) contained in the biogas shall be scrubbed (i.e., via iron sponge or other technology) before emission to air can occur.		
Impact 5.4: Development of AD facilities in California would reduce GHG emissions.	**Measure 5.4:** Implement Mitigation Measure 5.1a.	NI	NI
Impact 5.5: Development of AD facilities in California, together with anticipated cumulative development in the area, would contribute to regional criteria pollutants.	**Measure 5.5:** Implement Mitigation Measures 5.1a and 5.1b.	S	LSM
6. Hydrology			
Impact 6.1: Construction of AD Facilities could generate loose, erodible soils and other water quality pollutants that may impair water quality.	None required.	LS	LS
Impact 6.2: The operation of AD facilities could adversely affect surface and groundwater quality.	**Measure 6.2a:** During pre-processing, all water that contacts digester feedstock, including stormwater from feedstock handling and storage facilities and water from equipment washdown and feedstock wetting, shall be contained until appropriately disposed or utilized. Best Management Practices (BMPs) may be used to reduce loading of sediment, nutrients, trash, organic matter, and other pollutants. These BMPs may include, but are not limited to, trash grates and filters, oil-water separators, mechanical filters such as sand filters, vegetated swales, engineered wastewater treatment wetlands, settling ponds, and other facilities to reduce the potential loading of pollutants into surface waters or groundwater. All discharges of stormwater are prohibited unless covered under the General Industrial Stormwater Permit, other National Pollutant Discharge Elimination System (NPDES) permit, or are exempted from NPDES permitting requirements. The NPDES permits will generally require implementation of management measures to achieve a performance standard of best available technology economically achievable (BAT) and best conventional pollutant control technology (BCT), as appropriate. The General Industrial Stormwater Permit also requires the development of a storm water pollution prevention plan (SWPPP) and a monitoring plan, in compliance with permit requirements.[1] Other liquid and solid wastes may only be discharged pursuant to an NPDES permit or waste discharge requirement (WDR) order. **Measure 6.2b**: In order to minimize the amount of fugitive trash or feedstock released to surface waters, the following measures shall be implemented. When feasible, the project proponent shall preferentially select feedstocks that contain minimal amounts of trash that could become entrained in surface water, either via direct contact with stormwater flows or via other accidental release, such as due to wind. Processing of such feedstocks may, however, be unavoidable, such as in support of an AD facility that processes MSW. Therefore, the project applicant shall ensure that (1) drainage from all feedstock loading, unloading, and storage areas is contained onsite or treated to remove trash and stray feedstock, and sediment prior to release; (2) in all feedstock loading and unloading areas, and all areas where feedstock is moved by front loaders or other uncovered or uncontained transport machinery, the applicant shall ensure that mechanical sweeping and/or equivalent trash control operational procedures are performed at least daily, during operations; and (3) the facility operator shall train all employees involved in feedstock handling so as to	S	LSM

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[1] For more information, please refer to: http://www.swrcb.ca.gov/water_issues/programs/stormwater/industrial.shtml

LS – Less than Significant	LSM – Less than Significant with Mitigation	NI – No Impact	S – Significant

TABLE 1-1
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance	
		Before Mitigation	After Mitigation
	discourage, avoid, and minimize the release of feedstock or trash during operations. **Measure 6.2c**: In order to minimize water quality degradation associated with accidental spills at AD facilities, the applicant for individual projects that would be implemented under the Program EIR shall require project proponents to complete and adhere to the requirements of a Spill Prevention, Control, and Countermeasure Plan (SPCC). The SPCC shall contain measures to prevent, contain, and otherwise minimize potential spills of pollutants during facility operation, in accordance with federal, state, and local requirements. Additionally, the project applicant shall adhere to the requirements and recommendations of WDRs, which would be provided for the project by the applicable regional board. Requirements under WDRs include implementation of measures to minimize water quality degradation, including but not limited to restrictions on the concentration of water quality pollutants discharged from a proposed facility, and maximum acceptable flow volumes for a given facility. **Measure 6.2d:** Any proposed discharge to a pond for an individual project would require the project applicant to acquire WDRs from the appropriate regional board. The project applicant shall ensure that all ponds and discharges to such ponds adhere to all requirements under applicable WDRs. The need for pond liners in order to protect groundwater quality would be assessed during the regional board's review of the project, and requirements for pond liners would be included in the WDRs, as warranted. If appropriate, the WDRs would impose requirements for Class II surface impoundments as presented in Title 27 of the California Code of Regulations. Requirements include, but are not limited to, groundwater monitoring, double liner systems with leachate collection, water balance, a preliminary closure plan for clean closure, seismic analysis, and financial assurances. Compliance with WDRs may require the installation of facilities such as tanks and containers to store and process the digestate, the use of filter presses, and implementation of other water quality protection practices. **Measure 6.2e**: This measure would reduce potential for the movement of nutrients and other pollutants to groundwater and surface water for individual projects that would employ land application for liquid digestate or residual solids. The operators of individual projects implemented under this Program EIR shall ensure that land application of liquid digestate and/or residual solids adheres to all requirements of applicable WDRs. WDR requirements include but are not limited to, groundwater monitoring, completion of an anti-degradation analysis, and in some cases best practicable treatment and control to achieve salinity reduction in materials prior to discharge to land. WDRs would be issued by the appropriate regional board, and would consider site-specific conditions and waste characteristics, in order to determine applicable control measures and procedures that protect water quality. **Measure 6.2f:** This measure would reduce the potential for water quality degradation from projects that include discharge of liquid digestate to surface waters. The applicant for individual projects implemented under this Program EIR shall ensure that the discharge of liquid digestate to surface waters adheres to all NPDES permitting recommendations and requirements, as established by the appropriate regional board. Specific measures may include, but are not limited to, limitations on discharge volumes, seasonal discharge restrictions, limitations on loading rates and/or concentrations of specific constituents, and other facility-specific water quality control measures designed to protect receiving water quality and preserve beneficial uses identified in Basin Plans.		

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TABLE 1-1
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance	
		Before Mitigation	After Mitigation
Impact 6.3: AD facilities could be exposed to flooding hazards.	**Measure 6.3:** Individual applicants seeking coverage under this Program EIR shall ensure that, for their proposed AD facilities including pre-processing areas, feedstock storage areas, and digestate handling facilities, are protected from FEMA-defined 100-year flood events. Design measures may include, but are not limited to: facility siting, access placement, grading, elevated foundations, and site protection such as installation of levees or other protective features.	S	LSM
Impact 6.4: Construction of AD facilities could change drainage and flooding patterns	**Measure 6.4:** In order to ensure that the AD facilities would not result in detrimental increases in stormwater flow or flooding on site or downstream, the Applicant for each AD facility project shall prepare a comprehensive drainage plan (prior to construction) and implement the plan during construction. The comprehensive drainage plan shall include engineered stormwater retention facility designs, such as retention basins, flood control channels, storm drainage facilities, and other features as needed to ensure that, at a minimum, no net increase in stormwater discharge would occur during a 10-year, 24-hour storm event, as a result of project implementation. Project related increases in stormwater flows shall be assessed based on proposed changes in impervious surface coverage on site, as well as proposed grading and related changes in site topography.	S	LSM
Impact 6.5: AD facilities could require additional water supplies resulting in depletion of groundwater.	None required.	LS	LS
Impact 6.6: AD facilities could become inundated as a result of seiche, tsunami, or mudflow.	**Measure 6.6:** To ensure that proposed AD facilities would not incur impacts associated with seiche, tsunami, or mudflow, the applicant for each individual project shall ensure that all facilities are located outside of potential risk areas for seiche, tsunami, and mudflow. In the event that a proposed facility would be sited within a potential risk area for one of these hazards, the facility shall be raised above projected maximum base inundation elevations, or shall be protected from inundation by the installation of berms, levees, or other protective facilities.	S	LSM
Impact 6.7: AD facilities could contribute to cumulative impacts to water quality.	**Measure 6.7:** Implement Mitigation Measures 6.2 (a-f) and 6.3.	S	LSM
7. Noise			
Impact 7.1: Construction of AD facilities could temporarily increase noise levels at nearby sensitive receptor locations or result in noise levels in excess of standards in local general plans, noise ordinances, or other applicable standards.	**Measure 7.1a:** Construction activities shall be limited to the hours between 7 a.m. and 7 p.m., Monday through Saturday, or an alternative schedule established by the local jurisdiction, or other limits to construction hours normally enforced by the local jurisdiction (see Measure 7.1d below). **Measure 7.1b:** Construction equipment noise shall be minimized by muffling and shielding intakes and exhaust on construction equipment to a level no less effective than the manufacture's specifications, and by shrouding or shielding impact tools. **Measure 7.1c:** Construction contractors within 750 feet of sensitive receptors shall locate fixed construction equipment, such as compressors and generators, and construction staging areas as far as possible from nearby sensitive receptors. **Measure 7.1d**: Construction contractors shall comply with all local noise ordinances and regulations.	S	LSM

LS – Less than Significant LSM – Less than Significant with Mitigation NI – No Impact S – Significant

TABLE 1-1
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance Before Mitigation	Impact Significance After Mitigation
Impact 7.2: Noise from operation of AD facilities could substantially increase ambient noise levels at nearby land uses or result in noise levels in excess of standards in local general plans, local noise ordinances, or other applicable standards.	**Measure 7.2:** AD facilities located within 2,000 feet of a sensitive receptor shall conduct a site specific noise study. If operational sound levels would exceed local regulations, or 45 dBA at a sensitive receptor (if no regulations are available), additional sound-proofing such as enclosures, muffling, shielding, or other attenuation measures shall be installed to meet the required sound level.	S	LSM
Impact 7.3: AD facility operational activities associated with transportation would not increase ambient noise levels at nearby land uses.	None required.	LS	LS
Impact 7.4: Development of AD facilities could result in a cumulative increase in noise levels.	**Measure 7.4:** Implement Mitigation Measures 7.1a through 7.1d and Measure 7.2.	S	LSM
8. Public Services and Utilities			
Impact 8.1: The project would not substantially increase demands on fire protection services.	None required.	LS	LS
Impact 8.2: The project could potentially exceed wastewater treatment requirements of the Regional Water Quality Control Board (RWQCB).	**Measure 8.2a:** Implement Mitigation Measure 8.3b if the operator does not have an existing agreement, such as for co-located facilities. **Measure 8.2b:** In addition to an agreement for service, coordination with the wastewater treatment provider would be needed to determine if pre-treatment would be required to meet the RWQCB requirements for the existing wastewater treatment facility.	S	LSM
Impact 8.3: The project could result in significant environmental effects from the construction and operation of new water and wastewater treatment facilities or expansion of existing facilities.	**Measure 8.3a:** If the project proposes to obtain water from a water supplier (municipal system or other public water entity), the developer would enter into an agreement for service with the supplier. **Measure 8.3b**: If the project proposes to obtain wastewater service from a wastewater treatment provider (municipal or other public entity), the developer would enter into an agreement for service with the provider.	S	LSM
Impact 8.4: The project would not result in significant environmental effects from the construction of new stormwater treatment facilities or expansion of existing facilities.	None required.	LS	LS
Impact 8.5: The project would not require significant levels of new or expanded water supply resources or entitlements.	None required.	LS	LS
Impact 8.6: The project could result in exceeding the capacity of a wastewater treatment provider.	**Measure 8.6:** If the project proposes to obtain wastewater service from a wastewater treatment provider (municipal or other public entity), implement Mitigation Measure 8.3b.	S	LSM
Impact 8.7: The project could result in the construction of new energy supplies and could require additional energy infrastructure.	**Measure 8.7:** Projects requiring off-site energy infrastructure must complete CEQA review for the proposed energy improvements as a separate project. Infrastructure improvements may qualify as a categorical exemption pursuant to CEQA.	S	LSM
Impact 8.8: Development of AD facilities would not contribute to cumulative impacts to public services and utilities.	None required.	LS	LS

LS – Less than Significant LSM – Less than Significant with Mitigation NI – No Impact S – Significant

TABLE 1-1
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance Before Mitigation	Impact Significance After Mitigation
9. Transportation			
Impact 9.1: Construction of AD facilities would intermittently and temporarily increase traffic congestion due to vehicle trips generated by construction workers and construction vehicles on area roadways.	**Measure 9.1:** The contractor(s) will obtain any necessary road encroachment permits prior to installation of pipelines within the existing roadway right-of-way. As part of the road encroachment permit process, the contractor(s) will submit a traffic safety / traffic management plan (for work in the public right-of-way) to the agencies having jurisdiction over the affected roads. Elements of the plan will likely include, but are not necessarily limited to, the following: • Develop circulation and detour plans to minimize impacts to local street circulation. Use haul routes minimizing truck traffic on local roadways to the extent possible. Use flaggers and/or signage to guide vehicles through and/or around the construction zone. • To the extent feasible, and as needed to avoid adverse impacts on traffic flow, schedule truck trips outside of peak morning and evening commute hours. • Limit lane closures during peak traffic hours to the extent possible. Restore roads and streets to normal operation by covering trenches with steel plates outside of allowed working hours or when work is not in progress. • Limit, where possible, the pipeline construction work zone to a width that, at a minimum, maintains alternate one-way traffic flow past the construction zone. • Install traffic control devices as specified in Caltrans' Manual of Traffic Controls for Construction and Maintenance Work Zones where needed to maintain safe driving conditions. Use flaggers and/or signage to safely direct traffic through construction work zones. • Coordinate with facility owners or administrators of sensitive land uses such as police and fire stations, hospitals, and schools. Provide advance notification to the facility owner or operator of the timing, location, and duration of construction activities. • Coordinate with the local public transit providers so that bus routes or bus stops in work zones can be temporarily relocated as the service provider deems necessary.	S	LSM
Impact 9.2: AD facility operations would not substantially increase on-going (operational) traffic volumes on roadways serving the facilities.	**Measure 9.2:** Measures will be imposed by applicable local agencies, as needed, to address site-specific significant traffic impacts identified during subsequent facility-specific analyses, implementation of which would reduce those impacts to a less-than-significant level.	S	LSM
Impact 9.3: AD facilities could potentially cause traffic safety hazards for vehicles, bicyclists, and pedestrians on public roadways, and could increase traffic hazards due to possible road wear or to accidental spills of digestate (liquids and solids).	**Measure 9.3a:** Implement Measure 9.1, which stipulates actions required of the contractor(s) to reduce potential traffic safety impacts to a less-than-significant level. **Measure 9.3b:** Prior to construction, the contractor(s), in cooperation with the agencies having jurisdiction over the affected roadways, will survey and describe the pre-construction roadway conditions on rural roadways and residential streets. Within 30 days after construction is completed, the affected agencies will survey these same roadways and residential streets in order to identify any damage that has occurred. Roads damaged by construction will be repaired to a structural condition equal to the condition that existed prior to construction activity.	S	LSM

LS – Less than Significant LSM – Less than Significant with Mitigation NI – No Impact S – Significant

TABLE 1-1
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance	
		Before Mitigation	After Mitigation
	Measure 9.3c: Prior to initiation of project operations, the project sponsor(s) will submit a Spill Prevention Plan to the appropriate local agency. The Spill Prevention Plan will include, among other provisions, a requirement that each truck driver know how to carry out the emergency measures described in the Spill Prevention Plan (therefore reducing roadway hazards if an accidental spill were to occur).		
Impact 9.4: AD facilities could intermittently and temporarily impede access to local streets or adjacent uses (including access for emergency vehicles), as well as disruption to bicycle/pedestrian access and circulation.	**Measure 9.4:** Implement Measure 9.1, which stipulates actions required of the contractor(s) to reduce potential access impacts to a less-than-significant level.	S	LSM
Impact 9.5: The project could contribute to cumulative impacts to traffic and transportation (traffic congestion, traffic safety, and emergency vehicle access).	**Measure 9.5a:** Prior to construction, the project sponsor will coordinate with the appropriate local government departments, Caltrans, and utility districts and agencies regarding the timing of construction projects that would occur near AD project sites. Specific measures to mitigate potential significant impacts will be determined as part of the interagency coordination, and could include measures such as employing flaggers during key construction periods, designating alternate haul routes, and providing more outreach and community noticing. **Measure 9.5b:** Implement Mitigation Measure 9.2. **Measure 9.5c:** Implement Mitigation Measures 9.1, 9.3b and 9.3c.	S	LSM
10. Aesthetics			
Impact 10.1: AD facilities could have adverse effects on a scenic vista and/or scenic resources.	**Measure 10.1a:** Avoid siting AD facilities near scenic vistas and corridors designated within an applicable land use plan and the State Scenic Highway Program. **Measure 10.1b**: Landscaping and/or vegetated berms should be used to minimize views of facilities from sensitive views.	S	LSM
Impact 10.2: AD facilities could degrade the existing visual character/quality of the site and its surroundings.	**Measure 10.2a:** Implement Mitigation Measures 10.1a and 10.1b above. **Measure 10.2b:** Facilities using truck tippers or other un-enclosed unloading should consider using litter fences to manage blowing litter. Facilities should educate haulers delivering materials to the AD facility through literature, web links, or provide training on the acceptance of waste at the facilities to minimize litter. Facility operators should develop a protocol to identify feedstocks that are severely contaminated with potential litter and reject unacceptable loads. **Measure 10.2c:** Clean-up crews can be used as necessary to control litter. **Measure 10.2d:** Feedstocks and digestate byproducts should be stored in enclosed facilities or processed in a timely manner to prevent visibly deteriorated site conditions. **Measure 10.2e:** Project operators should consider enclosure of pre-processing operations if it provides an aesthetic and/or noise attenuating benefit.	S	LSM

LS – Less than Significant LSM – Less than Significant with Mitigation NI – No Impact S – Significant

TABLE 1-1
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance	
		Before Mitigation	After Mitigation
Impact 10.3: AD facilities could create a new source of light or glare with adverse affects to daytime and/or nighttime views.	**Measure 10.3a:** Implement 10.1b above. **Measure 10.3b:** Any lighting (portable or permanent) should be hooded and directed onto the project site. This would reduce effects to nighttime skies from uplighting, reduce glare, and prevent light from spilling onto adjoining properties and roads. **Measure 10.3c:** Flares may be enclosed to reduce the visibility of flames during operation.	S	LSM
Impact 10.4: The project could result in cumulative impacts to visual resources.	**Measure 10.4:** Implement Mitigation Measures 10.1a, 10.1b, 10.2a, 10.2b, 10.2c, 10.2d, 10.2e, 10.3a, 10.3b, and 10.3c, above.	S	LSM
11. Hazards and Hazardous Materials			
Impact 11.1: Construction of AD facilities could result in the potential exposure of construction workers, the public and the environment to preexisting soil and/or groundwater contamination.	**Mitigation Measure 11.1:** Prior to final project design and any earth disturbing activities, the applicant or agency(ies) responsible shall conduct a Phase I Environmental Site Assessment (ESA). The Phase I ESA shall be prepared by a Registered Environmental Assessor (REA) or other qualified professional to assess the potential for contaminated soil or groundwater conditions at the project site; specifically in the area proposed for construction of AD facilities. The Phase I ESA shall include a review of appropriate federal, State and local hazardous materials databases to identify hazardous waste sites at on-site and off-site locations within a one quarter mile radius of the project location. This Phase I ESA shall also include a review of existing and past land uses through aerial photographs, historical records, interviews of owners and/or operators of the property, observations during a reconnaissance site visit, and review of other relevant existing information that could identify the potential existence of contaminated soil or groundwater. If no contaminated soil or groundwater is identified or if the Phase I ESA does not recommend any further investigation then the project applicant or agency(ies) responsible shall proceed with final project design and construction. OR If existing soil or groundwater contamination is identified, and if the Phase I ESA recommends further review, the applicant or agency(ies) responsible shall retain a REA to conduct follow-up sampling to characterize the contamination and to identify any required remediation that shall be conducted consistent with applicable regulations prior to any earth disturbing activities. The environmental professional shall prepare a report that includes, but is not limited to, activities performed for the assessment, summary of anticipated contaminants and contaminant concentrations at the proposed construction site, and recommendations for appropriate handling of any contaminated materials during construction.	S	LSM
Impact 11.2: Transportation, use, disposal or accidental spill of hazardous materials during construction of AD facilities would not result in the potential exposure of construction workers, the public and the environment to hazardous materials.	None required.	LS	LS

LS – Less than Significant LSM – Less than Significant with Mitigation NI – No Impact S – Significant

TABLE 1-1
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance	
		Before Mitigation	After Mitigation
Impact 11.3: Transportation, use, disposal or accidental spill of hazardous materials during the operation and maintenance of AD facilities would not result in potential harmful exposures of the public or the environment to hazardous materials.	None required.	LS	LS
Impact 11.4: Operation of AD facilities could increase the risk of fire hazards due to the potential release of biogas.	**Mitigation Measure 11.4a:** Prior to project approval, AD facility operators shall prepare and implement a Fire Safety Plan that outlines fire hazards, describes facility operations procedures to prevent ignition of fires, requires regular inspection of fire suppression systems, and provides for worker training in safety procedures as well as protocols for responding to fire incidents. The Fire Safety Plan shall be reviewed and approved by the local fire enforcement agency. **Mitigation Measure 11.4b**: Implement Mitigation Measure 11.5.	S	LSM
Impact 11.5: AD facilities could be located within one quarter mile of a school resulting in potential hazards associated with accidental release of hazardous materials, including biogas.	**Mitigation Measure 11.5:** AD facilities shall be sited at least one quarter mile from existing or proposed schools, daycare facilities, hospitals and other sensitive land uses.	LS	LS
Impact 11.6: AD facility operations could generate vectors (flies, mosquitoes, rodents, etc.) exceeding regulatory agency thresholds for the presence of vectors.	None required.	LS	LS
Impact 11.7: AD facilities could be located within five miles of a public airport or private airstrip and create an aviation hazard.	**Mitigation Measure 11.7:** For any AD facility proposed within 5 statute miles of an airport's air operations area, the operator will notify the Federal Aviation Administration (FAA) Regional Airports Division office and the airport operator of the proposed facility as early in the process as possible. Such AD facilities must receive an FAA Determination of No Hazard prior to project approval.	S	LSM
Impact 11.8: Development of AD facilities could contribute to cumulative impacts related to hazardous materials.	**Mitigation Measure 11.8:** Implement Mitigation Measures 11.1, 11.4, 11.5, and 11.7.	LS	LS

LS – Less than Significant LSM – Less than Significant with Mitigation NI – No Impact S – Significant

CHAPTER 2
Introduction

2.1 Purpose and Use of this Draft Program EIR

The California Department of Resources Recycling and Recovery (CalRecycle) intends to adopt the Anaerobic Digestion Initiative, a comprehensive program to foster the development of anaerobic digester facilities (AD facilities) that could assist in reducing the amount of organics in the waste stream, convert organic solid wastes into sources of renewable energy, and produce valuable compost feedstocks, soil amendments and other products. CalRecycle has prepared this Draft Program EIR to provide information concerning the potential environmental effects that may result from the development of AD facilities in California. This document has been prepared pursuant to the California Environmental Quality Act (CEQA) of 1970 (as amended), and the CEQA Guidelines (California Code of Regulations, Title 14). CEQA requires that state and local government agencies consider the environmental consequences of projects over which they have discretionary authority.

CalRecycle emphasizes that the intent of this document is not to identify AD facilities as preferred to alternative waste management options, or to identify preferred AD facility systems or vendors. CalRecycle has previously provided RMDZ loans, permitting guidance, and technical assistance for projects using a range of technologies including biochemical and thermochemical conversion technologies. This effort should best be understood as an effort by CalRecycle to use its very limited funding to analyze the potential environmental impacts of AD facilities, which is but one of the conversion technologies available to reduce the level of organics going to landfills in California.

An EIR is a public informational document for use by governmental agencies and the public to identify and evaluate potential environmental effects of a proposed project, to recommend mitigation measures to lessen or eliminate adverse impacts, and to examine feasible alternatives to the project. The Program EIR may be used by public agencies when considering approval of future individual site-specific projects for AD facilities within their jurisdictions.

2.2 Project Background

Compostable organic materials comprise approximately 25 percent or 10 million tons per year of the solid waste stream for California landfills (CalRecycle, 2009). Currently there are no commercial-scale stand-alone AD facilities or AD digesters co-located at solid waste facilities that process municipal organic solid waste in California. However, interest in developing such AD facilities is growing, and CalRecycle anticipates that AD facilities will be developed across the state to meet the increasing need to divert organic waste from landfills and to develop renewable energy technologies. The following summaries highlight some of the recent activity to develop or expand AD facilities in California.

> A pilot-scale AD facility has been in operation since 2006 at the University of California (UC) Davis and is currently going through a process of commercialization and scale-up of operations.
>
> CR&R Incorporated is in the funding and permitting stage of developing an anaerobic digestion project at their MRF and Transfer Station in Perris, CA. Utilizing the ArrowBio technology, the project will process post-recycled residual municipal solid waste and convert it into biogas for injection into the gas utility pipeline or upgrade the biogas into a transportation fuel. The Los Angeles County Board of Supervisors selected this project in 2010 as a demonstration facility for the Southern California Conversion Technology Program.
>
> CalRecycle recently approved a Recycling Market Development Zone (RMDZ) loan to Environ Strategy Consultants, Inc. (Environ) that will be used for equipment for an anaerobic digestion project that will process food waste derived from commercial and industrial sources to produce biomethane gas. The project will rebuild and expand the AD facilities owned by the Inland Empire Utilities Agency (IEUA) in Chino, California. Environ anticipates starting production by October 2011.
>
> In January 2011, the Humboldt County Waste Management Authority published a California Environmental Quality Act (CEQA) Initial Study and Mitigated Negative Declaration (MND) for a proposed regional food waste diversion program to serve Humboldt County. The proposed program would divert food waste (which is currently hauled an average of 190 miles and landfilled) to a local, anaerobic food waste digester facility (HWMA, 2011).
>
> The Port of San Diego is planning a food waste AD facility that could divert organics from landfills in San Diego County.
>
> Based on Green Vision goals of diversion and renewable energy production, the City of San Jose has pursued anaerobic digestion as a key infrastructure strategy since 2008. On February 4, 2011, after a two year procurement process, the City staff released a notice of intent to award the processing of all commercial organic waste (up to 60,000 tons/year) to Zero Waste Energy Development Company who has proposed the Kompoferm high solids dry fermentation system for implementation in 2012. The initial study for this project is expected to be released in Spring 2011.

Several other AD facility projects are in the early planning stages. Although co-digestion at wastewater treatment plants (WWTPs) is not covered by this Program EIR (except as an alternative to the project), the following summaries highlight current activities at WWTPs.

> Food waste is currently co-digested with primary and secondary municipal wastewater solids and other high-strength wastes at East Bay Municipal Utilities District’s (EBMUD) Main Wastewater Treatment Plant (MWWTP) in Oakland.

Central Marin Sanitation Agency (CMSA) is planning a food waste to energy program that would generate renewable energy and maximize unused AD capacity at CMSA (Kennedy/Jenks, 2009). The Digester Improvement/FOG and Food-to-Energy Facility project's final design documents were approved February 8, 2011 and CMSA plans to award the construction contract in April 2011 (CalRecycle, 2011).

2.3 CEQA EIR Process

2.3.1 Type of EIR

A Program EIR is an EIR prepared on a related set of actions, in this case the development of expanded or new AD facilities throughout the State of California. This Draft Program EIR provides a broad analysis of environmental impacts and through the CEQA tiering process will expedite future site-specific environmental review by lead agencies with discretion to approve AD facilities, pursuant to CEQA. To comply with CEQA, lead agencies considering individual AD facility projects in the future will prepare a Negative Declaration or Mitigated Negative Declaration or site-specific EIR to address local impacts, but may utilize the information and analysis in this Program EIR. The process is expedited for site-specific projects as this Draft Program EIR reduces the need for duplicative review of general environmental impacts, cumulative impacts and broad alternatives. This Draft Program EIR also should assist in achieving consistent mitigation between individual projects. Program EIR and tiering regulations can be found in California Public Resources Code §21093 and §21094, and CEQA Guidelines §15152 and §15168.

2.3.2 Notice of Preparation and Scoping

In accordance with Section 15082(a) of the CEQA Guidelines, CalRecycle circulated a Notice of Preparation (NOP) for the project on April 30, 2010, which is included in **Appendix A**. The NOP was circulated to state and local agencies to solicit comments on the project as well as published on CalRecycle's website[1]. Recipients were given at least 30 days from receipt of the notice to respond. Six comment letters were received. Comments received on the NOP were used in consideration of the scope and content of this Draft Program EIR, including comments regarding the need for a more clearly defined project, which resulted in the development of the AD Initiative (described in detail in Chapter 3).

CalRecycle also formed a Technical Advisory Group (TAG) prior to the NOP to discuss the project description and environmental issues to be considered in this Draft Program EIR. The TAG includes state and regional regulatory agencies, solid waste industry representatives, AD facility developer representatives, and local jurisdictions. The project description incorporated input from the TAG regarding facilities and feedstocks that should be considered in this Draft Program EIR, and alternatives to be considered in the Program EIR.

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[1] http://www.calrecycle.ca.gov/SWFacilities/

2.3.3 Draft Program EIR

This document constitutes the Draft Program EIR which contains a description of the project, a description of the environmental setting, applicable regulatory requirements, discussions of project impacts, discussions of measures to be implemented to mitigate impacts found to be significant, as well as an analysis of project alternatives. As required by CEQA, this Draft Program EIR focuses on significant or potentially significant environmental effects (CEQA Guidelines §15143) as summarized in the NOP.

2.3.4 Public Review

This Draft Program EIR for the project is being distributed by the State Clearinghouse to state agencies and CalRecycle will also notify numerous other agencies, organizations, and interested groups and persons (including the members of the TAG) about the availability of the Draft Program EIR and encourage their comments during the 45-day public review period for this Draft Program EIR. For the duration of the comment period, the Draft Program EIR will be available at the Cal EPA library at the following location during regular business hours:

California Environmental Protection Agency
1001 I Street
P.O. Box 2815
Sacramento, CA
95812-2815

The Draft Program EIR will be available on the CalRecycle website at:

http://www.calrecycle.ca.gov/SWFacilities/Compostables/AnaerobicDig/

2.3.5 Final Program EIR and Certification

Written and oral comments received in response to the Draft Program EIR will be addressed in a response to comments document, which, together with the Draft Program EIR, will constitute the Final Program EIR. CalRecycle will receive public comments and consider the certification of the Final Program EIR and approval or denial of the project.

If the Final Program EIR includes impacts that cannot be mitigated to a less-than-significant level, the lead agency must state in writing the reasons for its actions. A statement of overriding considerations must be included in the record of the project approval and mentioned in the notice of determination (CEQA Guidelines, §15093(c)).

2.3.6 Mitigation Monitoring and Reporting

California Public Resources Code §21081.6(a)(1) requires public agencies, as part of the certification of an EIR, to prepare and approve a mitigation monitoring and reporting program. This program should be structured to ensure that changes to the project that the lead agency has adopted to mitigate or avoid significant environmental impacts are carried out during project implementation.

Throughout this Draft Program EIR, mitigation measures have been clearly identified and presented in language that will facilitate establishment of a mitigation monitoring and reporting program. Mitigation measures are listed in **Table 1-1** in the Executive Summary. A mitigation monitoring and reporting program will be prepared at the time of the Final Program EIR for this project and will identify the specific timing and roles and responsibilities for implementing mitigation measures.

2.4 Environmental Issues

This section discusses the environmental issue areas which are evaluated at a program level within this Program EIR. The following lists incorporate input from the TAG which reviewed a preliminary summary of potential environmental impacts.

This EIR analyzes the following environmental issues areas for which the project may have potentially significant impacts at the program level:

- Aesthetics
- Air Quality and Greenhouse Gas Emissions
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Noise
- Public Services and Utilities
- Transportation and Traffic
- Cumulative Impacts

The following environmental issue areas are discussed in much less detail as they are not anticipated to have potentially significant impacts at the program level, although they could require evaluation for individual projects due to the potential for local effects:

- Agricultural and Forest Resources
- Biological Resources
- Cultural Resources
- Geology, Soils and Seismicity
- Land Use and Land Use Planning
- Mineral Resources
- Population and Housing
- Recreation

2.5 References

California Integrated Waste Management Board, 2007. Guidance Document: How Conversion Technologies Fit Current Board Regulatory Structure (IWMB-2009-024). December 2007. Available online at: http://www.calrecycle.ca.gov/Publications/default.asp?pubid=1348. Accessed 08/12/2010.

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California Integrated Waste Management Board, 2009. Organics Policy Roadmap and Schedule. Available online at: http://www.ciwmb.ca.gov/Organics/RoadMap08/default.htm. Accessed 04/07/10.

CalRecycle, 2010. Landfill-Based Anaerobic Digester-Compost Pilot Project at Yolo County Central Landfill (DRRR-2010-002). Produced under Contract by Yolo County Planning and Public Works. April 2010. Available online at: http://www.calrecycle.ca.gov/Publications/default.asp?pubid=1354. Accessed 08/10/10.

CalRecycle, 2011. Email to Jacques Franco at CalRecycle from Jason Dow at Central Marin Sanitary Agency. February 9, 2011.

Humboldt Waste Management Agency (HWMA), 2011. Humboldt Regional Food Waste Digester. Initial Study and Mitigated Negative Declaration. January, 2011. Available online at: http://www.hwma.net/index.php?a=foodwastet. Accessed 02/09/11.

Kennedy/Jenks Consultants, 2009. A Sustainable Solution: Food Waste to Renewable Energy, Methane Capture Feasibility Study Report Summary. February 2, 2009.

State of California, 2010a. State of California, *California Environmental Quality Act*, Public Resources Code, Division 13, Sections 21000 through 21177, as amended January 1, 2010.

State of California, 2010b. State of California, Guidelines for California Environmental Quality Act, California Code of Regulations, Title 14, Chapter 3, Sections 15000 through 15387, as amended January 1, 2010.

CHAPTER 3

Project Description

3.1 Introduction

CalRecycle has prepared this Draft Program Environmental Impact Report (EIR) to assess the potential environmental effects that may result from the adoption of an Anaerobic Digestion (AD) Initiative, a comprehensive program to foster the development of AD facilities to process the organic fraction of municipal solid waste and other organic wastes throughout the State of California. Throughout the document, the adoption of the AD Initiative and subsequent development of AD facilities in California will be referred to as the “project”.

This Draft Program EIR will inform future policy considerations related to AD facilities and assist state and local agencies in preparing site-specific environmental documentation that may be required for AD facility applications and/or permits submitted to CalRecycle, regulatory agencies and local jurisdictions. In the event CalRecycle or other public agencies adopt regulations or ordinances relating to regulating or permitting AD facilities, the Draft Program EIR provides useful information and can serve as the basis for analyzing the environmental effects of individual projects.

By preparing this Program EIR, CalRecycle is providing additional focus in California on the potential development of AD facilities. While there has been considerable discussion and interest in AD facilities in California, to date there has not been a broad review of the potential environmental impacts of developing AD facilities. This Program EIR responds to the need for such environmental review. Some members of the Technical Advisory Group (TAG) have a concern that, by preparing the Program EIR, CalRecycle is indicating a preference for AD technologies over other technologies, or that it will appear that way to the public. CalRecycle emphasizes that the intent of this document is not to identify AD facilities as preferred to alternative waste management options, or to identify preferred AD facility systems or vendors. CalRecycle has previously provided RMDZ loans, permitting guidance, and technical assistance for projects using a range of technologies including biochemical and thermochemical conversion technologies. This effort should best be understood as an effort by CalRecycle to use its very limited funding to analyze the potential environmental impacts of AD facilities, which is but one of the conversion technologies available to reduce the level of organics going to landfills in California. The Program EIR is a starting point for the environmental review of AD facilities proposed in local jurisdictions. By tapping into the considerable California specific knowledge and experience of CalRecycle staff and the TAG this effort provides a technical outreach and overview that would not otherwise be available to local jurisdictions considering a specific AD facility proposal.

3.2 Anaerobic Digestion Initiative

Under its Strategic Directive 6.1, CalRecycle seeks to reduce by 50 percent the amount of organic waste disposed in the state's landfills by 2020. In addition to helping conserve limited landfill capacity, this CalRecycle policy recognizes that organic wastes are a resource, not just solid wastes that must be disposed. Organic wastes have an energy value that can be captured and utilized and are also a necessary component of compost, soil amendments, and other useful products. Directive 6.1 also encompasses one of CalRecycle's actions to help California significantly reduce its generation of greenhouse gases. Under the State's *Climate Change Scoping Plan* (CARB, 2008), CalRecycle is responsible for taking actions to reduce the emission of methane, a potent greenhouse gas, from landfills. AD facilities utilize organic wastes as a feedstock from which to produce biogas (which is captured and contains a high percentage of methane). Typically the methane gas produced by the anaerobic digestion process is converted to liquefied natural gas (LNG), compressed natural gas (CNG), or electricity (using internal combustion engines or fuel cells) for on-site energy needs and export to the energy grid (CARB, 2008). The development of AD facilities is one of CalRecycle's charges under the AB 32 Climate Change Scoping Plan. The AB 32 Climate Change Scoping Plan estimates that AD facilities in California could avoid methane emissions from landfills at a level of 2 million metric tons of carbon dioxide equivalents (CO_2e) per year by the year 2020 (CARB, 2008). Anaerobic digestion also can contribute to meeting the State's Renewable Portfolio Standard and Low Carbon Fuel Standard. To assist in achieving those objectives, CalRecycle intends to adopt the AD Initiative, a comprehensive program to foster the development of AD facilities to convert organic solid wastes into sources of energy, valuable compost feedstocks, soil amendments, and other products.

The AD Initiative consists of CalRecycle's adoption of a policy and a series of discrete actions to implement the policy, together with additional actions that will be developed and implemented in the future:

- It is the policy of CalRecycle to encourage the development of AD facilities in California as an alternative to the landfill disposal of organic solid waste. Specifically, as an initial measure, CalRecycle will encourage the establishment of in-vessel digesters located at existing or new solid waste facilities and in areas zoned for industrial or solid waste handling activities.
- CalRecycle shall, not later than January 1, 2012, establish programs to implement the above policy, including without limitation:
    - Provide research grants, loans, and contracts (dependent on funding availability) to develop AD facilities and for activities that advance the state of knowledge about anaerobic digestion and its applications and the uses of products and by-products, including anaerobic digestion demonstration projects that use the organic fraction of municipal solid waste as a feedstock.
    - Develop guidance publications to assist operators who seek to establish AD facilities.
    - Develop guidance publications to assist LEAs and other local and regional government agencies that permit and regulate AD facilities, specifically guidance for co-location at solid waste facilities.

  - Draft revised regulations for aspects of specific design, operation and permitting of AD facilities within the authority and responsibility of CalRecycle.
  - Promote anaerobic digestion through CalRecycle's participation with the California Energy Commission in implementing AB 118 (Alternative and Renewable Fuel and Vehicle Technology Program), the Bioenergy Interagency Working Group, and with the Air Resources Board in implementing the Anaerobic Digestion and Low Carbon Fuel Standard measures in the AB 32 Climate Change Scoping Plan.
  - Work with the California Pollution Control Financing Authority and California Alternative Energy and Advanced Transportation Financing Authority to help anaerobic digestion project proposals obtain funding.
  - Participate on technical workgroups convened by the Climate Action Reserve to develop or modify protocols, such as the Organic Waste Digestion Project Protocol, for projects that divert and anaerobically digest organic waste that otherwise would have gone to solid waste landfills.

3.3 Project Objectives

The project has several objectives including the following:

- Assist in meeting CalRecycle Strategic Directive 6.1: Reduce the amount of organics in the waste stream by 50 percent by 2020.
- Support Assembly Bill 32 (AB 32), the California Global Warming Solutions Act of 2006, greenhouse gas reduction measures related to the use of anaerobic digestion:
  - Measures E-3. Achieve a 33 percent renewable energy mix by 2020. (AD facilities produce biogas which is a renewable energy source.)
  - RW-3. High Recycling/Zero Waste. (Anaerobic digestion is one of five subcategories listed under this measure.)
- Assist local governments and state agencies (both lead and responsible agencies) by providing program-level analyses that will identify potential environmental effects of AD facilities and discuss mitigation measures or best management practices that can reduce or eliminate the environmental effects.

3.4 Background on Anaerobic Digestion

Anaerobic digestion is the biological decomposition of organic matter with little or no oxygen. The anaerobic digestion process occurs naturally in marshes and wetlands. There are a variety of controlled systems where AD technology is currently utilized in the United States including wastewater treatment facilities and dairy manure digesters and co-digesters. In other countries (primarily in Europe), AD technology is utilized to process and treat the organic fraction of municipal solid waste to recover energy and to reduce the volume of solid waste that must be landfilled.

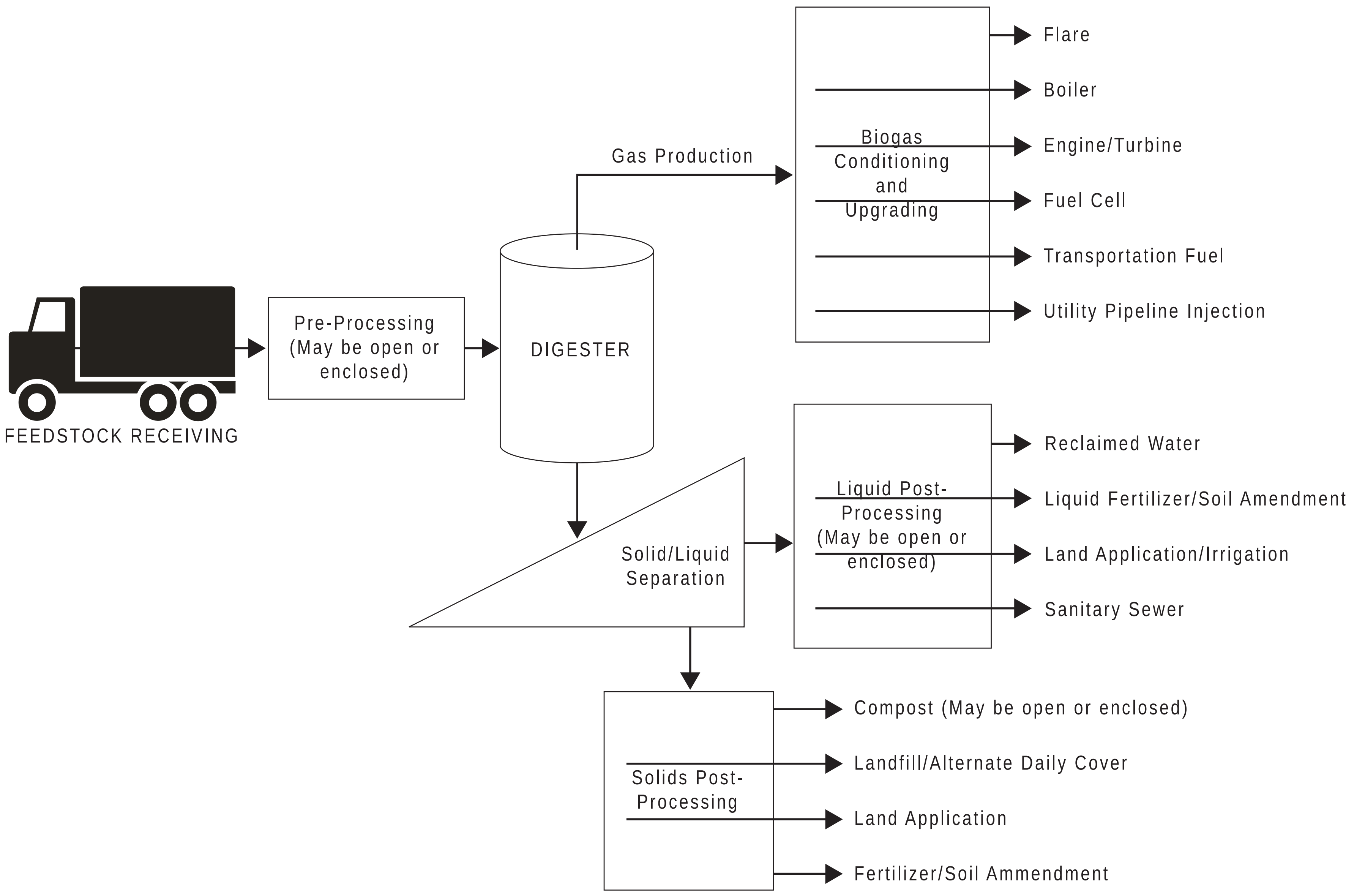
AD facilities for municipal organic waste would generally operate according to the process flow diagram shown in **Figure 3-1**. As with composting, organic materials are pre-processed prior to loading into the digester. Within the digester, decomposition occurs in four phases as shown in **Figure 3-2**: hydroloysis, acidogenesis, acetogenesis, and methanogeneis resulting in methane, carbon dioxide, water and digestate/residuals. Post-processing of gas, liquid and/or solids from the digester is always necessary. **Figure 3-3** shows the potential environmental effects during the three major operational phases (pre-processing, digestion and post-processing). These potential environmental effects, as well as regulations and mitigation measures to reduce potential impacts, are the focus of the Program EIR.

AD facilities that process solid waste produce biogas and digestate (liquids and solids). The biogas consists primarily of methane (CH_4), carbon dioxide (CO_2), with small amounts of hydrogen sulfide (H_2S), and ammonia (NH_3). Typically, biogas is saturated with water vapor and may have trace amounts of hydrogen (H_2), nitrogen (N_2), oxygen (O_2), dust and siloxanes (Greer, 2010). Digestate is the remaining solid and/or liquid residuals from the AD process.

Benefits of AD include a reduction in the mass of organic waste in landfills, reduced fugitive methane emissions from landfills, generation of liquid and/or solid soil amendments, reduction in odor, generation of renewable energy from biogas, and stabilization of organic material prior to disposal which reduces environmental impacts to air and water quality. One of the primary goals of this project is to divert organic waste from landfill disposal. There is a high diversity of organic waste in California, and it is often concentrated in areas with limited organic processing options that make it difficult to manage due to economic and environmental constraints. This geographic distribution directly affects the feasibility of organics diversion; and given the high costs of transportation; the economic feasibility of organics diversion is often determined primarily by geographic considerations. The diversity of organics also plays a significant role in identifying an appropriate technology.

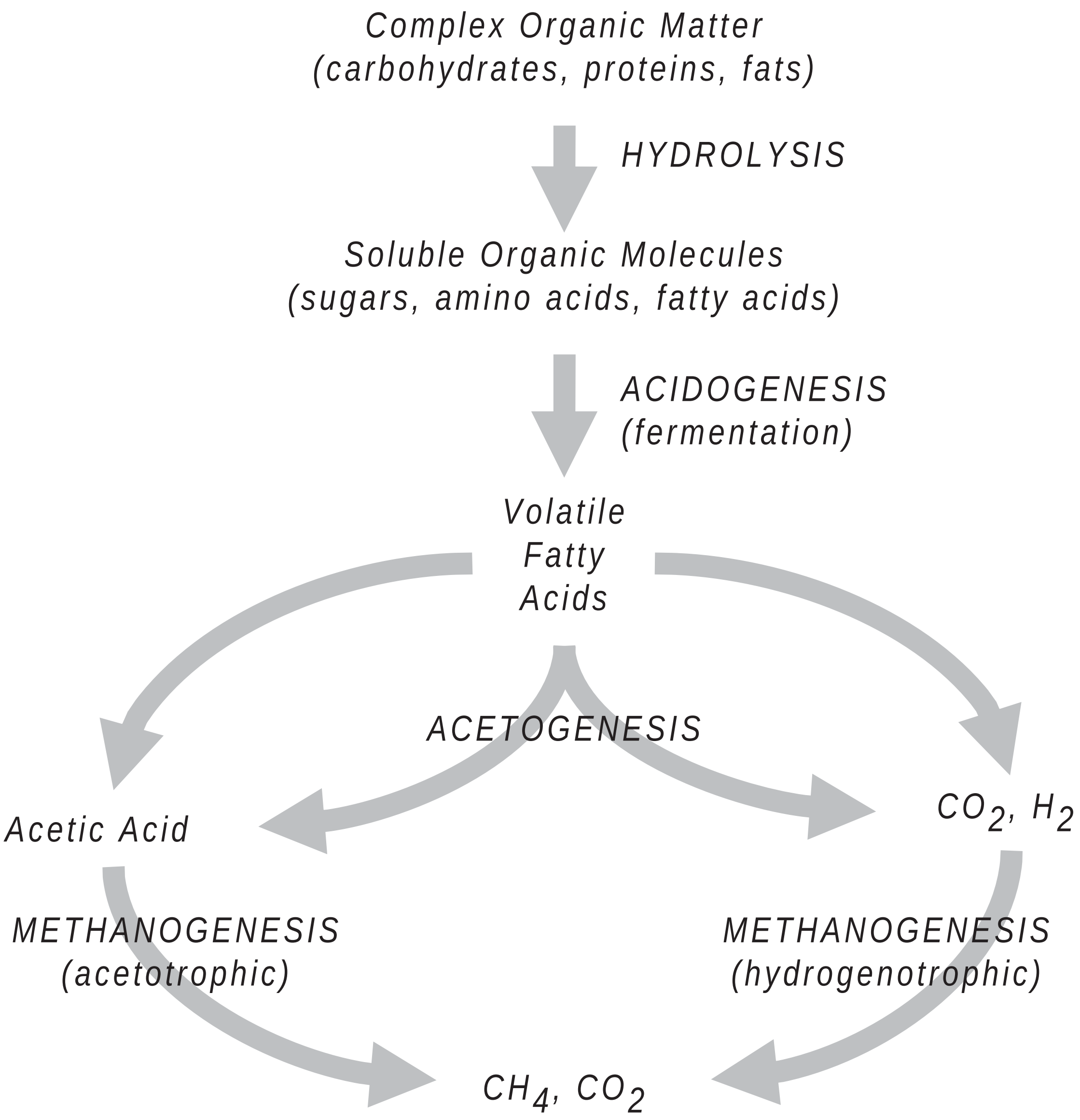
This is a program level EIR analyzing statewide impacts of anaerobic digestion (AD) facilities, but organics management decisions are often made at the local and regional level. There is no single best, most feasible or most environmentally benign organics management option suitable to all regions. Ultimately, each region must analyze its own organic waste streams and determine which management options are best based on the availability of technologically and economically feasible options.

AB 32 directed ARB to prepare a Scoping Plan that identifies how best to reach the 2020 GHG emissions limit. As part of this effort, and in consultation with CalRecycle, ARB proposed the Mandatory Commercial Recycling Measure. This measure requires development of regulations requiring recycling of commercial waste by the State’s businesses. This regulation is expected to result in diversion of an additional 2 million tons of compostable organic materials annually once fully implemented. These regulations will assist CalRecycle in achieving Strategic Directive 6.1, which calls for a reduction in the amount of organics in the waste stream of 50 percent by 2020.



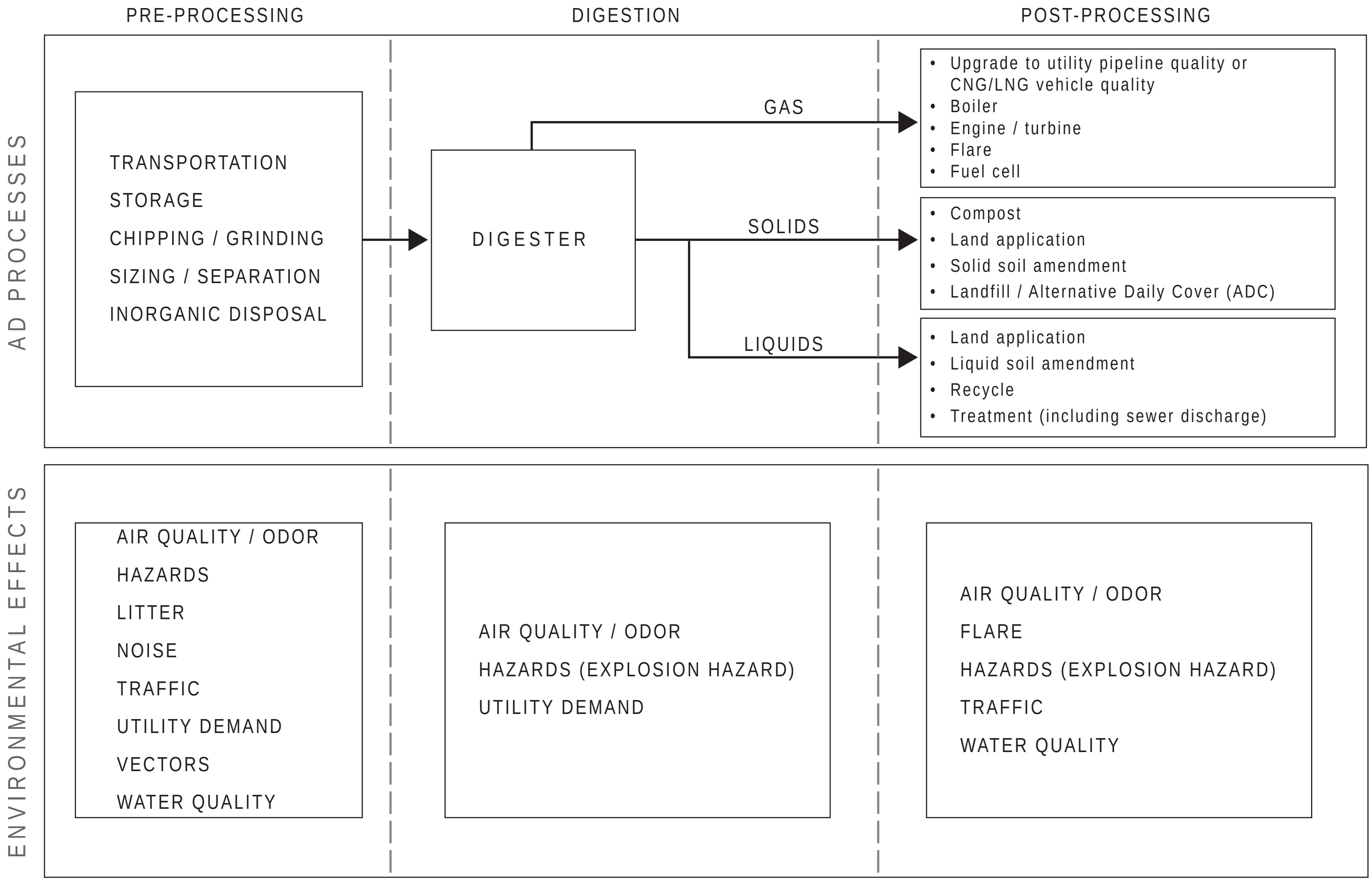
SOURCE: ESA, 2011

Figure 3-1
Anaerobic Digestion of Municipal Organic Solid Waste



SOURCE: CIWMB, 2009; and ESA, 2010

Figure 3-2
Anaerobic Digestion Phases



SOURCE: ESA, 2010

Figure 3-3
Anaerobic Digestion Processes and Potential Environmental Effects from Operational Phases

3.5 Proposed Facilities

The scope of proposed facility types has been focused by the objective of reducing the organic content of the solid wastes that are disposed in municipal solid waste landfills and to generate or recover energy from the solid wastes.

AD Facilities included in the scope: In-vessel AD facilities which are located at existing or new permitted solid waste facilities or stand-alone AD facilities in areas zoned for industrial or solid waste handling activities.

AD Facilities not included in the scope: Dairy manure digesters, dairy manure co-digesters and wastewater treatment plant digesters. In-ground digester cell technology (for example the landfill-based anaerobic digester-compost pilot project developed at the Yolo County Central Landfill), though not included in the project, is discussed and evaluated as an alternative in **Chapter 13**.

There are several variations of in-vessel digester technologies. This Draft Program EIR allows for flexibility in technology choices at the local level. Different in-vessel technologies have the same general processes which are discussed in the siting, construction and operational sections, below.

3.6 Feedstocks

The scope of this Draft Program EIR is focused on reducing organic portions of the municipal solid waste stream and feedstocks which enhance the efficiency of the AD process.

Feedstock materials included in the scope: Food waste, green material and mixed solid waste. The food and green material categories are intended to be inclusive and not limited by current regulatory definitions or collection methods – “food” includes cannery waste, meat, poultry, fish, cheese waste, food processing waste, fats, oils and greases (FOG), etc., and “green material” includes urban, agricultural, crop residues, contaminated green materials, etc. Use of manure will be considered as nitrogen nutrient amendment material for the purpose of increasing the growth of microorganisms and digester efficiency, but not as a primary waste stream to be evaluated.

Feedstock materials not included in the scope: Biosolids, untreated septage, waste co-digested with biosolids at wastewater treatment plants or dairy manure co-digesters, and hazardous waste.

3.7 Operation

The main operational phases for AD facilities are pre-processing, digestion and post-processing. Some photos of anaerobic digestion facilities are provided in **Appendix B** of this Program EIR, **Figure B-1** (photos of low-solids/ wet systems), **Figure B-2** (photos of high-solids/ dry systems) and **Figure B-3** (photos of pre-processing feedstocks and equipment). These photographs in **Appendix B** are provided only to show the industrial nature of the AD facilities, they are in no way an endorsement of specific AD technologies, vendors or service providers.

3.7.1 Pre-Processing

Pre-processing involves the activities necessary to prepare the feedstocks for delivery into the AD vessel. Pre-processing activities include feedstock receiving, storage of feedstock, all processing steps required to prepare the feedstock for the digester (such as sorting, screening, grinding and wetting), and the process of feedstock delivery into the digester. Some pre-processing activities (such as source-separation of the organic fraction and pre-screening) can occur prior to delivery to the AD facility. The amount of pre-processing equipment and residual waste (or waste that must be removed prior to digestion) would depend on the type of feedstock and digester technology. Some anaerobic digestion technologies are designed to remove inert solids in the pre-processing stage, while others are designed to remove inert solids after digestion during post-processing. Digester systems that are designed to remove inert solids during pre-processing use different techniques depending on the needs of the digester and the extent of contamination. For example, systems that require pre-pulping of wastes with water may use density separation technologies, while systems that minimize water inputs may use size separation techniques. Furthermore, source-separated organic loads that contain fewer inorganic solids than mixed solid wastes may require less pre-processing time and/or equipment, with fewer residual wastes to handle at the digestion facility.

3.7.2 Digestion

Various technologies are available for AD facilities. While new digestion technologies are regularly being developed, and existing technologies continuously improved, a good description of the range of these technologies is included in the March 2008 California Integrated Waste Management Board (now CalRecycle) report, *Current Anaerobic Digestion Technologies Used for Treatment of Municipal Organic Solid Waste* (CIWMB, 2008).

The anaerobic digestion systems developed for commercial applications differ based on the digester configurations and material handling systems. Digesters can be designed in single or two-stage configurations. Single-stage digester configurations may include multiple reactors, but each operates under the same conditions (i.e. initial solids content, loading rate, and temperature) and is loaded in parallel. Single-stage systems may incorporate pre-processing reactors (i.e. equalization tanks, hydropulpers, or tunnel sorting drums) in which some biological activity takes place, blurring the distinction between one and two-stage systems. However, pre-processing reactors are typically designed to optimize sorting and preparation of the waste materials for anaerobic digestion and are loaded in series with the digester. Two-stage systems typically include a hydrolysis stage optimized for acidification and fermentation of organic materials to acetate followed by a methanification stage optimized for methane production. The hydrolysis reactor is typically loaded first and the products are transferred to the methanification reactor. However, systems may also be designed to re-circulate digestate between reactors.

The reactors used for both single and two-stage systems may be designed to operate at different initial solids concentrations, loading rates, and temperatures. Typically, organic wastes contain 20 - 40% solids on a mass basis as received, although the initial solids concentration of the waste stream depends heavily on its composition (e.g. green and paper wastes tend to have higher initial solids concentrations than food wastes). Some systems dilute the waste with water to facilitate sorting, pumping and microbial contact within the reactor. Other systems minimize the addition of water and use heavy-duty pumps, conveyors, and/or front-end loaders to transfer incoming waste to the digester.

Plant operators often attempt to control the loading rate in order to allow sufficient time for degradation and to develop steady-state gas production. Over-loading the reactors can lead to acidification and inhibition of microbial decomposition, which may require re-inoculation or complete re-start of the system. Some digesters are loaded in batches (e.g. every one to five days a new batch is loaded). This may simplify the loading equipment and system operation, but the kinetics of degradation in batch-loaded reactors is different from continuous-loaded reactors. Typically, batch loading results in slower degradation and uneven gas production and methane content. Therefore, batch systems may have lower material throughput per given process area than continuous systems. In order to alleviate these problems, many batch-loaded digester systems incorporate multiple reactors with phased loading and/or continuous second-stage reactors.

Whether loaded continuously or in batches, the majority of commercial anaerobic digesters treating organic solid wastes are temperature controlled for enhanced degradation stability and rate. The microbes that degrade organic materials have evolved to thrive optimally at two different temperature ranges. Mesophilic microorganisms prefer temperatures of 30 to 40 degrees Celsius, while thermophilic microorganisms prefer temperatures of 45 to 55 degrees Celsius. Studies have revealed microorganisms capable of degrading organic materials at higher and lower temperatures, but hyperthermophilic and psychrophilic digesters have yet to enter the marketplace. Therefore, such systems will not be considered at present. Differences in operational temperature may impact gas production rates and methane contents, organic loading rates, pathogen destruction, digestate quality, and the type of permits required. Thermophilic microorganisms tend to degrade some materials at a higher rate than mesophilic microorganisms. This can reduce the size of the reactors required, but it increases the energy input requirement.

The final reactor design may incorporate different combinations of the above design considerations into a completed system. For example, commercial digesters include single-stage systems with waste diluted to less than 10% solids-mass fraction; single-stage systems that process undiluted wastes; two-stage systems in which diluted wastes are loaded into the first stage; and two-stage systems with undiluted waste (i.e., high solids AD facilities) loaded in batches into the first-stage reactors and leachate loaded continuously into the second-stage reactor. The potential exists for other configurations to be utilized as well. For example, some reactors may be aerated, solids may be separated and re-circulated, and other design innovations could be envisioned.

As noted above, there are many final reactor designs available, some that were reviewed in preparing this Program EIR can be found in the References at the end of this Chapter. These references are provided in the interest of making this Program EIR a better informational document to help the reader in understanding more about the operation of AD facilities. These include Waasa (SMUD, 2005), BTA (BTA, 2010), BIMA (Entec, 2010), Dranco (De Baere, 2010), Kompogas (Evergreen

Energy Corporation, 2007), Valorga (Valorga International, 2010), Schwarting-Uhde (STOWA, 2006), , Biopercolat (Wherle Werk Ag, 2010), Biocel (CIWMB, 2008), SEBAC (Teixeira, 2004), APS (CIWMB, 2008), Bioferm (BIOFirm, 2009), and Kompoferm (Eggersmann, 2010). References to these systems are in no way an endorsement of specific AD technologies, vendors or service providers.

3.7.3 Post-Processing

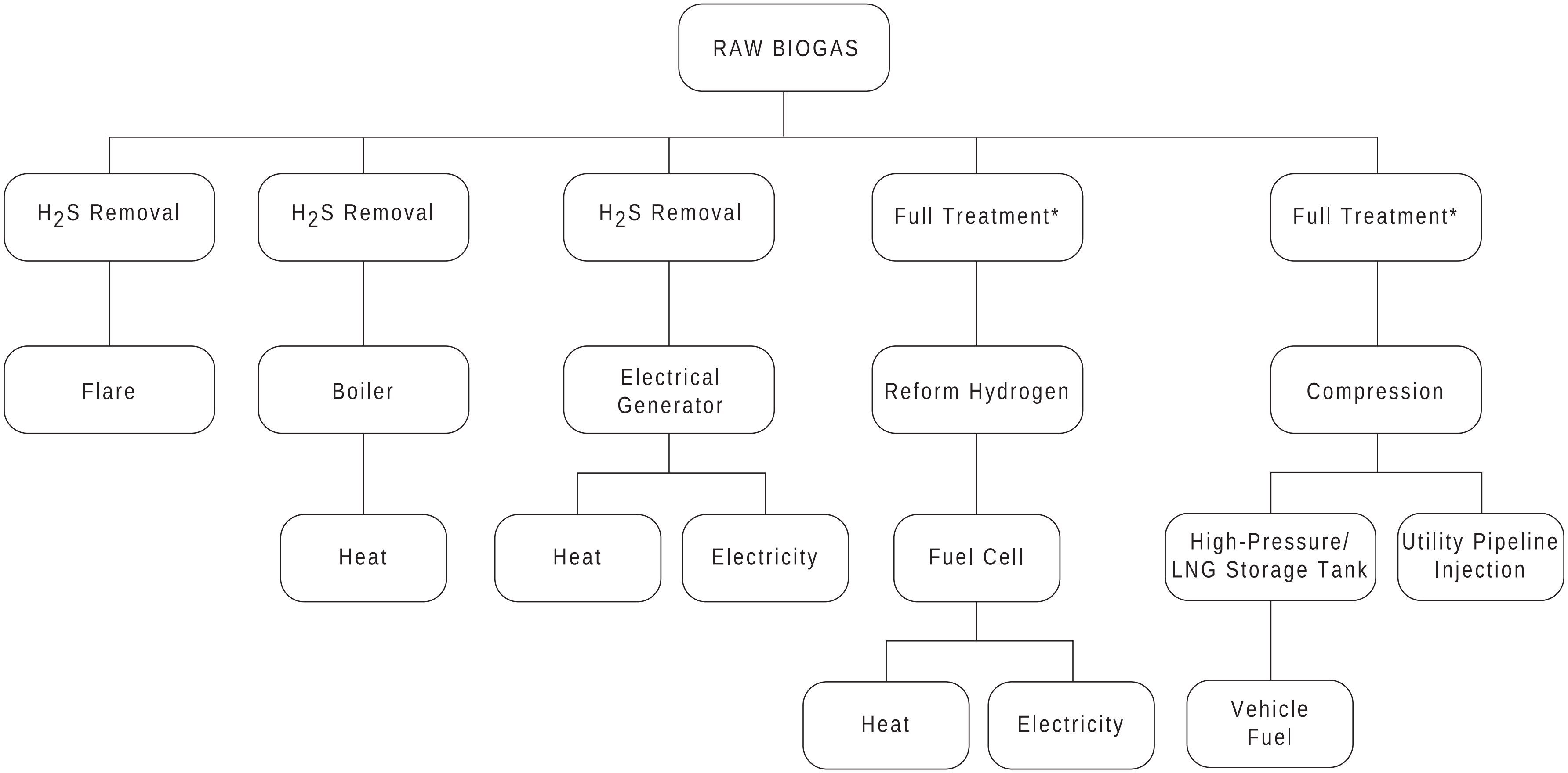
The products of the AD process are digestate and biogas. The digestate is further processed or dewatered resulting in separate liquid and solid products.

Biogas

Biogas generated through the AD process is captured and can be combusted in a flare, used directly in boilers or in reciprocating or gas turbine engines to produce electricity and heat, or the biogas can be upgraded to biomethane through the removal of hydrogen sulfide, carbon dioxide (CO_2), and moisture. Biomethane is a product almost equivalent to natural gas, which typically contains more than 95 percent methane (CH_4). Biomethane can be used in place of natural gas for various processes, and can be used onsite, piped to neighboring facilities, or by utility companies. Biomethane can be upgraded to utility standards and pumped into a natural gas supply pipeline, as well as for electrical generation, heating, cooling, and for natural gas-fueled vehicles. For each biogas optional use specific gas conditioning measures would be required. Although there are methodological variations in how the biogas can be conditioned, **Figure 3-4** below depicts the general processes considered in this Draft Program EIR.

Digestate

Through the AD process, biomass in the waste stream is reduced through conversion to biogas and the nutrients are concentrated in the remaining effluent. The effluent from the AD process consists of liquids, remaining biomass, and inorganic solids. The post-treatment options to separate the liquids from the solids in the effluent include screening and presses. The liquid can be discharged to surface waters, percolation ponds, sanitary sewers, or beneficially used as irrigation water for agricultural crops. Efforts are underway to convert the liquid digestate into value added liquid fertilizer. However, the chemical composition of the liquid effluent may restrict discharge options. Some post-digestion aeration and/or filtration may be required prior to discharge to reduce the solids content, oxygen demand, ammonia concentration, and/or salt concentration. The solid (or remaining digestate) can be aerobically composted, disposed of in landfills or beneficially used as a soil amendment for agricultural crops. Use of the solid as alternative daily cover could potentially be approved on a site-specific basis.



*Full treatment includes removal of H_2S, water, siloxane, and CO_2

SOURCE: Extension, 2010; and ESA, 2010

Figure 3-4
Alternative Biogas Utilization and Required Cleanup

3.8 Construction

Construction of AD facilities would require site preparation and earthwork, consisting of stripping the area of vegetation (or demolition of structures if the site were previously developed) and either removing or storing the materials for later use in the finished grading phase. Rough earthwork would consist of cutting or filling the site to produce overall site gradients as specified by each project. In general, surfaces would be graded to drain to on-site retention/detention facilities. Excavation may occur for on-site utility infrastructure. Road paving may be required for entrance and on-site access roads.

If biogas at an AD facility is delivered by pipeline offsite, project construction activities could include surface preparation, excavation, trench shoring, pipeline installation, trench backfilling, and surface restoration, which may include paving if the pipelines are constructed within roadway rights-of-way.

3.9 Structures

Digester structures would vary depending on the type of AD facility, feedstocks, and use of end products (biogas and digestate). Co-located facilities may share structures with existing operations. Structures could include:

- Administrative buildings, which would be typical for industrial operations and would likely be prefabricated metal buildings.
- Digester tanks and potentially an operating control room.
- Storage tanks or storage areas or buildings for materials in the pre-processing phase, prior to entering the digester.
- Storage tanks or areas for liquid or solid or biogas end products.
- Structures may be needed to house the biogas post-processing equipment used to generate electricity from the biogas.

3.10 Infrastructure

Development of AD facilities could require the construction of various supporting infrastructure including, but not limited to, pipelines for transporting effluent, stormwater treatment and disposal facilities, water and wastewater infrastructure and on-site access roads.

3.11 Off-Site Improvements

In addition to the on-site improvements, some off-site improvements could also be needed such as signage, utility or traffic improvements, biogas processing equipment or additional wastewater processing infrastructure.

3.12 Governmental Agency Approvals

Approvals and permits that may be required from agencies for the development of site-specific AD projects are identified in **Table 3-1**. This is not an exhaustive list but represents the most likely permits and approvals which may be needed for project construction and operation.

TABLE 3-1
APPROVALS POTENTIALLY NEEDED FOR ANAEROBIC DIGESTER FACILITIES

Approvals	Authority	Potentially Affected Resources
Federal		
*Clean Water Act Section 404/ Rivers and Harbor Act Section 10 Dredge and Fill Permit (Clean Water Act, 33 USC 1344)	U.S. Army Corps of Engineers	Project facilities involving the discharge of dredge for fill material into waters of the U.S, including wetlands, or construction in navigable waters or activities within a floodplain.
*Federal Endangered Species Act compliance (Sections 7 and 9, 16 USC 1536)	U.S. Fish and Wildlife Service	Project facilities affecting species listed as endangered and threatened
*Federal Endangered Species Act compliance (Sections 7 and 9, 16 USC 1536)	National Marine Fisheries Service	Project facilities affecting designated special-status Anadromous fish species and critical habitat
*Magnuson Stevens Fisheries Conservation and Management Act Compliance	National Marine Fisheries Service	Project facilities affecting Essential Fish Habitat
State		
CalRecycle Discretionary Action Compostable Material Handling Permit or, Transfer/Processing Permit, Grants, Loans	CalRecycle	General protection of Public Health, Safety and the Environment Based on incoming feedstocks and operations
*California Endangered Species Act compliance (California Fish and Game Code, Section 2081 and 2090)	California Department of Fish and Game	Portions of project facilities affecting state designated special-status species
*Section 1601 *et seq.* Streambed Alteration Agreement (California Fish and Game Code, Sections 1600-1616)	California Department of Fish and Game	Portions of project facilities include activities affecting bed, bank, or channel of surface waters and adjacent riparian habitat.
*Williamson Act contract	Department of Conservation	Agricultural land when portions of project facilities require public acquisition of land under a Williamson Act contract
*Encroachment Permit	California Department of Transportation	Portions of project facilities (pipelines, etc.) within rights-of-way or easements managed by Caltrans
* Water Quality Certification (Clean Water Act, Section 401, 33 USC 1341)	Regional Water Board	Water quality certification for projects that affect wetlands and waters of the U.S.
NPDES Construction Stormwater Permit (Clean Water Act, Section 402, 33 USC 1342)	Regional Water Board	Water quality permit when portions of project activities or facilities may result in discharges to waters of the U.S.
Stormwater Pollution Prevention Plan (SWPPP)	Regional Water Board	Water quality plan required to receive NPDES permit coverage for construction site stormwater discharges.
*General Order for Dewatering and Other Low Threat Discharge to Surface Waters	Regional Water Board	Water quality permit when portions of project construction may require local groundwater dewatering, resulting in discharges to surface waters
Waste Discharge Requirements (WDRs)	Regional Water Board	Water quality permit when portions of project activities or facilities may result in discharges of residual solids and/or liquids to land.
*National Historic Preservation Act	State Historic Preservation Office	For activities in portions of project that could

TABLE 3-1
APPROVALS POTENTIALLY NEEDED FOR ANAEROBIC DIGESTER FACILITIES

Approvals	Authority	Potentially Affected Resources
Section 106 Compliance		affect cultural and historic resources considered eligible for inclusion in the National Register of Historic Places
Local		
CalRecycle Discretionary Action Compostable Material Handling Permit or, Transfer/ Processing Permit	Local Enforcement Agency	General protection of Public Health, Safety and the Environment Based on incoming feedstocks and operations
Authority to Construct	Air District with jurisdiction	Air quality ATC, in compliance with the local air district rules and regulations.
Permit To Operate	Air District with jurisdiction	Air quality PTO, upon completion of facility construction in compliance with the local air district rules and regulations.
*Rezoning, conditional use permit or similar land use approval	Counties and cities	Facilities or activities modifying land uses regulated under county or city land use codes
*Site plan review and approval	Counties and cities	Facilities or activities affecting land regulated under county or city site planning regulations
Wastewater Discharge Permit	Counties and cities	Facilities or activities that would result in wastewater discharge to the sewerage system
Local grading and erosion control Permit	Counties and cities	Earthmoving conducted as part of project
Building Permit	Counties and cities	Building(s) constructed as part of project
*Encroachment Permit	Counties or cities or other local jurisdictions such as special districts	Pipelines or other facilities in portions of project area on or affecting rights-of-way or easements

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* - Permit or approval may be applicable based upon location of site-specific activities and facilities.

3.13 CalRecycle Permitting/Regulatory Framework

The proposed AD facilities could be regulated under CalRecycle’s existing composting and transfer/processing regulations. The application of permitting requirements must be applied on a case-by-case basis. The determination as to the type of facility would be based on the nature of the feedstock and the temperature of on-site processes. If the feedstock reach a temperature of at least 50 degrees Celsius/122 degrees Fahrenheit (50°C/122°F) on site, then the facility could be regulated as a compostable material handling facility. If the feedstock does not reach the temperature of 50°C/122°F on site, then the facility could be regulated as a transfer/processing facility. This permitting discussion does not address potential on-site disposal of solid byproducts from AD facilities.

3.13.1 Compostable Materials Handling Facility

Composting is defined broadly as “the controlled or uncontrolled biological decomposition of organic wastes” (California Public Resources Code [PRC] Section 40116.1). Anaerobic digestion fits within this statutory definition. Thus, AD facilities could be regulated under CalRecycle’s compostable material handling regulations, located at Title 14 California Code of Regulations (CCR) Section 17850 et seq., if the feedstocks and processes meet the definitions within the implementing regulations. The relevant definitions from the Compostable Materials Handling Requirements include the following from Title 14 CCR Section 17852:

> "Active Compost" means compost feedstock that is in the process of being rapidly decomposed and is unstable. Active compost is generating temperatures of at least 50 degrees Celsius (122 degrees Fahrenheit) during decomposition; or is releasing carbon dioxide at a rate of at least 15 milligrams per gram of compost per day, or the equivalent of oxygen uptake.
>
> "Compostable Material" means any organic material that when accumulated will become active compost as defined in section 17852(a)(1).
>
> "Compostable Material Handling Operation" or "Facility" means an operation or facility that processes, transfers, or stores compostable material. Handling of compostable materials results in controlled biological decomposition. Handling includes composting, screening, chipping and grinding, and storage activities related to the production of compost, compost feedstocks, and chipped and ground materials.
>
> "Feedstock" means any compostable material used in the production of compost or chipped and ground material including, but not limited to, agricultural material, green material, food material, biosolids, and mixed solid waste. Feedstocks shall not be considered as either additives or amendments.

The determination of whether or not feedstocks meet the definition of compostable materials would be made on a case-by-case basis. Additionally if feedstocks do not reach a temperature of 50°C/122°F on site, then they are precluded from becoming active compost and the compostable material handling regulations would not apply. The temperature could be reached during pre-processing, within the digester, or if aerobic composting of digestate occurs during post-processing on site.

Thus it is foreseeable that an AD facility could be regulated as a compostable materials handling facility if feedstocks are organic wastes and the feedstock reaches a temperature of 50°C/122°F on site (pre-processing, in the digester, or during post-processing)[1]. If the AD facility does not meet these two requirements, then it could be regulated as a transfer/processing facility as discussed below. The determination of whether the facility requires a permit, EA notification, or is excluded would be made by the LEA; the tier regulatory placement is shown in **Table 3-2**.

TABLE 3-2
COMPOSTABLE MATERIAL HANDLING OPERATIONS AND FACILITIES - LEVEL OF PERMITTING OR AUTHORIZATION REQUIRED

Determination made by Local Enforcement Agency (LEA)	Compostable Material Handling Facilities
Full Permit	All compostable handling operations which do not meet the requirements for EA notification and are not excluded require a full permit (14 CCR Section 17854).
Registration Permit	N/A
EA Notification	EA Notification applies to the following operations and facilities: Agricultural Material Composting Operations pursuant to 14 CCR Section 17856 Green Material Composting Operations and Facilities pursuant to 14 CCR Section 17857.1 Research Composting Operations pursuant to 14 CCR Section 17862
Exclusion from regulatory requirements	Excluded activities are listed at 14 CCR 17855. Within-vessel composting (less than 50 cubic yards) Feedstock does not reach 50° C/122° F

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[1] It should also be noted that if the digestate fails the standards set for metals or pathogens set in Title 14 CCR Sections 17868.2 and 17868.3, the end product would require additional processing or disposal.

3.13.2 Transfer Processing Operations and Facilities

It is anticipated that projects which do not qualify as compostable materials handling facilities could be regulated as transfer processing operations and facilities. Transfer or processing stations are defined as "those facilities utilized to receive solid wastes, temporarily store, separate, convert, or otherwise process the materials in the solid wastes, or to transfer the solid wastes directly from smaller to larger vehicles for transport, and those facilities utilized for transformation" (California PRC Section 40200). The determination of whether the facility requires a permit, qualifies under a notification tier or is excluded from regulations would be made by the LEA; the tier regulatory placement is shown in **Table 3-3**. Additionally, it is anticipated that proposed facilities would not meet the three-part test at 14 CCR Section 17402.5 because of the putrescible nature of the anticipated feedstocks.

TABLE 3-3
TRANSFER PROCESSING OPERATIONS AND FACILITIES - LEVEL OF PERMITTING OR AUTHORIZATION REQUIRED

Determination made by Local Enforcement Agency (LEA)	Transfer/Processing Operations and Facilities
Full Permit	If project receives 100 tons per day or more of solid waste it would be considered a Large Volume Transfer/Processing Facility and requires a full permit (14 CCR Section 17403.7).
Registration Permit	If project receives 15 tons per day or more of solid waste but less than 100 tons per day, it would be considered a Medium Volume Transfer/Processing Facility and requires a registration permit (14 CCR Section 17403.6).
EA Notification	If a project receives less than 15 tons per day of solid waste, it would be considered a Limited Volume Transfer Operation and requires an EA Notification (14 CCR Section 17403.3).
Exclusion from regulatory requirements	Excluded activities are listed at 14 CCR Section 17403.1 None are anticipated to apply to the proposed project. Facilities which meet the three-part test at 14 CCR Section 17402.5 are not subject to regulation; however, AD facilities as described within this Draft Program EIR would not meet the three-part test.

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CHAPTER 4
Approach to Environmental Analysis

4.1 Introduction

This chapter presents the general approach to analysis that was used in this Draft Program EIR to evaluate the impacts of the project.

Developing the approach to the environmental analysis involves:

- Identifying the types of facilities that the program would cover and thereby facilitate development, and
- Projecting the extent of digester facilities development that may occur as a result of the program,

This chapter expands upon each of these items.

4.2 Anaerobic Digester (AD) Facilities

In the United States, AD facilities have been used to digest or decompose agricultural waste (such as animal feeding operations and dairies) and in wastewater treatment operations. However, no commercial-scale municipal solid waste (MSW) digesters are in operation. The groundbreaking of the first commercial-scale dry fermentation AD facility in the U.S. was held September 15, 2010 at the University of Wisconsin Oshkosh, and is scheduled to begin operations in April 2011. This facility will process up to 8,000 tons of organic waste per year and will generate renewable heat and power for the campus (University of Wisconsin Oshkosh, 2010).

The adoption of the CalRecycle AD Initiative will foster the development of AD facilities to process the organic fraction of MSW and other organic wastes in California. Therefore, this Draft Program EIR evaluates the effects of the development and operation of these facilities in California.

For the purpose of this Program EIR, AD facility development is expected to consist of in-vessel digesters to be located at permitted solid waste facilities and within industrially zoned areas. Under CEQA, a Program EIR may evaluate “individual activities carried out under the same authorizing statutory or regulatory authority and having generally similar environmental effects which can be mitigated in similar ways” (CEQA Guidelines §15168(a)(4)). Because these actions would be directly facilitated by the proposed project, this document programmatically evaluates the environmental impacts of the development of AD facilities as actions that could result from program implementation.

As identified in Chapter 3, Project Description, the following types of commercial-scale AD facilities could be developed under the program: one-stage continuous, two-stage continuous and batch systems with wet or dry processes. This Program EIR evaluates the physical effects to the environment from construction and operation of these commercial-scale AD facilities. Each of the resource chapters in the Program EIR considers the various phases of digester projects (construction, pre-processing, the digestion phase, and post-processing uses of the gases, liquids and solids) and analyzes those phases that could affect the physical environment. Because of the programmatic review, specific equipment brands or vendors are not analyzed and the analysis is more general.

This Program EIR does not evaluate the impacts of solid waste or industrial facilities which are already permitted, independent of the AD facility. On a site-specific project level, the CEQA analysis would need to include an assessment of changes to other existing facilities by development of the AD facility (such as residuals being sent to the digester rather than an existing co-located landfill).

4.3 Impacts and Mitigation Measures

Types of Impacts

The environmental setting is the physical environmental conditions in the vicinity of the project, as they exist at the time the Notice of Preparation (NOP) was published, April 30, 2010 (CEQA Guidelines §15125(a)).

This Program EIR evaluates the potential adverse environmental effects of CalRecycle’s adoption and implementation of the project. The environmental resources analyzed in this Program EIR (see Chapters 5 – 11) are those identified as being potentially affected by AD facility projects. Each resource chapter includes a discussion of existing environmental setting and regulatory requirements. The analysis first determines the extent to which each of the studied resources could be affected if AD facilities are developed. The analysis then applies a set of specific significance criteria (Thresholds of Significance) to categorize the severity of the potential environmental effects. These standards of significance are defined at the beginning of each impact analysis in Chapters 5 - 11, following a discussion of environmental and regulatory settings. Once the potential environmental changes are identified in this analysis, they are compared to the standards of significance for each impact area in Chapters 5-11. The impacts are then divided into the following categories:

- **Less-Than-Significant Impact.** A project impact is considered less-than-significant when it does not reach the standard of significance and would therefore cause no substantial change in the environmental. No mitigation is required for less-than-significant impacts.
- **Significant Impact.** Significant impacts are identified by the evaluation of project effects against the significance criteria identified in the Program EIR. A project impact is considered significant if it reaches or could potentially reach the level of significance identified in the Program EIR. Mitigation measures are identified to reduce these effects to the environment.
- **No Impact.** There are not impacts because the project is not anticipated to create change or the project would result in a beneficial impact.

- **Cumulative Significant Impact.** A cumulative impact can result when a change in the environment results from the incremental impact of a project when added to other related past, present or reasonably foreseeable future projects. Significant cumulative impacts may result from individually minor but collectively significant projects.

For all ***significant*** impacts, the Program EIR is required to include a description of feasible measures that could be implemented to avoid or substantially lessen the adverse change in any of the physical conditions within the area affected by the proposed project or to mitigate (reduce in magnitude) the impacts to a level that is below the defined standard of significance. Where available, mitigation measures are presented for all impacts determined to be significant. Where implementation of the mitigation measures would reduce the magnitude of the impact to below the defined standard of significance, the impact is determined to be less than significant after mitigation. Where implementation of the mitigation measures would not reduce the magnitude of the impact below the defined standard of significance, the impact is determined to be ***significant and unavoidable***.

Mitigation Measures

Where significant adverse impacts are identified, the Program EIR must "describe feasible measures which could minimize" those impacts to a less-than-significant level (CEQA Guidelines §15126.4). For each significant impact, mitigation measures are identified. In some cases, the Program EIR includes a list of alternative mitigation measures, which could reduce the impact to a less-than-significant level, or contribute to doing so, any of which may be selected by CalRecycle or a Lead Agency tiering from this Program EIR. Where multiple measures are required to reduce an impact to a less-than-significant level, the discussion clearly identifies which combination or permutation of measures would be necessary to achieve the appropriate level of mitigation.

Where measures are available that can reduce the magnitude of an impact, but not to a less-than-significant level, these are also identified. The Program EIR strives not to include measures that are clearly infeasible. Under CEQA, "feasible means capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors" (CEQA Guidelines §15364).

If, even with imposition of mitigation measures, the project will generate unavoidable significant effects, CalRecycle can only approve the project if it makes a written statement of overriding considerations and finds that the benefits of the project outweigh the occurrence of those unavoidable effects (CEQA Guidelines §15092 and §15093).

For any mitigation measures imposed by CalRecycle, CEQA requires that CalRecycle adopt a Mitigation Monitoring and Reporting Program (MMRP) specifying how it will ensure compliance with the mitigation measures. The MMRP would be developed prior to action on the project (Public Resources Code §21081.6(a)(1)).

4.4 Environmental Setting and Baseline

The environmental setting is the physical environmental conditions in the vicinity of the project, as they exist at the time the NOP was published, April 30, 2010 (CEQA Guidelines §15125). As with any Program EIR, the existing environmental setting for certain topics will include a reasonable amount of historical data in order to accurately and meaningfully portray existing conditions. This environmental setting will normally constitute the baseline physical conditions by which a Lead Agency determines whether an impact is significant. The description of the environmental setting needs to be no longer than is necessary to understand the significant effects of the project and its alternatives (CEQA Guidelines §15125).

The environmental baseline is that condition against which the future "with-project" condition is compared to determine the amount of impact. Normally, the environmental baseline is the same as existing conditions, as is the case for this Program EIR. **Figure 4-1** and **Table 4-1** show the existing composition of the disposed waste stream in California.

TABLE 4-1
COMPOSITION OF CALIFORNIA'S OVERALL DISPOSED WASTE STREAM

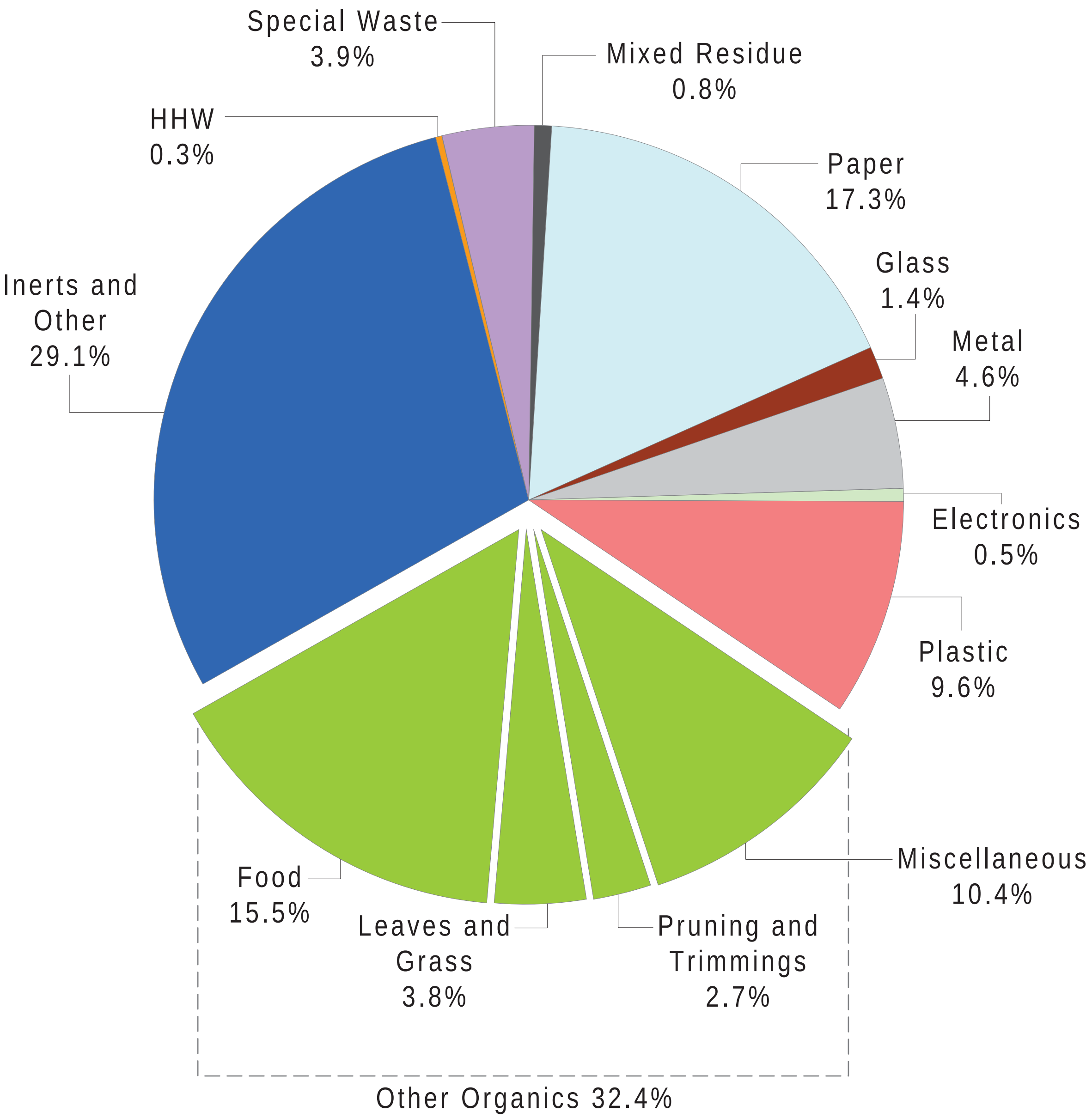
Material	Est. Percent	+ / -	Est. Tons
Paper	17.3%		6,859,121
Uncoated Corrugated Cardboard	4.8%	0.9%	1,905,897
Paper Bags	0.4%	0.1%	155,848
Newspaper	1.3%	0.3%	499,960
White Ledger Paper	0.7%	0.3%	259,151
Other Office Paper	1.2%	0.6%	472,147
Magazines and Catalogs	0.7%	0.2%	283,069
Phone Books and Directories	0.1%	0%	24,149
Other Miscellaneous Paper	3.0%	0.4%	1,202,354
Remainder/Composite Paper	5.2%	0.7%	2,056,546
Glass	1.4%		565,844
Clear Glass Bottles and Containers	0.5%	0.1%	196,093
Green Glass Bottles and Containers	0.2%	0.1%	79,491
Brown Glass Bottles and Containers	0.3%	0.1%	108,953
Other Colored Glass Bottles and Containers	0.1%	0%	40,570
Flat Glass	0.1%	0.1%	33,899
Remainder/Composite Glass	0.3%	0.1%	106,838
Metal	4.6%		1,809,684
Tin/Steel Cans	0.6%	0.1%	236,405
Major Appliances	0%	0.1%	17,120
Used Oil Filters	0%	0%	3,610
Other Ferrous	2.0%	0.4%	801,704
Aluminum Cans	0.1%	0%	47,829
Other Non-Ferrous	0.2%	0.1%	84,268
Remainder/Composite Metal	1.6%	0.5%	618,747
Electronics	0.5%		216,297
Brown Goods	0.2%	0.1%	76,725
Computer-related Electronics	0.1%	0.1%	32,932
Other Small Consumer Electronics	0.1%	0%	34,588
Video Display Devices	0.2%	0.1%	72,053

TABLE 4-1
COMPOSITION OF CALIFORNIA'S OVERALL DISPOSED WASTE STREAM

Material	Est. Percent	+ / -	Est. Tons
Plastic	9.6%		3,807,952
PETE Containers	0.5%	0.1%	199,644
HDPE Containers	0.4%	0.1%	157,779
Miscellaneous Plastic Containers	0.4%	0.1%	163,008
Plastic Trash Bags	0.9%	0.1%	361,997
Plastic Grocery and Other Merchandise Bags	0.3%	0%	123,405
Non-Bag Commercial and Industrial Packaging Film	0.5%	0.2%	194,863
Film Products	0.3%	0.2%	113,566
Other Film	1.4%	0.3%	554,002
Durable Plastic Items	2.1%	0.4%	834,970
Remainder/composite Plastic	2.8%	0.7%	1,104,719
Other Organic	32.4%		12,888,039
Food	15.5%	1.9%	6,158,120
Leaves and Grass	3.8%	0.7%	1,512,832
Pruning and Trimmings	2.7%	1.5%	1,058,854
Branches and Stumps	0.6%	0.4%	245,830
Manures	0.1%	0.1%	20,373
Textiles	2.2%	0.3%	886,814
Carpet	3.2%	2.0%	1,285,473
Remainder/Composite Organic	4.3%	0.5%	1,719,743
Inerts and Other	29.1%		11,577,768
Concrete	1.2%	0.4%	483,367
Asphalt Paving	0.3%	0.4%	129,834
Asphalt Roofing	2.8%	1.5%	1,121,945
Lumber	14.5%	2.2%	5,765,482
Gypsum Board	1.6%	0.7%	642,511
Rock, Soil and Fines	3.2%	1.1%	1,259,308
Remainder/Composite Inerts and Other	5.5%	1.3%	2,175,322
Household Hazardous Waste (HHW)	0.3%		120,752
Paint	0.1%	0.1%	48,025
Vehicle and Equipment Fluids	0%	0%	6,424
Used Oil	0%	0%	3,348
Batteries	0%	0%	19,082
Remainder/Composite Household Hazardous	0.1%	0.1%	43,873
Special Waste	3.9%		1,546,470
Ash	0.1%	0.1%	40,736
Treated Medical Waste	0%	0%	0
Bulky Items	3.5%	1.2%	1,393,091
Tires	0.2%	0.1%	60,180
Remainder/Composite Special Waste	0.1%	0.1%	52,463
Mixed Residue	0.8%		330,891
Mixed Residue	0.8%	0.2%	330,891
Totals	100%		39,722,818
Sample Count	751		

Notes: Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.

SOURCE: CalRecycle, 2009. *California 2008 Statewide Waste Characterization Study.* August 2009.



NOTE: Numbers may not total exactly due to rounding.

SOURCE: CalRecycle, 2009; and ESA, 2010

Figure 4-1
Overview of California's Overall Disposed Waste Stream

4.5 Cumulative Impacts

Cumulative impacts are defined in the State CEQA Guidelines (§15355) as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts." A cumulative impact is "the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor, but collectively significant, projects taking place over a period of time." In a manner consistent with state CEQA Guidelines §15130[a], the discussion of cumulative impacts in this Draft Program EIR focuses on potentially significant cumulative impacts.

Cumulative impacts associated with each of the environmental resources (e.g., Air Quality, Traffic, Noise, etc.) are discussed within their respective chapters. The appropriate geographic scope for cumulative impacts analysis associated with resource areas ranges from site-specific to statewide.

The project does not directly propose the construction of any new AD facilities, but the Program EIR does analyze the impacts from these facilities because the Program EIR and the project will help facilitate AD facility CEQA reviews and permits; thus directly facilitating their development. While the Program EIR resource sections analyze the impacts of AD facility development located at permitted solid waste facilities and within industrially zoned areas, the cumulative analysis also considers the impacts from other closely related past, present, and reasonably foreseeable probable future projects throughout California.

Probable Future AD Facility Projects

Forecasting future development involves estimating and projection. Invariably projecting a precise level of future development for AD facilities in California under the AD Initiative is extremely challenging. Notwithstanding, the Program EIR must provide information about physical environmental effects that could occur as a result of implementing the CalRecycle AD Initiative project. To ensure that potential errors that are part of any projection do not downplay or minimize the potential for environmental impacts, this Program EIR has made assumptions that lead to projections of a high level of AD facility development so that the cumulative impact analysis does not understate the development of AD facilities (and potential impacts) that could occur.

As mentioned above, there are no existing commercial-scale AD facilities to process MSW in the U.S. Thus, for the purpose of projecting potential AD facility development, a primary consideration is Strategic Directive 6.1, whereby CalRecycle seeks to reduce the amount of organic waste disposed in California landfills by 50 percent by 2020, as well as information contained in technical articles, primarily *Life-Cycle Analysis of Energy and Greenhouse Gas Emissions from Anaerobic Biodegradation of Municipal Solid Waste* (DiStefano and Belenky, 2009) , with a data check against results in *Assessing the Environmental Burdens of Anaerobic Digestion in Comparison to Alternative Options for Managing the Biodegradable Fraction of Municipal Solid Waste* (Haight, 2005). The DiStefano and Belenky article assumed an average AD facility size of 50,000 tons MSW to be processed per year. This facility size was based on MSW throughput capacity of dry digesters in

Western Europe (DiStefano and Belenky, 2009). For the cumulative analysis in this Program EIR, it was assumed that 70 AD facilities (each assumed to process 50,000 tons of MSW) could be developed statewide by 2020 based on the 28 million tons of biodegradable MSW landfilled in California in 2007, half (about 14 million tons) of which is goal-set to be reduced as part of Strategic Directive 6.1. The diverted material would be processed by a suite of alternative technologies. These technologies could include composting, source reduction, waste to energy conversion, and AD facilities. Based on the proportion of organics in the disposed waste stream (shown in **Table 4-1**) that would be usable substrate for AD facilities, which would primarily be the “Food” fraction, it was assumed that aggressive programs could result in up to 3.5 million tons of organics per year diverted to AD facilities. This estimate would represent about 25 percent of the total 14 million ton diversion goal of Strategic Directive 6.1 and would result in the development of 70 AD facilities, assuming each would process 50,000 tons of biodegradable MSW per year. Notably, these AD diversion and facility projections are conservative, based on the assumption that AD technologies are very successful.

It is acknowledged that currently, AD facility development in California faces difficult economic conditions; capital requirements are high and the financial return from the systems may not justify the cost. Several factors would need to be necessary to develop up to 70 AD facilities in California. Key factors could include:

- Mandatory food waste collection programs;
- Restriction on organic material disposal at landfills;
- Increased tipping fees at landfills and compost facilities;
- Increased demand for new energy sources;
- Increased demand for local renewable energy sources;
- Increased efforts in California (AB 32) to reduce greenhouse gases (GHGs);
- Improvements in AD technologies; and
- Public financial support or the development of profitable business models.

There have been a variety of factors that have caused the price of fossil-fuels to spike over the past 50 years and there are no sources of energy that can be developed without environmental consequences. Changes in public opinion could dramatically change the types of energy projects that are supported or required in the future. AD facilities could benefit from increased incentives for local, renewable energy sources. Using factors from the DiStefano and Belenky study (2009), the assumed 70 AD facilities in California could generate approximately 200 million cubic meters of methane, which would correspond to about 500 million megawatt-hours of annual electrical capacity.

For the purpose of cumulative impact analyses in the various resource chapters in this Program EIR, development of the digesters can be assumed to be concentrated geographically near major population centers (within reasonable limits), to the extent that such assumptions will help to identify potentially significant cumulative impacts.

Operating Parameters of Future AD Facilities

It is understood that the 70 AD facilities statewide could use biogas for electricity or co-generation, or upgrade biogas to biomethane quality through the removal of hydrogen sulfide, CO_2, and moisture. Biomethane can be used in place of natural gas for various processes, including use by utility companies if the biomethane is upgraded to utility standards and pumped into a natural gas supply pipeline, as well as for electrical generation, heating, and for natural gas-fueled vehicles.

Several of the environmental resource chapters analyze vehicles trips directly (Chapter 9, Transportation and Traffic) or indirectly (Chapter 5, Air Quality and GHG Emissions, and Chapter 7, Noise). In regards to truck trips, the analyses in this Program EIR have relied upon estimates detailed in recent information incorporated in the DiStefano and Belenky study (2009), which assumed 100 miles round trip per 18-ton haul truck per facility, or about 275,000 miles traveled annually per AD facility.

4.6 References

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CHAPTER 5
Air Quality and Greenhouse Gas

5.1 Environmental Setting

The environmental setting first identifies the air quality pollutants of concern in California; including criteria air pollutants, toxic air contaminants (TACs), odors, and greenhouse gases (GHGs) that could be emitted during the construction and operation of anaerobic digester (AD) facilities. This discussion also explains California's climate and meteorology and their effect on air quality.

Air Quality Pollutants of Concern

Criteria Air Pollutants

Ozone. Short-term exposure to ozone can irritate the eyes and cause constriction of the airways. Besides causing shortness of breath, ozone can aggravate existing respiratory diseases such as asthma, bronchitis, and emphysema. Ozone is not emitted directly into the atmosphere, but is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving reactive organic gases (ROG) (also termed volatile organic compounds or VOCs) and nitrogen oxides (NOx). ROG and NOx are known as precursor compounds for ozone. Significant ozone production generally requires ozone precursors to be present in a stable atmosphere with strong sunlight for approximately three hours. Ozone is a regional air pollutant because it is not emitted directly by sources, but is formed downwind of sources of ROG and NOx under the influence of wind and sunlight. Ozone concentrations tend to be higher in the late spring, summer, and fall, when the long sunny days combine with regional subsidence inversions to create conditions conducive to the formation and accumulation of secondary photochemical compounds, like ozone. Ground level ozone in conjunction with suspended particulate matter in the atmosphere leads to hazy conditions generally termed as "smog."

Notably, some hydrocarbons are less ozone-forming than other hydrocarbons, so the United States Environmental Protection Agency (USEPA) has officially excluded them from the definition of regulated hydrocarbons under the VOC classification. This definition excludes methane, ethane, and compounds not commonly found in large quantities in engine exhaust from consideration as VOCs.

Carbon Monoxide (CO). Ambient CO concentrations normally are considered a local effect and typically correspond closely to the spatial and temporal distributions of vehicular traffic. Wind speed and atmospheric mixing also influence carbon monoxide concentrations. Under inversion conditions, CO concentrations may be distributed more uniformly over an area that may extend some distance from vehicular sources. When inhaled at high concentrations, CO combines with hemoglobin in the blood and reduces the oxygen-carrying capacity of the blood. This results in reduced oxygen reaching the brain, heart, and other body tissues. This condition is especially critical for people with cardiovascular diseases, chronic lung disease, or anemia, as well as for fetuses.

Carbon monoxide concentrations have declined dramatically in California due to existing controls and programs, and most areas of the state have no problem meeting the CO State and federal standards. CO measurements and modeling were important in the early 1980's when CO levels were regularly exceeded throughout California. In more recent years, CO measurements and modeling have not been a priority in most California air districts due to the retirement of older polluting vehicles, less emissions from new vehicles and improvements in fuels. The clear success in reducing CO levels is evident in the first paragraph of the executive summary of the California Air Resources Board *2004 Revision to the California State Implementation Plan for Carbon Monoxide Updated Maintenance Plan for Ten Federal Planning Areas* (CARB, 2004), shown below:

> "The dramatic reduction in carbon monoxide (CO) levels across California is one of the biggest success stories in air pollution control. Air Resources Board (CARB or Board) requirements for cleaner vehicles, equipment and fuels have cut peak CO levels in half since 1980, despite growth. All areas of the State designated as non-attainment for the federal 8-hour CO standard in 1991 now attain the standard, including the Los Angeles urbanized area. Even the Calexico area of Imperial County on the congested Mexican border had no violations of the federal CO standard in 2003. Only the South Coast and Calexico continue to violate the more protective State 8-hour CO standard, with declining levels beginning to approach that standard."

Respirable Particulate Matter (PM10 and PM2.5). PM10 and PM2.5 consist of particulate matter that is 10 microns or less in diameter and 2.5 microns or less in diameter, respectively. (A micron is one-millionth of a meter). PM10 and PM2.5 represent fractions of particulate matter that can be inhaled into the air passages and the lungs and can cause adverse health effects. Some sources of particulate matter, such as wood burning in fireplaces, demolition, and construction activities, are more local in nature, while others, such as vehicular traffic, have a more regional effect. Very small particles of certain substances (e.g., sulfates and nitrates) can cause lung damage directly, or can contain adsorbed gases (e.g., chlorides or ammonium) that may be injurious to health. Particulates also can damage materials and reduce visibility. Large dust particles (diameter greater than 10 microns) settle out rapidly and are easily filtered by human breathing passages. This large dust is of more concern as a soiling nuisance rather than a health hazard. The remaining fraction, PM10 and PM2.5, are a health concern particularly at levels above the federal and State ambient air quality standards. PM2.5 (including diesel exhaust particles) is thought to have greater effects on health, because these particles are so small and thus, are able to penetrate to the deepest parts of the lungs. Scientific studies have suggested links between fine particulate matter and numerous health problems including asthma, bronchitis, acute and chronic respiratory symptoms such as shortness of breath and painful breathing. Recent studies have shown an association between morbidity and mortality and daily concentrations of particulate matter in the air. Children are more susceptible to the health risks of PM10 and PM2.5 because their immune and respiratory systems are still developing.

Mortality studies since the 1990s have shown a statistically significant direct association between mortality (premature deaths) and daily concentrations of particulate matter in the air. Despite important gaps in scientific knowledge and continued reasons for some skepticism, a comprehensive evaluation of the research findings provides persuasive evidence that exposure to fine particulate air pollution has adverse effects on cardiopulmonary health (Dockery and Pope, 2006). The CARB has estimated that achieving the ambient air quality standards for PM10 could reduce premature mortality rates by 6,500 cases per year (CARB, 2002).

Nitrogen Dioxide (NO_2). NO_2 is a reddish brown gas that is a by-product of combustion processes. Automobiles and industrial operations are the main sources of NO_2. NO_2 may be visible as a coloring component of a brown cloud on high pollution days, especially in conjunction with high ozone levels.

NO_2 is an air quality concern because it acts as a respiratory irritant and is a precursor of ozone. NO_2 is a major component of the group of gaseous nitrogen compounds commonly referred to as nitrogen oxides (NOx). Nitrogen oxides are produced by fuel combustion in motor vehicles, industrial stationary sources (such as industrial activities), ships, aircraft, and rail transit. Typically, nitrogen oxides emitted from fuel combustion are in the form of nitric oxide (NO) and nitrogen dioxide (NO_2). NO is often converted to NO_2 when it reacts with ozone or undergoes photochemical reactions in the atmosphere. Therefore, emissions of NO_2 from combustion sources are typically evaluated based on the amount of NOx emitted from the source.

Sulfur dioxide (SO_2). SO_2 is a combustion product of sulfur or sulfur-containing fuels such as coal, diesel, and biogas. SO_2 is also a precursor to the formation of atmospheric sulfate and particulate matter and contributes to potential atmospheric sulfuric acid formation that could precipitate downwind as acid rain. SO_2 is a major component of the group of gaseous sulfurous compounds commonly referred to as sulfur oxides (SOx).

Hydrogen sulfide (H_2S). H_2S is generated by the anaerobic decomposition of organic material. It is emitted naturally in geothermal areas and is also associated with certain industrial processes. Exposure to low concentrations of H_2S may cause irritation to eyes, nose, or throat. Exposure to higher concentrations (typically at work settings) can cause olfactory fatigue, respiratory paralysis, and death. However, no health effects have been found in humans exposed to typical environmental concentrations.

Lead. Lead has a range of adverse neurotoxin health effects, and was formerly released into the atmosphere primarily via leaded gasoline products. The phase-out of leaded gasoline in California resulted in decreasing levels of atmospheric lead. AD facilities would not introduce any new sources of lead emissions; consequently, lead emissions are not required to be quantified and are not further evaluated in this analysis.

Toxic Air Contaminants (TACs)

TACs are airborne substances that are capable of causing short-term (acute) and/or long-term (chronic and/or carcinogenic) adverse human health effects (i.e., injury or illness). TACs are substances for which federal or State criteria air pollutant standards have not been adopted. Thus, for TACs, there

is no federal or State ambient air quality standard against which to measure a project's air quality impacts. For this reason, TACs are analyzed by performing a health risk assessment. TACs include both organic and inorganic chemical substances. They may be emitted from a variety of common sources including gasoline stations, automobiles, dry cleaners, industrial operations, and painting operations. The current California list of TACs includes approximately 200 compounds, including particulate emissions from diesel-fueled engines, which can be emitted through the construction and/or operation of AD facilities. In addition, operation of AD facilities could result in trace amounts of air toxics (primarily H_2S and ammonia) that may be released as fugitives from the digester or from the potential combustion or flaring of the biogas. Additional air toxics that could be generated by the combustion of biogas (either in an engine or flare) include benzene, formaldehyde, and other products of incomplete combustion.

Diesel Particulate Matter (DPM). Diesel particulate matter is a TAC and is the most complex of diesel emissions. Diesel particulates, as defined by most emission standards, are sampled from diluted and cooled exhaust gases. This definition includes both solids and liquid material that condenses during the dilution process. The basic fractions of DPM are elemental carbon and heavy hydrocarbons derived from fuel and lubricating oil. DPM contains a large portion of the polycyclic aromatic hydrocarbons (PAH) found in diesel exhaust. Diesel particulates include small nuclei mode particles of diameters below 0.04μm and their agglomerates of diameters up to 1μm. DPM is expected to be the TAC of greatest concern generated by the construction and operation of AD facilities since it would be emitted outside of the digester and thus not captured during the digestion process.

In 2001, CARB assessed the statewide health risks from exposure to DPM and to other TACs. Ambient exposures to diesel particulates in California are significant fractions of total TAC levels in the State. CARB subsequently developed the *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles* (CARB, 2000). According to this plan, the statewide cancer risk from exposure to diesel exhaust was about 540 per million (i.e., 540 cancers per million people) as compared to a total risk for exposure to all ambient air toxics of 760 per million as reported in 2000. This estimate of risk from diesel exhaust, which accounts for a substantial portion (about 70 percent) of the total risk from TACs, included both urban and rural areas in the State. It can be considered as an average worst-case for the State, since it assumes constant exposure to outdoor concentrations of diesel exhaust and does not account for expected lower concentrations indoors, where people spend most of their time.

Ammonia. Ammonia is a TAC and is considered a precursor to PM2.5. Ammonia is generated during AD of organic materials and is therefore of interest in evaluating the air quality impacts of the project. Ammonia gas (a base) is known to react with acids in the atmosphere (typically nitric or sulfuric acid) to form ammonium nitrates or sulfates, which are particulates. Although it is known that the release of ammonia gas is a participant in the formation of ammonium nitrate, it is difficult to forecast how much ammonium nitrate would be created by a release of a certain amount of ammonia. The reaction that forms ammonium nitrate or ammonium sulfate depends on the presence of other chemicals that are in turn part of a complex photochemical process occurring in the atmosphere (including NOx and SOx). At the same time, both ammonia and ammonium particulates are subject to removal processes that constantly remove the pollutants from the atmosphere. No health effects have been found in humans exposed to typical environmental (moderate) concentrations of ammonia. In high concentrations, it can severely irritate the eyes, nose, ears, and throat. Lung damage and death may occur after exposure to very high concentrations of ammonia. Individuals with asthma may be more sensitive to breathing ammonia than others.

Odorous Emissions

Anaerobic decomposition of organic materials can be a source of odor. Though odors rarely cause any physical harm, they still remain unpleasant and can lead to public distress generating complaints. The occurrence and severity of odor impacts depend on the nature, frequency and intensity of the source; wind speed and direction; and the sensitivity of receptors.

Greenhouse Gas Emissions

Global climate change refers to observed changes in weather features that occur across the Earth as a whole, such as temperature, wind patterns, precipitation, and storms, over a long period (CAT, 2006; CEC, 2006; CEC, 2008; IPCC, 2007). Global temperatures are modulated by naturally occurring atmospheric gases, such as water vapor, carbon dioxide, methane, and nitrous oxide. These gases allow sunlight into the Earth's atmosphere, but prevent radiant heat from escaping into outer space, thus altering Earth's energy balance in a phenomenon called the "greenhouse effect". Some greenhouse gases are short lived, such as water vapor, while others, such as sulfur hexafluoride, have a long lifespan in the atmosphere.

Earth has a dynamic climate that is evidenced by repeated episodes of warming and cooling in the geologic record. Consistent with a general warming trend, global surface temperatures have increased by 0.74°C ± 0.18°C over the past 100 years (IPCC, 2007). The recent warming trend has been correlated with the global Industrial Revolution, which resulted in increased urban and agricultural centers at the expense of forests and reliance on fossil fuels (CAT, 2006). Eleven of the past twelve years are among the twelve warmest years recorded since 1850 (CEC, 2006). Although natural processes and sources of greenhouse gases contribute to warming periods, recent warming trends are attributed to human activities as well (CAT, 2006; CEC 2006). Potential global warming impacts may include, but are not limited to, loss in snow pack, sea level rise, more extreme heat days per year, more high ozone days, more large forest fires, and more drought years. Secondary effects are likely to include a global rise in sea level, impacts to agriculture, changes in disease vectors, and changes in habitat and biodiversity. While the possible outcomes and the feedback mechanisms involved are not fully understood, and much research remains to be done, the potential for substantial environmental, social, and economic consequences over the long term may be great.

GHGs include all of the following naturally-occurring and anthropogenic (man-made) gases: carbon dioxide (CO_2), methane, nitrous oxide (N_2O), sulfur hexafluoride, perfluorocarbons, hydrofluorocarbons, and nitrogen trifluoride (NF_3) (California Health and Safety Code §38505(g). In terms of Global Warming Potential (GWP), each of these gases varies substantially from one another. GWP is a measure of how much a given mass of GHG will contribute to global warming, comparing one GHG to the same mass of CO_2 on a relative scale (CAPCOA, 2009; CAT, 2006; IPCC, 2007). The GWP depends on the absorption of infrared radiation by a given species, the spectral location of its absorbing wavelengths, and the atmospheric lifetime of the species. GHG emissions are measured in units of pounds or tons of CO_2 equivalents (CO_2e). As an example, HFC-23 contributes 14,800 times as much as CO_2 to the GWP over 100 years. GWP values for key GHGs are summarized in **Table 5-1**. The following sections contain a general discussion of the natural and anthropogenic sources of each GHG.

TABLE 5-1
GLOBAL WARMING POTENTIAL OF GREENHOUSE GASES

Gas	Lifetime (years)	Global Warming Potential for 100-Year Time Horizon
Carbon Dioxide (CO_2)	50-200	1
Methane (CH_4)	12	25
Nitrous Oxide (NO_2)	114	298
Perfluorocarbons (PFC-14)	50,000	7,300
Hydrofluorocarbons (HFC-23)	270	14,800
Sulfur Hexafluoride (SF_6)	3,200	22,800

SOURCE: IPCC. 2007. Table 2.14, Chapter 2, Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the IPCC. Available at: http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-chapter2.pdf

Carbon Dioxide (CO_2). In the atmosphere, carbon generally exists in its oxidized form as CO_2. Natural sources of CO_2 include animal and plant respiration, ocean-atmospheric exchange and volcanic eruptions. Anthropogenic sources of CO_2 include the combustion of fossil fuels, such as coal, oil, and gas in power plants, automobiles, industrial facilities and other sources, and specialized industrial production processes and product uses (i.e., mineral production, metal production, and use of petroleum based products). The largest source of CO_2 emissions globally is the combustion of fossil fuels. Sinks of CO_2 include forests, wetlands and agriculture. When CO_2 sources exceed CO_2 sinks, the Earth's natural balance is no longer in equilibrium. Since the late 1800s, the concentration of CO_2 in the atmosphere has risen approximately 30% (CAT, 2006; CAPCOA, 2009).

Methane (CH_4). Methane in the atmosphere is eventually oxidized, yielding carbon dioxide and water. Natural sources of methane include, but are not limited to, anaerobic production, wetlands, termites, oceans, methane gas hydrates (clathrates), volcanoes and other geologic structures, wildfires, and animals. Anthropogenic sources of methane include, but are not limited to, landfills, natural gas systems, coal mining, manure management, forested lands, wastewater treatment, rice cultivation, composting, petrochemical production, and field burning of agricultural residues. In California, agricultural processes contribute significant sources of anthropogenic methane (CAT, 2006; CAPCOA, 2009).

Nitrous Oxide (N_2O). In the atmosphere, nitrous oxide reacts with ozone. Primary natural sources of nitrous oxide include bacterial breakdown of nitrogen in soils and oceans. Anthropogenic sources of nitrous oxide include fertilizer application, production of nitrogen fixing crops, nitric acid production, animal manure management, sewage treatment, combustion of fossil fuels, and nitric acid production (CAT, 2006; CAPCOA, 2009).

Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), and Sulfur Hexafluoride (SF_6). HFCs are man-made chemicals containing the element fluorine. Developed as alternatives to ozone-depleting substances for industrial, commercial and consumer products, they are used predominantly as refrigerants and aerosol propellants. PFCs are man-made as well, primarily used as replacements to ozone-damaging chlorofluorocarbons and hydrochlorofluorocarbons. Sources include aluminum production and semiconductor manufacturing. Man made, major releases of SF_6 come from leakage from electrical substations, magnesium smelters and some consumer goods, such as tennis balls and training shoes. Each of these GHGs possesses a relatively high GWP and long atmospheric lifetimes (CAT, 2006; CAPCOA, 2009).

California Climate and Meteorology

Air quality is affected by the rate, amount, and location of pollutant emissions and the associated meteorological conditions that influence pollutant movement and dispersal. Atmospheric conditions (for example, wind speed, wind direction, and air temperature) in combination with local surface topography (for example, geographic features such as mountains and valleys), determine how air pollutant emissions affect local air quality.

Because of the strong influence of the Pacific Ocean and mountains, variations in climate in California run in a general east-to-west direction. California’s climate varies from Mediterranean (most of the State) to steppe (scattered foothill areas), to alpine (high Sierra), to desert (Colorado and Mojave Deserts).

The Sierra Nevada, Coast and Cascade Ranges act as barriers to the passage of air masses. During summer, California is protected from much of the hot, dry air masses that develop over the central United States. Because of these barriers, and California’s western border of the Pacific Ocean, summer weather in portions of the State is generally milder than that in the rest of the country and is characterized by dry, sunny conditions with infrequent rain.

In winter, the same mountain ranges prevent cold, dry air masses from moving into California from the central areas of the United States. Consequently, winters in California are also milder than would be expected at these latitudes.

Regulatory Requirements

Federal

Clean Air Act

The Clean Air Act (CAA) is a federal law that regulates air emissions from stationary and mobile sources. Principal provisions include the authorization for the USEPA to establish National Ambient Air Quality Standards (NAAQS) to protect public health and public welfare and to regulate emissions of hazardous air pollutants. Six criteria pollutants include carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, particulate matter (equal to or less than PM10) and lead. **Table 5-2** shows current federal and State ambient air quality standards and provides a brief discussion of the related health effects and principal sources for each pollutant. The CAA was amended in 1977 and 1990, primarily to set new deadlines for achieving attainment of NAAQS because many areas of the country had failed to meet the deadlines.

TABLE 5-2
STATE AND NATIONAL CRITERIA AIR POLLUTANT STANDARDS, EFFECTS, AND SOURCES

Pollutant	Averaging Time	State Standard	National Standard	Pollutant Health and Atmospheric Effects	Major Pollutant Sources
Ozone	1 hour 8 hours	0.09 ppm 0.07 ppm	--- 0.075 ppm	High concentrations can directly affect lungs, causing irritation. Long-term exposure may cause damage to lung tissue.	Formed when reactive organic gases (ROG) and nitrogen oxides (NOx) react in the presence of sunlight. Major sources include on-road motor vehicles, solvent evaporation, and commercial / industrial mobile equipment.
Carbon Monoxide	1 hour 8 hours	20 ppm 9.0 ppm	35 ppm 9 ppm	Classified as a chemical asphyxiant, carbon monoxide interferes with the transfer of fresh oxygen to the blood and deprives sensitive tissues of oxygen.	Internal combustion engines, primarily gasoline-powered motor vehicles.
Nitrogen Dioxide	1 hour Annual Avg.	0.18 ppm 0.030 ppm	0.100 ppm 0.053 ppm	Irritating to eyes and respiratory tract. Colors atmosphere reddish-brown.	Motor vehicles, petroleum refining operations, industrial sources, aircraft, ships, and railroads.
Sulfur Dioxide	1 hour 3 hours 24 hours Annual Avg.	0.25 ppm --- 0.04 ppm ---	--- 0.5 ppm 0.14 ppm 0.03 ppm	Irritates upper respiratory tract; injurious to lung tissue. Can yellow the leaves of plants, destructive to marble, iron, and steel. Limits visibility and reduces sunlight.	Fuel combustion, chemical plants, sulfur recovery plants, and metal processing.
Respirable Particulate Matter (PM10)	24 hours Annual Avg.	50 µg/m3 20 µg/m3	150 µg/m3 ---	May irritate eyes and respiratory tract, decreases in lung capacity, cancer and increased mortality. Produces haze and limits visibility.	Dust and fume-producing industrial and agricultural operations, combustion, atmospheric photochemical reactions, and natural activities (e.g., wind-raised dust and ocean sprays).
Fine Particulate Matter (PM2.5)	24 hours Annual Avg.	--- 12 µg/m3	35 µg/m3 15 µg/m3	Increases respiratory disease, lung damage, cancer, and premature death. Reduces visibility and results in surface soiling.	Fuel combustion in motor vehicles, equipment, and industrial sources; residential and agricultural burning; Also, formed from photochemical reactions of other pollutants, including NOx, sulfur oxides, and organics.
Lead	Monthly Ave. Quarterly	1.5 µg/m3 ---	--- 1.5 µg/m3	Disturbs gastrointestinal system, and causes anemia, kidney disease, and neuromuscular and neurological dysfunction.	Present source: lead smelters, battery manufacturing & recycling facilities. Past source: combustion of leaded gasoline.
Hydrogen Sulfide	1 hour	0.03 ppm	No National Standard	Nuisance odor (rotten egg smell), headache and breathing difficulties (higher concentrations)	Geothermal Power Plants, Petroleum Production and refining
Sulfates	24 hour	25 µg/m3	No National Standard	Breathing difficulties, aggravates asthma, reduced visibility	Produced by the reaction in the air of SO2.
Visibility Reducing Particles	8 hour	Extinction coefficient of 0.23/km; visibility of 10 miles or more	No National Standard	Reduces visibility, reduced airport safety, lower real estate value, discourages tourism.	See PM2.5.

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ppm = parts per million; µg/m^3 = micrograms per cubic meter.

SOURCE: California Air Resources Board (CARB), 2010a. *Ambient Air Quality Standards,* available at http://www.arb.ca.gov/research/aaqs/aaqs2.pdf Standards last updated February 16, 2010. California Air Resources Board, 2009a. *ARB Fact Sheet: Air Pollution Sources, Effects and Control,* http://www.arb.ca.gov/research/health/fs/fs2/fs2.htm, page last reviewed December 2009.

Pursuant to the 1990 amendments to the CAA, the USEPA classifies air basins, or portions of air basins, as “attainment” or “nonattainment” for each criteria air pollutant, based on whether or not the NAAQS had been achieved. **Table 5-3** shows the current attainment statuses across the project area by air basin (shown in **Figure 5-1**) for the pollutants of highest concern (ozone and particulates).

TABLE 5-3
CRITERIA POLLUTANT ATTAINMENT STATUS BY CALIFORNIA AIR BASIN

Air Basin	State Ozone	Federal Ozone	State PM10	Federal PM10	State PM2.5	Federal PM2.5
Great Basin Valleys Air Basin	N	U	N	N	A	U
Lake County Air Basin	A	U	A	U	A	U
Lake Tahoe Air Basin	N	U	N	U	A	U
Mojave Desert Air Basin	N	N	N	N	N	U
Mountain Counties Air Basin	N	N	N	U	N	N
North Central Coast Air Basin	N	U	N	U	A	U
North Coast Air Basin	A	U	N	U	U	U
Northeast Plateau Air Basin	NT	U	N	U	U	U
Sacramento Valley Air Basin	N	N	N	N	N	N
Salton Sea Air Basin	N	N	N	N	U	N
San Diego Air Basin	N	N	N	U	N	U
San Francisco Bay Area Air Basin	N	N	N	U	N	N
San Joaquin Valley Air Basin	N	N	N	A	N	N
South Central Coast Air Basin	N	N	N	U	N	U
South Coast Air Basin	N	N	N	N	N	N

A Attainment. An area is designated attainment if the state or federal standard for the specified pollutant is met.
N Nonattainment. An area is designated nonattainment if the State or federal standard for the specified pollutant is not met.
NT Nonattainment – Transitional. An area is designated non-attainment – transitional to signify that the area is close to attaining the standard for that pollutant.
U Unclassified. An area is designated unclassified if the data are incomplete and do not support a designation of attainment or nonattainment.

Air basins classified as N or NT areas have at least one area within that basin that has shown a violation of the relevant ambient standard.

SOURCE: California Air Resources Board (CARB), 2010b. *Area Designation Maps,* http://www.arb.ca.gov/desig/adm/adm.htm, page updated July 26, 2010 and accessed July 29, 2010.

The 1990 amendments to the CAA requires each state to prepare an air quality control plan referred to as the State Implementation Plan (SIP). The amendments added requirements for states containing areas that violate the NAAQS to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIP is a living document that is periodically modified to reflect the latest emissions inventories, planning documents, and rules and regulations of air basins as reported by the agencies with jurisdiction over them. The USEPA has responsibility to review all state SIPs to determine if they conform to the mandates of the CAA and will achieve air quality goals when implemented. If the USEPA determines a SIP to be inadequate, it may prepare a Federal Implementation Plan (FIP) for the nonattainment area and may impose additional control measures. Failure to submit an approvable SIP or to implement the plan within mandated timeframes can result in sanctions being applied to transportation funding and stationary air pollution sources in the air basins.

Regulation of TACs, termed Hazardous Air Pollutants (HAPs) under federal regulations, is achieved through federal, State and local controls on individual sources. The 1977 amendments to the CAA required the USEPA to identify National Emission Standards for Hazardous Air Pollutants (NESHAPs) to protect public health and welfare. These substances include certain volatile organic chemicals, pesticides, herbicides, and radionuclides that present a tangible hazard, based on scientific studies of exposure to humans and other mammals. There is uncertainty in the precise degree of hazard.

SOURCE: CA Air Resources Board, 2008; and ESA, 2010

Figure 5-1
California Air Basins

Relevant to the CAA, GHGs and climate change, *Massachusetts v. Environmental Protection Agency* (549 U.S. 497) is the pivotal federal court case. In this case, twelve states and cities, including California, sued to force the USEPA to regulate GHGs as a pollutant pursuant to the CAA. This lawsuit was pursued in conjunction with several environmental organizations. The petitioners contended that the CAA gave the USEPA the necessary authority and the mandate to address GHGs in light of scientific evidence on global warming.

The USEPA was one of several respondents in the case. The USEPA contended that it did not have the authority under the CAA to regulate GHGs, and even if the USEPA did have such authority, it would decline to exercise it. Central to this case was the exact definition of an air pollutant as stipulated in the CAA. In April 2007, the United States Supreme Court ruled five to four that the plaintiffs had standing to sue, that the CAA gave the USEPA the authority to regulate GHGs, and that the USEPA's reasons for not regulating GHG were found to be inadequate. Since this ruling, the USEPA has been developing regulations for geologic carbon sequestration projects and will be issuing GHG permits for large sources.

State

The CARB manages air quality, regulates mobile emissions sources, and oversees the activities of county APCDs and regional AQMDs. CARB establishes state ambient air quality standards and vehicle emissions standards.

California has adopted ambient standards that are more stringent than the federal standards for the criteria air pollutants. These are shown in **Table 5-2**. Under the 1988 California Clean Air Act (CCAA) patterned after the CAA, areas have been designated as attainment or nonattainment with respect to the state standards. **Table 5-3** summarizes the attainment status with California standards of the Program area by air basin for the pollutants of highest concern (ozone and particulates).

Toxic Air Contaminants

The State Air Toxics Program was established in 1983 under Assembly Bill (AB) 1807 (Tanner). A total of 243 substances have been designated TACs under California law; they include the 189 (federal) hazardous air pollutants (HAPs) adopted in accordance with AB 2728. The Air Toxics "Hot Spots" Information and Assessment Act of 1987 (AB 2588) seeks to identify and evaluate risk from air toxics sources; however, AB 2588 does not regulate air toxics emissions. Toxic air contaminant emissions from individual facilities are quantified and prioritized. "High-priority" facilities are required to perform a health risk assessment and, if specific thresholds are violated, are required to communicate the results to the public in the form of notices and public meetings.

CARB developed the *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles* (CARB, 2000), which represents proposals to reduce diesel particulate emissions, with the goal of reducing emissions and associated health risks by 75 percent in 2010 and by 85 percent in 2020. The program aims to require the use of state-of-the-art catalyzed diesel particulate filters and ultra low sulfur diesel fuel on diesel-fueled engines.

CARB recently published the *Air Quality and Land Use Handbook: A Community Health Perspective* (CARB, 2005). The primary goal in developing the handbook was to provide information that will help keep California's children and other vulnerable populations out of harm's way with respect to nearby sources of TACs. The handbook highlights recent studies that have shown that public exposure to air pollution can be substantially elevated near freeways and certain other facilities. The health risk is greatly reduced with distance. For that reason, CARB provides some general recommendations aimed at keeping appropriate distances between sources of air pollution and sensitive land uses, such as residences.

Greenhouse Gases

Executive Order S-3-05

In 2005, in recognition of California's vulnerability to the effects of climate change, Governor Schwarzenegger established Executive Order S-3-05, which sets forth a series of target dates by which statewide emission of greenhouse gas would be progressively reduced, as follows:

- By 2010, reduce greenhouse gas emissions to 2000 levels;
- By 2020, reduce greenhouse gas emissions to 1990 levels; and
- By 2050, reduce greenhouse gas emissions to 80 percent below 1990 levels.

Assembly Bill 32 (AB 32)

In 2006, California passed the California Global Warming Solutions Act of 2006 (Assembly Bill No. 32; California Health and Safety Code Division 25.5, §s 38500, et seq., or AB 32), which requires the CARB to design and implement emission limits, regulations, and other measures, such that statewide greenhouse gas emissions will be reduced to 1990 levels by 2020.

In December 2007, CARB approved the 2020 emission limit of 427 million metric tons of CO_2 equivalents (CO_2e) of greenhouse gases. The 2020 target of 427 million metric tons of CO_2e requires the reduction of 169 million metric tons of CO_2e, or approximately 30 percent, from the state's projected 2020 emissions of 596 million metric tons of CO_2e (business-as-usual).

AB 32 required development of a mandatory reporting rule for major sources of GHGs. The CARB reporting rule (California Code of Regulations Title 17, Subchapter 10, Article 2, §95100 to 95133) became effective in January 2009. The rule requires reporting of GHG emissions for:

- Cement plants;
- Petroleum refineries ($\geq$ 25,000 metric tons of CO_2e in any calendar year);
- Hydrogen plants ($\geq$ 25,000 metric tons of CO_2e in any calendar year);
- Electric generating facilities and cogeneration facilities (> 1 MW capacity and > 2,500 metric tons of CO_2e in any year)
- Electricity retail providers and marketers
- Other facilities that emit >25,000 metric tons of CO_2e, for stationary combustion sources, in any calendar year.

Cement plants, oil refineries, fossil-fueled electric-generating facilities/providers, cogeneration facilities, and hydrogen plants and other stationary combustion sources that emit more than 25,000 metric tons/year CO_2e, make up 94 percent of the point source CO_2e emissions in California.

In June 2008, CARB published its *Climate Change Draft Scoping Plan* (CARB, 2008a) that was approved and adopted by the CARB Board on December 11, 2008 as the *Climate Change Scoping Plan* (CARB, 2008b). The *Climate Change Draft Scoping Plan* reported that CARB met the first milestones set by AB 32 in 2007: developing a list of early actions to begin sharply reducing GHG emissions; assembling an inventory of historic emissions; and establishing the 2020 emissions limit. Key elements of the *Climate Change Scoping Plan* include:

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standards;
- Achieving a statewide renewables energy mix of 33 percent;
- Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system;
- Establishing targets for transportation-related GHG emissions for regions throughout California, and pursuing policies and incentives to achieve those targets;
- Adopting and implementing measures pursuant to existing state laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard; and
- Creating targeted fees, including a public goods charge on water use, fees on high global warming potential gases, and a fee to fund the administrative costs of the state's long-term commitment to AB 32 implementation (CARB, 2008b).

CARB has not yet determined what amount of GHG emissions reductions it recommends from local government land use decisions; however, the *Climate Change Scoping Plan* does state that successful implementation of the plan relies on local governments' land use planning and urban growth decisions because local governments have primary authority to plan, zone, approve, and permit land development to accommodate population growth and the changing needs of their jurisdictions. CARB further acknowledges that decisions on how land is used will have large effects on the GHG emissions that will result from the transportation, housing, industry, forestry, water, agriculture, electricity, and natural gas emission sectors.

The *Climate Change Scoping Plan* also includes recommended measures that were developed to reduce GHG emissions from key sources and activities while improving public health, promoting a cleaner environment, preserving our natural resources, and ensuring that the impacts of the reductions are equitable and do not disproportionately impact low-income and minority communities. These measures, shown below in **Table 5-4** by sector, also put the state on a path to meet the long-term 2050 goal of reducing California's GHG emissions to 80 percent below 1990 levels.

The total reduction for the recommended measures is 174 million metric tons/year of CO_2e, slightly exceeding the 169 million metric tons/year of CO_2e reductions estimated to be needed in the *Climate Change Draft Scoping Plan*. The measures in the *Climate Change Scoping Plan* approved by the Board will be developed over the next two years and be in place by 2012.

TABLE 5-4
LIST OF RECOMMENDED ACTIONS BY SECTOR

Measure No.	Measure Description	GHG Reductions (Annual Million Metric Tons CO_2e)
Transportation		
T-1	Pavley I and II – Light Duty Vehicle Greenhouse Gas Standards	31.7
T-2	Low Carbon Fuel Standard (Discrete Early Action)	15
T-3[1]	Regional Transportation-Related Greenhouse Gas Targets	5
T-4	Vehicle Efficiency Measures	4.5
T-5	Ship Electrification at Ports (Discrete Early Action)	0.2
T-6	Goods Movement Efficiency Measures. • Ship Electrification at Ports • System-Wide Efficiency Improvements	3.5
T-7	Heavy-Duty Vehicle Greenhouse Gas Emission Reduction Measure – Aerodynamic Efficiency (Discrete Early Action)	0.93
T-8	Medium- and Heavy-Duty Vehicle Hybridization	0.5
T-9	High Speed Rail	1
Electricity and Natural Gas		
E-1	Energy Efficiency (32,000 GWh of Reduced Demand) • Increased Utility Energy Efficiency Programs • More Stringent Building & Appliance Standards Additional Efficiency and Conservation Programs	15.2
E-2	Increase Combined Heat and Power Use by 30,000 GWh (Net reductions include avoided transmission line loss)	6.7
E-3	Renewables Portfolio Standard (33% by 2020)	21.3
E-4	Million Solar Roofs (including California Solar Initiative, New Solar Homes Partnership and solar programs of publicly owned utilities) • Target of 3000 MW Total Installation by 2020	2.1
CR-1	Energy Efficiency (800 Million Therms Reduced Consumptions) • Utility Energy Efficiency Programs • Building and Appliance Standards • Additional Efficiency and Conservation Programs	4.3
CR-2	Solar Water Heating (AB 1470 goal)	0.1
Green Buildings		
GB-1	Green Buildings	26
Water		
W-1	Water Use Efficiency	1.4†
W-2	Water Recycling	0.3†
W-3	Water System Energy Efficiency	2.0†
W-4	Reuse Urban Runoff	0.2†
W-5	Increase Renewable Energy Production	0.9†
W-6	Public Goods Charge (Water)	TBD†
Industry		
I-1	Energy Efficiency and Co-Benefits Audits for Large Industrial Sources	TBD
I-2	Oil and Gas Extraction GHG Emission Reduction	0.2
I-3	GHG Leak Reduction from Oil and Gas Transmission	0.9
I-4	Refinery Flare Recovery Process Improvements	0.3
I-5	Removal of Methane Exemption from Existing Refinery Regulations	0.01
Recycling and Water Management		
RW-1	Landfill Methane Control (Discrete Early Action)	1
RW-2	Additional Reductions in Landfill Methane • Increase the Efficiency of Landfill Methane Capture	TBD†

TABLE 5-4
LIST OF RECOMMENDED ACTIONS BY SECTOR

Measure No.	Measure Description	GHG Reductions (Annual Million Metric Tons CO_2e)
RW-3	High Recycling/Zero Waste • Commercial Recycling • Increase Production and Markets for Organic Products • Anaerobic Digestion • Extended Producer Responsibility • Environmentally Preferable Purchasing	9†
Forests		
F-1	Sustainable Forest Target	5
High Global Warming Potential (GWP) Gases		
H-1	Motor Vehicle Air Conditioning Systems: Reduction of Refrigerant Emissions from Non-Professional Services (Discrete Early Action)	0.26
H-2	SF_6 Limits in Non-Utility and Non-Semiconductor Applications (Discrete Early Action)	0.3
H-3	Reduction of Perfluorocarbons in Semiconductor Manufacturing (Discrete Early Action)	0.15
H-4	Limit High GWP Use in Consumer Products Discrete Early Action (Adopted June 2008)	0.25
H-5	High GWP Reductions from Mobile Sources • Low GWP Refrigerants for New Motor Vehicle Air Conditioning Systems • Air Conditioner Refrigerant Leak Test During Vehicle Smog Check • Refrigerant Recovery from Decommissioned Refrigerated Shipping Containers • Enforcement of Federal Ban on Refrigerant Release during Servicing or Dismantling of Motor Vehicle Air Conditioning Systems	3.3
H-6	High GWP Reductions from Stationary Sources • High GWP Stationary Equipment Refrigerant Management Program: - Refrigerant Tracking/Reporting/Repair Deposit Program - Specifications for Commercial and Industrial Refrigeration Systems • Foam Recovery and Destruction Program • SF Leak Reduction and Recycling in Electrical Applications • Alternative Suppressants in Fire Protection Systems • Residential Refrigeration Early Retirement Program	10.9
H-7	Mitigation Fee on High GWP Gases	5
Agriculture		
A-1	Methane Capture at Large Dairies	1.0†

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1. This is not the SB 375 regional target. CARB will establish regional targets for each California's 18 Metropolitan Planning Organization (MPO's) regions following the input of the regional targets advisory committee and a consultation process with MPO's and other stakeholders per SB 375

† GHG emission reduction estimates are not included in calculating the total reductions needed to meet the 2020 target

Senate Bill 97 (SB 97)

SB 97, signed August 2007 (Chapter 185, Statutes of 2007; Public Resources Code §21083.05 and 21097), acknowledges that climate change is a prominent environmental issue that requires analysis under CEQA. This bill directed the Governor's Office of Planning and Research (OPR), which is part of the state Resources Agency, to prepare, develop, and transmit to CARB guidelines for the feasible mitigation of GHG emissions (or the effects of GHG emissions), as required by CEQA, by July 1, 2009. The Resources Agency was required to certify and adopt those guidelines by January 1, 2010. On December 31, 2009, the Natural Resources Agency delivered its rulemaking package to the Office of Administrative Law for their review pursuant to the Administrative Procedure Act. The adopted guidelines became effective on March 18, 2010.

California Air Pollution Control Officers Association (CAPCOA)

In January 2008, CAPCOA issued a "white paper" on evaluating and addressing GHGs under CEQA (CAPCOA, 2008). This resource guide was prepared to support local governments as they develop their programs and policies around climate change issues. The paper is not a guidance document. It is not intended to dictate or direct how any agency chooses to address GHG emissions. Rather, it is intended to provide a common platform of information about key elements of CEQA as they pertain to GHG, including an analysis of different approaches to setting significance thresholds.

The paper notes that for a variety of reasons, local agencies may decide not to have a CEQA threshold. Local agencies may also decide to assess projects on a case-by-case basis when the projects come forward. The paper also discusses a range of GHG emission thresholds that could be used. The range of thresholds discussed includes a GHG threshold of zero and several non-zero thresholds. Non-zero thresholds include percentage reductions for new projects that would allow the state to meet its goals for GHG emissions reductions by 2020 and perhaps 2050. These would be determined by a comparison of new emissions versus business as usual emissions and the reductions required would be approximately 30 percent to achieve 2020 goals and 90 percent (effectively immediately) to achieve the more aggressive 2050 goals. These goals could be varied to apply differently to a new project, by economic sector, or by region in the state.

Other non-zero thresholds are discussed in the paper, including:

- 900 metric tons/year CO_2e (a market capture approach);
- 10,000 metric tons/year CO_2e (potential CARB mandatory reporting level with Cap and Trade);
- 25,000 metric tons/year CO_2e (the CARB mandatory reporting level for the statewide emissions inventory);
- 40,000 to 50,000 metric tons/year CO_2e (regulated emissions inventory capture – using percentages equivalent to those used in air districts for criteria air pollutants),
- Projects of statewide importance (9,000 metric tons/year CO_2e for residential, 13,000 metric tons/year CO_2e for office project, and 41,000 metric tons/year CO_2e for retail projects), and
- Unit-based thresholds and efficiency-based thresholds that were not quantified in the report.

Local Jurisdictions

The CARB has delegated much of its air pollution control authority to local air pollution control districts (APCDs) and air quality management districts (AQMDs). California's 15 air basins are identified in **Figure 5-1**. For some air basins covering more than one county, a unified air district has been formed to manage air quality issues throughout the basin. In other multicounty air basins, individual county air districts manage air quality in only their county. Individual air districts or groups of air districts prepare air quality management plans designed to bring an air basin into compliance for nonattainment criteria pollutants. Those plans are submitted to the CARB for approval and usually contain an emissions inventory and a list of rules proposed for adoption. The project would not preempt or supersede the authority of local agencies to prohibit, restrict, or control air pollutant sources subject to those agencies' control.

5.2 Impacts and Mitigation Measures

Approach and Methods

Criteria Pollutants

Construction and operations of AD facilities would result in criteria pollutant emissions. Construction of AD facilities would produce emissions of PM10 and PM2.5 from fugitive dust primarily during earthmoving activities, as well as construction equipment and haul truck exhaust emissions of ROG, NOx, PM10, PM2.5, CO, and CO_2. Implementation of standard best management practices would reduce the potential for air quality violations from construction of digester facilities. In regards to criteria air pollutant emissions for the operation of anaerobic digesters, additional sources and emissions would include any diesel equipment on-site for pre-processing, increased traffic on the local and regional roadway network, and the post processing of the biogas. These impacts are discussed and mitigation measures are identified below in Impact 5.1. Finally, regional cumulative criteria pollutant impacts are discussed in Impact 5.5. Notably, due to the uncertainties associated with this programmatic assessment, such as potential size and locations of potential facilities, as well as pertinent jurisdictional AQMD or APCD thresholds of significance that would apply to the AD facilities, these impacts are discussed on a qualitative basis.

Odors

Due to the collection, transport, storage, and pre-processing activities of the potentially odiferous organic substrates for digestion and resultant digestates, the siting of these AD facilities could lead to objectionable odors at off-site receptors in the vicinity of an AD facility. This impact is discussed and mitigation measures are identified below in Impact 5.2.

Toxic Air Contaminants

Since accurate quantification of health risks requires detailed site specific information which is not available on a programmatic level, health risk impacts are discussed qualitatively below in Impact 5.3. This includes a description of general methodology, risk models, TAC sources, and potential mitigation measures.

Greenhouse Gases

The development of AD facilities could result in changes in temporary, short-term, and operation-related (long-term) emissions of GHGs. Similar to several other resource areas, there are no adopted quantitative statewide guidelines (significance thresholds) for GHG emission impacts. Lead agencies should develop methods to analyze the impact of GHG in CEQA review documents. This project would be considered to have a significant impact if it would be in conflict with the AB 32 State goals for reducing GHG emissions. It is assumed that AB 32 will be successful in reducing GHG emissions and reducing the cumulative GHG emissions statewide by 2020. Therefore, the project has been reviewed to determine whether it would conflict with the goals of AB 32. This impact is discussed below in Impact 5.4.

Thresholds of Significance

CEQA defines a significant effect on the environment as a substantial, or potentially substantial, adverse change in the physical conditions of the area affected by the project. According to Appendix G of the CEQA Guidelines, a project would have a significant effect on air quality or associated with GHG if it would:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- Result in a cumulatively considerable net increase of any non-attainment pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors);
- Expose sensitive receptors to substantial pollutant concentrations;
- Create objectionable odors affecting a substantial number of people;
- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; or
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHG.

The following discussion of environmental impacts is limited to those potential impacts that could result in some level of potentially significant environmental change, as defined by CEQA. However, consistent with the CEQA Guidelines for a program-level EIR (CEQA Guidelines §15168), as individual AD facilities are proposed, the lead agency will examine these individual projects to determine whether their construction and operational effects were fully analyzed in this Program EIR. Future review of individual AD facilities may require additional site-specific CEQA review, including site specific air quality studies that could include further modeling (e.g., AERMOD) or analysis of these particular air quality impacts on a project-by-project basis.

Impact Analysis

Impact 5.1: Construction and operations of AD facilities within California would result in emissions of criteria air pollutants at levels that could substantially contribute to a potential violation of applicable air quality standards or to nonattainment conditions. (Significant)

Construction

Construction related emissions for AD facilities would arise from a variety of activities, including: (1) grading, excavation, road building, and other earth moving activities; (2) travel by construction equipment and employee vehicles, especially on unpaved surfaces; (3) exhaust from construction equipment; (4) architectural coatings; and (5) asphalt paving.

Construction-related fugitive dust emissions would vary from day to day, depending on the level and type of activity, silt and clay content of the soil, and the weather. In the absence of mitigation, construction activities may result in significant quantities of dust, and as a result, local visibility and PM10 concentrations may be adversely affected on a temporary and intermittent basis during construction. In addition, the fugitive dust generated by construction would include not only PM10, but also larger particles, which would fall out of the atmosphere within several hundred feet of the site and could result in nuisance-type impacts.

Construction equipment and construction-worker commute vehicles would also generate criteria air pollutant emissions. Criteria pollutant emissions of ROG and NOx from these emissions sources would incrementally add to regional atmospheric loading of ozone precursors during the construction period.

Although construction activities would be short-term in duration, due to the uncertainties regarding size and locations of potential facilities, as well as pertinent jurisdictional AQMD or APCD thresholds of significance that would apply to the AD facilities, digester construction activities are considered potentially significant prior to mitigation. Mitigation measures have been incorporated below to determine if emissions would be significant on a project specific level and control strategies to reduce these emissions.

Operations

Emissions associated with digester operations would depend on several factors, such as the size and type of AD facility (e.g., one-stage or two-stage continuous systems, batch systems, wet or dry processes), any equipment needed for pre-processing, the increased traffic on the local and regional roadway network (including additional waste haul trucks and employees), and the post processing of the biogas (e.g., flaring of excess biogas, combusting for electricity, or cleaning up biogas for use as a transportation fuel or injection to utility transmission lines). Operational sources of fugitive dust would primarily be processing equipment and truck movement over paved and unpaved surfaces. In addition, non-methane VOCs released from pre-digested substrate materials during the receipt and pre-processing activities at AD facilities would not be a regional change but could result in increased localized emissions. Although there will be emissions associated with these sources at AD facilities, the operation of these facilities would divert organics out of landfills. By doing so, there would be less activity at the landfill, such as potentially fewer pieces of off-road equipment and a potential decrease in the vehicle miles traveled (VMT) for haul trucks. The AD facilities could also generate biogas to replace fossil fuels for electricity production or for vehicle transportation. However, quantification of operational emissions is too speculative on this statewide programmatic level since there are too many unknown localized variables and operational considerations. Project-by-project analysis will be able to obtain specific information, such as landfill and AD facility distances to the applicable solid waste centroid (for VMT), operating information for the landfill that organics are being diverted from (i.e., equipment operations, methane capture rate and end use of the biogas), as well as individual AD facility operating characteristics (i.e., organics throughput, equipment, biogas usage), which will be evaluated to develop an informative emissions inventory.

Due to the uncertainties underlying this programmatic assessment regarding the variable criteria described above for AD facility operations, as well as pertinent jurisdictional AQMD or APCD thresholds of significance that would apply to the AD facilities, digester operations are considered potentially significant prior to mitigation. Mitigation measures have been incorporated below to determine if emissions would be significant on a project specific level and to identify control strategies to reduce these emissions.

Mitigation Measures

Measure 5.1a: Applicants shall prepare and submit an Air Quality Technical Report as part of the environmental assessments for the development of future AD facilities on a specific project-by-project basis. The technical report shall include an analysis of potential air quality impacts (including a screening level analysis to determine if construction and operation related criteria air pollutant emissions would exceed applicable air district thresholds, as well as greenhouse gas (GHG) emissions and any health risk associated with toxic air contaminants (TACs) from all AD facility sources) and reduction measures. Preparation of the technical report should be coordinated with the appropriate air district and shall identify compliance with all applicable New Source Review and Best Available Control Technology (BACT) requirements. The technical report shall identify all project emissions from permitted (stationary) and non-permitted (mobile and area) sources and mitigation measures (as appropriate) designed to reduce significant emissions to below the applicable air district thresholds of significance, and if these thresholds cannot be met with mitigation, then the individual AD facility project could require additional CEQA review or additional mitigation measures.

Measure 5.1b: Applicants shall require construction contractors and system operators to implement the following Best Management Practices (BMPs) as applicable during construction and operations:

- Facilities shall be required to comply with the rules and regulations from the applicable Air Quality Management District (AQMD) or Air Pollution Control District (APCD).
- Facilities shall require substrate unloading and pre-processing activities to occur indoors within enclosed, negative pressure buildings. Collected foul air (including volatile organic compounds (VOCs) off-gassed from undigested substrates) should be treated via biofilter or air scrubbing system.
- Use equipment meeting, at a minimum, Tier II emission standards.
- Minimize idling time either by shutting equipment off when not in use or reducing the time of idling to 5 minutes (as required by the state airborne toxics control measure [Title 13, §2485 of the California Code of Regulations]). Provide clear signage that posts this requirement for workers at the entrances to the site.
- Maintain all equipment in proper working condition according to manufacturer's specifications.
- Use electric equipment when possible.
- Where feasible as an alternative to internal combustion engines, which generate nitrogen oxides (NOx) emissions, use biogas from AD facilities as a transportation fuel (compressed biomethane), in fuel cells to generate clean electricity, or inject biomethane into the utility gas pipeline system. If there are other low NOx

technologies available at the time of AD facility development, these should be considered as well during the facility design process.

Impact Significance After Mitigation: Less than Significant

Implementation of Mitigation Measures 5.1a and 5.1b would ensure that BMPs are followed during construction and operational activities and that emissions associated with AD facilities to be built under this Program EIR would be reduced to a less–than-significant level.

Impact 5.2: Operation of AD facilities in California could create objectionable odors affecting a substantial number of people. (Significant)

Factors that affect odor impacts include the proposed AD facility design, sensitive receptor proximity, and exposure duration. Anaerobic digestion is the biological decomposition of organic matter in the absence of molecular oxygen. As a result, odorous compounds, such as ammonia and H_2S, are generated and could be released into the environment. The anaerobic digestion process occurs naturally in marshes, wetlands and is the principal decomposition process in landfills. However, in the operation of AD facilities, the digestion process occurs in a closed system. Volatile organic compounds are broken down through the anaerobic digestion process, and exhaust is generally processed in a more controlled environment.

However, the collection transport, storage, and pre-processing activities of the potentially odiferous organic substrates for digestion and the resultant digestate could produce nuisance odors at AD facilities. In addition, the siting of these digester facilities could lead to objectionable odors at off-site receptors in the vicinity. Mitigation measures shall be implemented in order to ensure the potential nuisance impact associated with odors would not affect a substantial number of people.

Mitigation Measures

Measure 5.2a: Applicants for the development of AD facilities shall comply with appropriate local land use plans, policies, and regulations, including applicable setbacks and buffer areas from sensitive land uses for potentially odoriferous processes.

Measure 5.2b: If an AD facility handles compostable material and is classified as a compostable material handling facility, the facility must develop an Odor Impact Minimization Plan (OIMP) pursuant to 14 CCR 17863.4. Otherwise, applicants shall develop and implement an Odor Management Plan (OMP) that incorporates equivalent odor reduction controls for digester operations. Odor control strategies that can be incorporated into these plans include, but are not limited to, the following:

- A list of potential odor sources.
- Identification and description of the most likely sources of odor.
- Identification of potential, intensity, and frequency of odor from likely sources.
- A list of odor control technologies and management practices that could be implemented to minimize odor releases. These management practices shall include the establishment of the following criteria:

- Require substrate haulage to the AD facility within sealed containers.
- Establish time limit for on-site retention of undigested substrates (i.e., substrates must be put into the digester within 24 hours of receipt).
- Provide enclosed, negative pressure buildings for indoor receiving and pre-processing. Treat collected foul air in a biofilter or air scrubbing system.
- Establish contingency plans for operating downtime (e.g., equipment malfunction, power outage).
- Manage delivery schedule to facilitate prompt handling of odorous substrates.
- Handle digestate within enclosed building and/or directly pump to sealed containers for transportation.
- Protocol for monitoring and recording odor events.
- Protocol for reporting and responding to odor events.

Impact Significance After Mitigation: Less than Significant

Impact 5.3: Construction and operation of AD facilities in California could lead to increases in chronic exposure of sensitive receptors in the vicinity to certain toxic air contaminants from stationary and mobile sources. (Significant)

For construction impacts, emissions of toxics can occur from site preparation and construction activities that are required for AD facilities. Large construction projects may last many months and may result in significant levels of DPM emissions and possibly resulting in long-term significant health risks. The nearest sensitive receptors must be included in the modeling analysis to determine worst case impacts from construction activities.

The impacts from operation of a typical AD facility can be determined by comparing the facility's pre- and post-project emissions. For operations, air toxics emissions could include DPM from trucks that deliver substrate to the facility, or from trace amounts of air toxics (primarily H_2S and ammonia) that may be released as fugitives from the anaerobic digester or from the potential combustion or flaring of the biogas. Additional air toxics that could be generated by the combustion of biogas (either in an engine or flare) include benzene, formaldehyde, and other products of incomplete combustion.

Combustion of biogas containing H_2S generates sulfur dioxide, which can react with water to produce sulfuric acid. AD facilities typically include control technologies that convert the H_2S to sulfur, which is then removed from the gas stream in order to avoid corrosion of engine parts in the combustion chamber and in the exhaust system. In addition, ammonia may form in the anaerobic digestion process from nitrogen compounds contained in the organic substrates.

Health impacts from exposure to toxic emissions related to the AD facilities are dependent on the magnitude of concentrations that the public can be exposed to, as well as to the relative toxicities of the individual pollutants released from each type of facility. Exposure levels are determined by carrying out dispersion modeling of estimated toxics emissions from typical proposed facility sources (described above) by using a screening model, such as the EPA model SCREEN3 (USEPA, 1995). The SCREEN3 model predicts possible worst-case impacts, by using hypothetical worst-case meteorology. For calculating more accurate impacts at site-specific facilities, the EPA model AERMOD can be used (American Meteorological Society, 2006). AERMOD uses meteorological data that is representative of the site, as well as multiple toxic emission source types, such as point, area, or volume to represent the emission sources.

For a screening analysis, cancer and non-cancer health risks can be calculated by applying algorithms given in the document published by California Office of Environmental Health Hazard Assessment (OEHHA) to calculate health risks (OEHHA, 2003). For more accurate site specific risks, AERMOD can be run in conjunction with the CARB model “Hot Spots Analysis Reporting Program” (HARP) to estimate cancer and non-cancer health risks that the public can be exposed to (CARB, 2009b). HARP uses the same toxicity values as are given in the OEHHA Risk Assessment Guidelines and incorporates multi-pathway uptake factors for the various toxic species to calculate risks.

The estimated cancer risks from AD facility emissions are then compared to the applicable AQMD or APCD significance thresholds to determine if the impacts from the scenarios evaluated might result in significant impacts to the public. In addition, Hazard Quotients are estimated for non-carcinogens in HARP to determine if the modeled exposure levels exceed established health thresholds, called Reference Exposure Levels (RELs), to test for significance. The estimated risks for the various digester scenarios can then be used to estimate health risks, and for those scenarios with unacceptable risks, mitigation measures are applied to determine if the projects can achieve acceptable health risks to the public. Due to the unknown site specific exposure and information that is needed to quantify and evaluate health risk associated with AD facilities, this impact is considered potentially significant.

Mitigation Measures

Measure 5.3a: Implement Mitigation Measures 5.1a and 5.1b.

Measure 5.3b: Based on the Air Quality Technical Report (specified in Measure 5.1a), if the health risk is determined to be significant on a project-by-project basis with diesel particulate matter (DPM) as a major contributor, then the applicants shall implement control measures such that the AD facility health risk would be below the applicable air district threshold, which may include implementation of one or more of the following requirements, where feasible and appropriate:

- Use either new diesel engines that are designed to minimize DPM emissions (usually through the use of catalyzed particulate filters in the exhaust) or retrofit older engines with catalyzed particulate filters (which will reduce DPM emissions by 85%);
- Use electric equipment to be powered from the grid, which would eliminate local combustion emissions;
- Use alternative fuels, such as compressed natural gas (CNG) or liquefied natural gas (LNG).

Measure 5.3c: Hydrogen sulfide (H_2S) contained in the biogas shall be scrubbed (i.e., via iron sponge or other technology) before emission to air can occur.

Impact Significance After Mitigation: Less than Significant

Implementation of Mitigation Measures 5.3a, 5.3b, and 5.3c would ensure that BMPs are followed during construction and operations and that TAC emissions from digester operations to be built under this Program EIR would be reduced to a less-than-significant level.

Impact 5.4: Development of AD facilities in California would reduce GHG emissions. (No Impact)

"The most common GHG that results from human activity is carbon dioxide, followed by methane and nitrous oxide" (OPR, 2008). State law defines GHG to also include hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride. These latter GHG compounds would not be expected to be emitted by AD facilities. GHG impacts are considered to be exclusively cumulative impacts; there are no non-cumulative GHG emission impacts from a climate change perspective (CAPCOA, 2008).

Four types of criterion are used to determine whether the project could conflict with the state goals for reducing GHG emissions. The analyses are as follows:

a. Any potential conflicts with the CARB's 39 recommended actions in the Climate Change Scoping Plan.
b. The relative size of the potential AD facilities. This criterion is typically applied on a project-by-project basis.
c. The general energy efficiency parameters of AD facilities to determine whether the design is inherently energy efficient.
d. Any potential conflicts with applicable City or County plans, policies, or regulations adopted for the purpose of reducing the emissions of GHGs.

With regard to Criterion A described above, the project does not pose any apparent conflict with the most recent list of the CARB early action strategies (see **Table 5-4**). In fact, an established goal of the project is the furthering of compliance with the GHG reduction measures contained in AB 32, specifically Measures E-3 (achieve a 33% renewables mix by 2020) and RW-3 (high recycling/zero waste). Anaerobic digestion produces biogas which is a renewable energy source (supports Measure E-3) and anaerobic digestion is one of the categories listed under measure RW-3.

In regards to Criterion B, GHG emissions associated with digester operations would depend on several factors, such as the size and type of AD facility, any equipment needed for pre-processing, the increased traffic on the local and regional roadway network, and the post processing of the biogas (e.g., flaring of excess biogas, combusting for electricity, or cleaning up biogas for use as a transportation fuel or injection into natural gas utility transmission lines). Although there will be emissions associated with these sources at AD facilities, the operation of these facilities would divert organics out of landfills. By doing so, there would be less activity at the landfill, such as potentially fewer pieces of off-road equipment and a potential decrease in the vehicle miles traveled (VMT) for haul trucks. The AD facilities could also generate biogas to replace fossil fuels for electricity production or for vehicle transportation. Notably, several studies have projected reductions in GHGs by the diversion of organics into AD facilities (DiStefano and Belenky, 2009; Haight, 2005). Results and potential applicability drawbacks of these studies are described below.

The emission estimates presented below are based on life-cycle analyses and depict potential CO_2 equivalents (CO_2e) reductions in comparison to landfill processes by the capture and combustion of methane in biogas and subsequent electricity displacement due to on-site generation. As presented in the *Life-Cycle Analysis of Energy and Greenhouse Gas Emissions from Anaerobic Biodegradation of Municipal Solid Waste* (DiStefano and Belenky, 2009), construction of each AD facility would result in approximately 10,750 metric tons of CO_2e. Key assumptions included in this article, which studied the energy requirements and GHG emissions associated with current landfilling of municipal solid waste (MSW) in comparison to potential MSW digestion in AD facilities for the whole United States, included an average AD facility size of 50,000 tons MSW to be processed per year. The analysis included emissions associated with the collection and transport of MSW to AD facilities, transport of rejected MSW and associated landfill operations, production of biogenic methane, transport of digestate to landfills, construction of AD facilities, and operation of AD facilities (assumed to be dry single-stage thermophilic reactors with electricity generation from the biogas). In summary, the article found that AD systems would result in an approximate 57,480 metric ton to 60,236 metric ton CO_2e reduction (depending on if the electricity displaced natural gas or coal, respectively) per AD facility versus landfilling of the MSW. In addition, the study *Assessing the Environmental Burdens of Anaerobic Digestion in Comparison to Alternative Options for Managing the Biodegradable Fraction of Municipal Solid Waste* (Haight, 2005), found that AD systems for processing 108,322 tons of organic MSW would result in a reduction of 121,908 metric tons CO_2e per year versus landfilling. The following California specific assumptions could impact the findings of these studies in terms of applicability to this programmatic assessment:

- Several California test facilities have described variable methane potential for organic substrates, which was not accounted for in the above studies;
- The above studies did not encapsulate the full spectrum of facility types that could be developed in California (i.e., wet systems, mesophilic systems, batch systems, etc.);
- The above studies did not analyze all potential uses of the solids portion of digestate that are covered in this programmatic assessment (i.e., aerobically composted, used as a soil amendment, alternative daily cover, etc.);
- The above studies did not analyze all potential uses of the biogas that are covered in this programmatic assessment (i.e., flaring of excess biogas, combusting for electricity, or cleaning up biogas for use as a transportation fuel or injection to utility transmission lines)
- California's energy grid mix differs from the assumptions in the above studies;
- CARB estimates a 75 percent landfill gas collection efficiency for California, which matches the DiStefano and Belenky study, but is greater than the assumption of 50 percent collection in the Haight study;
- The Haight study assumes all organics in the MSW are appropriate for AD. However, in California, about 50 percent of current disposal is organic waste and less than half of this is appropriate for AD;

- Landfill carbon sequestration is not considered an emission offset, which was not discussed in the above studies.

Due to the many unknown variables and operational considerations associated with quantification of GHGs on a statewide programmatic level, GHG emissions determination is too speculative at this juncture. Project-by-project analysis (as required in Mitigation Measure 5.1a) will be able to obtain specific information, such as landfill and AD facility distances to the applicable solid waste centroid (for VMT), operating information for the landfill (i.e., equipment operations, methane capture rate and usage) that organics are being diverted from, as well as individual AD facility operating characteristics (i.e., organics throughput, equipment, biogas usage), which will be evaluated to develop an informative GHG inventory.

With respect to GHG analysis Criterion C, biogas generated through the anaerobic digestion process is captured in the digester and can be combusted in a flare, used directly in internal combustion engines to produce electricity and heat, or the biogas can be upgraded to biomethane through the removal of hydrogen sulfide, CO_2, and moisture. Biomethane can be used in place of natural gas for various processes, including use by utility companies if the biomethane is upgraded to utility standards and pumped into a natural gas supply pipeline, as well as for electrical generation, heating, and for natural gas-fueled vehicles. Thus, development of AD facilities would result in an inherently efficient and renewable source of energy.

Finally, with regard to Criterion D, digester development and operations would be expected to comply with applicable City or County plans, policies, or regulations adopted for the purpose of reducing the emissions of GHGs. As described for Criterion A, the Program would directly support several GHG reduction measures contained in AB 32 (increased renewables mix and high recycling/zero waste), which would also be beneficial in meeting any local jurisdiction reduction goals.

Mitigation Measures

Measure 5.4: Implement Mitigation Measure 5.1a.

Impact Significance After Mitigation: Less than Significant.

Based upon the analysis of Criteria A, B, C and D presented above, development of AD facilities would support the CARB early action strategies, may result in a net decrease in GHG emissions, would result in an inherently efficient and renewable source of energy, and would be expected to comply with any applicable City or County plans, policies, or ordinance/regulations to reduce GHG emissions. With implementation of Mitigation Measures 5.1a, which will assess GHG emissions on a project-by-project basis to ensure compliance with the applicable air district thresholds and/or guidance and incorporate further emission mitigation if required, the development of AD facilities would not result in a cumulatively considerable increase in GHG emissions and would not impair the State's ability to implement AB 32.

Impact 5.5: Development of AD facilities in California, together with anticipated cumulative development in the area, would contribute to regional criteria pollutants. (Significant)

CEQA requires that the EIR examine cumulative impacts. As discussed in CEQA Guidelines §15130(a)(1), a cumulative impact "consists of an impact which is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts." The analysis of cumulative impacts need not provide the level of detail required of the analysis of impacts from the project itself, but shall "reflect the severity of the impacts and their likelihood of occurrence" (CEQA Guidelines §15130(b)). A cumulative impact occurs when two or more individual effects, considered together, are considerable or would compound or increase other environmental impacts. Cumulative impacts can result from individually minor but collectively significant impacts, meaning that the project's incremental effects are considerable when viewed in connection with the effects of past, current, and probable future projects. Notably, any project that would individually have a significant air quality impact would also be considered to have a significant cumulative air quality impact.

Additional sources of criteria pollutant emissions associated with AD facility operations would include any additional diesel equipment on-site for pre-processing, increased traffic on the local roadway network (though for AD facilities co-located at a solid waste facility, there would be no net increase in traffic as the organics would be transported there already), and the post processing of the biogas. Although AD facility operations would result in air pollutant emissions from these sources, AD facilities would also divert organics from landfills. By doing so, there would be less activity at the landfill, such as potentially fewer pieces of off-road equipment and a potential decrease in the VMT for haul trucks. The AD facilities could also generate biogas to replace fossil fuels for electricity production or for vehicle transportation. Other land development projects, industrial projects, and the increase in air quality emissions resulting from activities associated with population growth would also contribute to an increase in air quality emissions. Individual air districts classified as nonattainment areas for the state or federal ozone or federal PM10 ambient standards are required to prepare state implementation plans (SIPs) and air quality management plans (AQMPs) showing how they will come into compliance with the ambient standards. AQMPs include policies to reduce air emissions from industrial operations, auto and truck exhaust, increases in population, and other activities that could result in increased air emissions. This cumulative impact is considered less than significant because AQMPs include policies aimed at reducing emissions and direct air quality impacts would be reduced to a less-than-significant level with implementation of mitigation.

Mitigation Measure

Measure 5.5: Implement Mitigation Measures 5.1a and 5.1b.

Impact Significance After Mitigation: Less than Significant

Implementation of Mitigation Measure 5.5 would ensure that BMPs are followed during operational activities at all AD facilities to be developed under this Program EIR. In addition, because the jurisdictionally appropriate SIPs and AQMPs describe the measures that would be used to reduce emissions (from vehicular and non-vehicular sources) and to attain the ambient standards, cumulative development under this Program would be considered less than significant.

5.3 References

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CHAPTER 6
Hydrology and Water Quality

6.1 Environmental Setting

The following text provides an overview of the environmental setting for the project, as relevant to surface and groundwater supply and quality.

Surface Water

California's surface water resources are diverse and varied, ranging from large and long-reaching perennial rivers in the north and central areas of the state, to primarily intermittent waterways along much of the southern coast, to desert washes and dry lakes in the inland east and south. Major waterways include the Trinity River system which drains the northern reaches of California's Coastal Range and the southern Cascades; the Sacramento-San Joaquin River system, which is the largest river system in the state and which drains the southern tip of the Cascade Range, the western Sierra Nevada, the eastern Coastal Range, and the Central Valley; and the Colorado River, which flows along California's eastern border and into Mexico. There are many smaller perennial and intermittent waterways that drain California's seaboard and the eastern slope of the Sierras.

Northern portions of the state generally receive substantially more precipitation than southern portions of the state. Snowpack in the Sierra Nevada and the southern Cascades serves as a significant reservoir for water storage. Snowpack accumulates over the winter and early spring months, and gradually melts in the late spring and summer, feeding surface flows, filling reservoirs, and recharging groundwater. Captured snowmelt, especially east and north of the Central Valley, is highly managed, and is released from reservoirs to supply regional agriculture and urban needs, and to provide water for export to other areas of the state.

Water from the Sacramento-San Joaquin Delta is pumped from Clifton Court into a network of aqueducts and reservoirs that supply water to Central and Southern California for agricultural and urban uses. Other state, federal, and local water projects provide water to specific cities or areas. Such projects include diversions from the Sierra Nevada to the San Francisco Bay Area, from the Owens Valley to Los Angeles, and from the Colorado River to the Imperial Valley and San Diego. Other water projects provide surface water supply to Santa Barbara, Blythe, San Luis Obispo, the northern San Francisco Bay Area, Vacaville, and other urban areas.

In recent decades, California's natural and engineered water systems have come under increasing demand pressure, in an attempt to meet urban, agricultural, industrial, and environmental water requirements. During dry years it is almost impossible to meet the needs of all water users, and recent droughts have resulted in reductions in water supplied for urban, environmental, and agricultural uses.

Groundwater

Groundwater is used extensively in many areas of the state to support urban, agricultural, and industrial users, especially in areas where surface water supplies are limited, or infrastructure for the delivery of surface water is lacking. Such areas include California's Central Valley, the southern portion of the San Francisco Bay Area, the greater Los Angeles area, and the inland desert areas of southern California.

California's major aquifers have been delineated by the California Department of Water Resources (DWR, 2003). Additional minor aquifers are scattered across the state; these minor aquifers are smaller in extent and contain less water than the aquifers delineated by DWR. However, these minor aquifers are frequently important localized sources of water, and are used for rural residential supply, grazing and farming, and, to a limited extent, for municipal water supply.

Groundwater overdraft has been a significant problem in California for many decades. In some portions of the southern half of the Central Valley, groundwater levels have been historically depleted on the order of 3 to 6 feet per year. Although state and local agencies are collaborating to reduce groundwater overdraft in many areas of the state, workable and realistic solutions are difficult to develop. As a result, groundwater overdraft is expected to continue for decades across the Central Valley, the Bay Area, southern desert areas, and several other areas. Over an extended period of time, extensive groundwater overdraft can result in irreversible land subsidence as depleted aquifers compact. Areas of significant land subsidence are characterized by reduced aquifer capacity and lowered land surfaces relative to historic conditions.

Water Quality

Surface water quality in California is highly variable, and ranges from very high quality lakes and streams in the Sierra Nevada and Cascade mountains and in remote or undeveloped areas, to highly-polluted drainage courses that carry municipal, agricultural, and industrial wastewater. The New River, the most polluted river in the United States, flows across the Mexico-United States border and into California, carrying with it municipal and industrial pollutants that include fecal bacteria, heavy metals, pesticides, and other toxic substances. Intermediate to these two extremes are waterways from which California's inhabitants, farmers, and industry get much of their water supply.

Groundwater quality is also highly variable both by geographical area and by depth within an area. High-quality groundwater exists in the Sierra Nevada, Cascades, and along the eastern side of the Central Valley, but is in aquifers of limited extent. High-quality groundwater also exists in other locations around the state that have limited agricultural and urban development. Groundwater across much of the Coastal Range and western flank of the southern Central Valley, and southern deserts often have high levels of naturally-occurring salts and metals that make the water unfit for many uses. In areas with extensive urban or agricultural activities, waste discharges have induced high levels of salts and other contaminants that make the groundwater unfit for consumption or other uses unless it is treated.

Surface water quality is affected by agricultural, urban, and industrial sources of pollution. Point sources, which are defined as specific outfalls discharging into natural waters, are easily identified and are regulated by California's Regional Water Boards and the US EPA. Nonpoint sources, including polluted runoff from urban and agricultural sources, are more challenging to identify. Nonpoint sources generally drain into a river or waterway over an extended area, or via many individual inlets. In some instances, the waterways that receive polluted runoff and wastewater discharges serve as water supply sources for downstream water users.

Major sources of groundwater pollution include historic and ongoing waste discharges, leaking underground storage tanks, and infiltration of polluted runoff from agricultural and urban areas. Nitrogen fertilizers in particular are of concern, because increased nitrate levels in groundwater exceed drinking water standards in many areas of the state. Groundwater pollution can be extremely costly and difficult to remediate.

Common classes of water quality pollutants that are regulated under state and federal regulations include inorganics, pathogens, and pesticides and other organic compounds. Inorganics include nutrients (phosphorus and various forms of nitrogen including nitrate), salts, and metals (aluminum, antimony, arsenic, copper, cyanide, lead, mercury, nickel, etc.). Pathogens include total coliforms and fecal coliforms. Pesticides include herbicides and insecticides. Other organic compounds include volatile organic compounds (VOCs), and petroleum products (fuels, oils, greases, etc.). Water quality physical parameters such as dissolved oxygen are also regulated.

Both point sources and nonpoint sources of water pollution can degrade surface water and groundwater. Water pollution is a substantial issue in many areas, from the perspective of both environmental quality and human health. Water pollutant levels in California are regulated by state agencies including the Water Boards[1] and the California Department of Health Services. As discussed in the "Regulatory Setting" section below, these agencies implement federal water quality and drinking water quality requirements under the Clean Water Act, the Safe Drinking Water Act, and various state-level laws and regulations.

Regulatory Requirements

The Water Boards generally regulate point source waste discharges using National Pollutant Discharge Elimination System (NPDES) permits and Waste Discharge Requirement (WDR) orders. The Water Boards address nonpoint source discharges by mandating the use of best management practices (BMPs) and/or by establishing Total Maximum Daily Loads pursuant to the Clean Water Act. The relevant federal and state laws and regulations are discussed below.

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1 The Water Boards consist of the State Water Resources Control Board (State Water Board) and nine Regional Water Quality Control Boards (regional boards)

Federal

Clean Water Act

The federal Clean Water Act (CWA) established the basic structure for regulating discharges of pollutants into "waters of the United States." The act specifies a variety of regulatory and non-regulatory tools to sharply reduce direct pollutant discharges into waterways, finance municipal wastewater treatment facilities, and manage polluted runoff. The CWA includes the following sections:

- Sections 303 and 304, which provide for water quality standards, criteria, and guidelines.
- Section 401, which requires every applicant for a federal permit or license for any activity that may result in a discharge to a water body to obtain a water quality certification that the proposed activity will comply with applicable water quality standards.
- Section 402, which regulates point- and nonpoint-source discharges to surface waters through the NPDES program. In California, the State Water Board oversees the NPDES program, which is administered by the regional boards. The NPDES program provides for both general permits (those that cover a number of similar or related activities) and individual permits. Anti-backsliding requirements provided for under CWA Sections 402(o)(2) and 303(d)(4) prohibit slackening of discharge requirements and regulations under revised NPDES permits. With isolated/limited exceptions, these regulations require effluent limitations in a reissued permit to be at least as stringent as those contained in the previous permit.
- Section 404, which establishes a program to regulate the discharge of dredged and fill material into waters of the U.S., including some wetlands. Activities in waters of the U.S. that are regulated under this program include fills for development, water resource projects (e.g., dams and levees), infrastructure development (e.g., highways and airports), and conversion of wetlands to uplands for farming and forestry.

Clean Water Act Section 303(d) Impaired Waters List

Under Section 303(d) of the CWA, states are required to develop lists of water bodies that would not attain water quality objectives after implementation of required levels of treatment by point-source dischargers (municipalities and industries). Section 303(d) requires that the state develop a TMDL for each of the listed pollutants. The TMDL is the amount of loading that the water body can receive and still be in compliance with water quality objectives. The TMDL can also act as a plan to reduce loading of a specific pollutant from various sources to achieve compliance with water quality objectives. The TMDL prepared by the state must include an allocation of allowable loadings to point and nonpoint sources, with consideration of background loadings and a margin of safety. The TMDL must also include an analysis that shows the linkage between loading reductions and the attainment of water quality objectives. EPA must either approve a TMDL prepared by the state or, if it disapproves the state's TMDL, issue its own. NPDES permit limits for listed pollutants must be consistent with the waste load allocation prescribed in the TMDL. After implementation of the TMDL, it is anticipated that the problems that led to placement of a given pollutant on the Section 303(d) list would be remediated. In California, preparation and management of the Section 303(d) list is administered by the regional boards.

Section 401 Water Quality Certification or Waiver

Under Section 401 of the CWA, an applicant for a Section 404 permit (to discharge dredged or fill material into waters of the United States) must first obtain a certificate from the appropriate state agency stating that the fill is consistent with the state's water quality standards and criteria. In California, the authority to either grant water quality certification or waive the requirement is delegated by the State Water Board to the nine regional boards.

National Pollutant Discharge Elimination System Permit Program

The NPDES permit program was established by the CWA to regulate municipal and industrial discharges to surface waters of the United States. Federal NPDES permit regulations have been established for broad categories of discharges, including point-source municipal waste discharges and nonpoint-source stormwater runoff. NPDES permits generally identify the following:

- effluent and receiving-water limits on allowable concentrations and/or mass emissions of pollutants contained in the discharge;
- prohibitions on discharges not specifically allowed under the permit; and
- provisions that describe required actions by the discharger, including industrial pretreatment, pollution prevention, self-monitoring, and other activities.

In November 1990, EPA published regulations establishing NPDES permit requirements for municipal and industrial stormwater discharges. Phase 1 of the permitting program applied to municipal discharges of stormwater in urban areas where the population exceeded 100,000 persons. Phase 1 also applied to stormwater discharges from a large variety of industrial activities, including general construction activity if the project would disturb more than 5 acres. Phase 2 of the NPDES stormwater permit regulations, which became effective in March 2003, required that NPDES permits be issued for construction activity for projects that disturb between 1 and 5 acres. Phase 2 of the municipal permit system (known as the "NPDES General Permit for Small MS4s") required small municipal areas of less than 100,000 persons to develop stormwater management programs.

In California, the USEPA has delegated its NPDES permitting functions to the State Water Board (state board) and the regional boards.

Executive Order 11988 and the Federal Emergency Management Agency

Under Executive Order 11988, the Federal Emergency Management Agency (FEMA) is responsible for management of floodplain areas. FEMA administers the National Flood Insurance Program (NFIP) to provide subsidized flood insurance to communities that comply with FEMA regulations limiting development in floodplains. FEMA also issues Flood Insurance Rate Maps (FIRMs) that identify which land areas are subject to flooding. These maps provide flood information and identify flood hazard zones in the community. The design standard for flood protection is established by FEMA, with the minimum level of flood protection for new development determined to be the 1-in-100 annual exceedance probability (AEP) (i.e., the 100-year flood event). Specifically, where levees provide flood protection, FEMA requires that the levee crown have 3 feet of freeboard above the 1-in-100 AEP water surface elevation, except in the vicinity of a structure such as a bridge, where the levee crown must have 4 feet of freeboard for a distance of 100 feet upstream and downstream of the structure.

Federal Antidegradation Policy

The federal antidegradation policy, established in 1968, is designed to protect existing uses and water quality and national water resources. The federal policy directs states to adopt a statewide policy that includes the following primary provisions:

- Existing in-stream uses and the water quality necessary to protect those uses shall be maintained and protected.
- Where existing water quality is better than necessary to support fishing and swimming conditions, that quality shall be maintained and protected unless the state finds that allowing lower water quality is necessary for important local economic or social development.
- Where high-quality waters constitute an outstanding national resource, such as waters of national and state parks, wildlife refuges, and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected.

National Toxics Rule

For 14 states, including California, the National Toxics Rule promulgates chemical-specific numeric criteria for priority toxic pollutants as needed to bring all states into compliance with the requirements of section 303(c)(2)(B) of the CWA. States determined by EPA to fully comply with section 303(c)(2)(B) requirements are not affected by this rule, however California is not in compliance.

The rule addresses two situations. For a few states, EPA is promulgating a limited number of criteria which were previously identified as necessary in disapproval letters to such states, and which the state has failed to address. For other states, Federal criteria are necessary for all priority toxic pollutants for which EPA has issued section 304(a) water quality criteria guidance and that are not the subject of approved state criteria. When these standards take effect, they will be the legally enforceable standards in the affected states for all purposes and programs under the CWA, including planning, monitoring, NPDES permitting, enforcement and compliance.

Safe Drinking Water Act

Under the Safe Drinking Water Act (SDWA) (Public Law 93-523), passed in 1974, the US EPA regulates contaminants of concern to domestic water supply. Contaminants of concern relevant to domestic water supply are defined as those that pose a public health threat or that alter the aesthetic acceptability of the water. These types of contaminants are regulated by EPA primary and secondary Maximum Contaminant Levels (MCLs) that are applicable to treated water supplies delivered to the distribution system. MCLs and the process for setting these standards are reviewed triennially. Amendments to the SDWA enacted in 1986 established an accelerated schedule for setting MCLs for drinking water. EPA has delegated to the California Department of Public Health (CDPH; formerly the Department of Health Services) the responsibility for administering California’s drinking-water program. CDPH is accountable to EPA for program implementation and for adopting standards and regulations that are at least as stringent as those developed by EPA. The applicable state primary and secondary MCLs are set forth in Title 22, Division 4, Chapter 15, Article 4 of the California Code of Regulations.

State

California State Nondegradation Policy

In 1968, as required under the federal antidegradation policy described above, the State Water Board adopted Resolution No. 68-16 a “Statement of Policy with Respect to Maintaining High Quality of Waters in California.” Resolution 68-16 states that the disposal of wastes into state waters shall be regulated to achieve the highest water quality consistent with maximum benefit to the people of the state and to promote the peace, health, safety, and welfare of the people of the state, and provides as follows:

1. “Whenever the existing quality of water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality will be maintained until it has been demonstrated to the State that any change will be consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial use of such water and will not result in water quality less than that prescribed in the policies.”
2. “Any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained.”

California Toxics Rule

In May 2000, the State Water Board adopted and EPA approved the California Toxics Rule, which establishes numeric water quality criteria for approximately 130 priority pollutant trace metals and organic compounds. The State Water Board subsequently adopted its State Implementation Policy of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries (SIP). The SIP outlines procedures for NPDES permitting for toxic-pollutant objectives that have been adopted in Basin Plans and in the California Toxics Rule.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act[2] (Division 7 of the California Water Code) established the State Water Board and divided the state into nine regions, each overseen by a regional board. The nine regional boards have the primary responsibility for the coordination and control of water quality within their respective jurisdictional boundaries. Pursuant to the Porter-Cologne Water Quality Control Act, the regional boards establish water quality objectives for the purpose of protecting beneficial uses. The Act recognizes that water quality may be changed to some degree without unreasonably affecting beneficial uses. Designated beneficial uses, together with the corresponding water quality objectives, constitute water quality standards under the federal CWA. Therefore, the

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[2] http://www.swrcb.ca.gov/laws_regulations/docs/portercologne.pdf

water quality objectives form the regulatory references for meeting state and federal requirements for water quality control.

Under authority of the Porter-Cologne Water Quality Control Act, the regional boards require persons who discharge or propose to discharge waste that could affect the quality of waters of the State to file a Report of Waste Discharge with the appropriate RWQCB. The regional board then issues or waives WDRs for the discharge or requires the discharger to enroll under a general NPDES Order or general WDR order.

State Water Resources Control Board

Created by the California State Legislature in 1967, the State Water Board holds authority over water resources allocation and water quality protection within the state. The five-member State Water Board allocates water rights, adjudicates water right disputes, develops statewide water protection plans, establishes water quality standards, and guides the nine regional water boards. The mission of State Water Board is to, "preserve, enhance, and restore the quality of California's water resources, and ensure their proper allocation and efficient use for the benefit of present and future generations."

Regional Water Boards

The nine regional water boards in California maintain jurisdiction over water quality within their regions. Each regional board is responsible for supporting the development of NPDES permits within their region, and for defining and enforcing water quality limitations for specific waters within their domain. Each of the regional boards has prepared water quality control plans (commonly referred to as Basin Plans) for relevant large scale watersheds or basins within its purview. These plans identify the existing and potential beneficial uses of waters of the State and establish water quality objectives to protect these uses. The basin plans also contain implementation, surveillance, and monitoring plans. Statewide and regional water quality control plans include enforceable prohibitions against certain types of discharges, including those that may pertain to nonpoint sources. Basin plans also establish beneficial uses and their corresponding water quality objectives, in order to meet state and federal regulatory criteria for water quality standards. As such, California's basin plans serve as regulatory references for meeting both State and federal requirements for water quality control (40 CFR Parts 130 and 131).

Waste Discharge Requirements (WDRs)

California's regional boards also oversee permitting as authorized under the Porter-Cologne Water Quality Control Act. If a project does not require federal permitting, it may still require a state permit. Found in Division 7 of the California Water Code, the Porter-Cologne Act requires persons who discharge waste that could affect the quality of waters of the State to file a Report of Waste Discharge with the appropriate regional board. Each regional board can adopt WDR General Orders (GOs) or individual WDR orders to regulate such discharges, and a given discharger will be subject to Waste Discharge Requirements (WDRs) either under a GO or a project specific state permit. WDRs usually include discharge prohibitions and discharge specifications including flow volumes and water quality constituent limitations to which a discharger must adhere. WDRs usually impose water quality monitoring requirements, and may require liner systems or other engineered features.

The limitations imposed by WDRs vary from region to region and from project to project, depending upon proposed discharge characteristics, and sensitivities of affected resources. In this manner, WDRs protect waters of the State from significant water quality degradation. Alternatively, if no degradation of water quality is anticipated from a proposed discharge, the regional board may issue a conditional waiver of WDRs.

Construction Stormwater NPDES Permit

The federal CWA prohibits discharges of stormwater from construction projects unless the discharge is in compliance with an NPDES permit. The State Water Board is the permitting authority in California and adopted a statewide General Permit for Stormwater Discharges Associated with Construction Activity (Order No. 99-08) for construction projects that disturb one or more acres of soil. Effective July 1, 2010 all dischargers are required to obtain coverage under the updated Construction General Permit Order 2009-0009-DWQ (the Construction General Permit), adopted on September 2, 2009. Construction activities include clearing, grading, excavation, stockpiling, and reconstruction of existing facilities (removal or replacement).

In general, the Construction General Permit requires that the landowner and/or contractor submit a notice of intent (NOI) and develop and implement a storm water pollution prevention plan (SWPPP). It is the responsibility of the landowner to obtain coverage under the Construction General Permit prior to commencement of construction activities. To obtain coverage, the landowner must file an NOI with a vicinity map and the appropriate fee to the State Water Board. The NOI requirements of the Construction General Permit are intended to establish a mechanism which can be used to clearly identify the responsible parties, locations, and scope of operations of dischargers covered by the Construction General Permit and to document the discharger's knowledge of the requirements for a SWPPP.

The Construction General Permit requires a risk-based permitting approach, dependent upon the likely level of risk imparted by a project. The Construction General Permit contains several additional compliance items, including (1) additional mandatory BMPs to reduce erosion and sedimentation, which may include incorporation of vegetated swales, setbacks and buffers, rooftop and impervious surface disconnection, bioretention cells, rain gardens, rain cisterns, implementation of pollution/sediment/spill control plans, training, and other structural and non-structural actions; (2) sampling and monitoring for non-visible pollutants; (3) effluent monitoring and annual compliance reports; (4) development and adherence to a Rain Event Action Plan; (5) requirements for the post-construction period; (6) numeric action levels and effluent limits for pH and turbidity; (7) monitoring of soil characteristics on site; and (8) mandatory training under a specific curriculum. Under the updated permit, BMPs will be incorporated into the compliance action and monitoring requirements for each development site, as compared to the existing permit, where specific BMPs are implemented via a SWPPP. Under the updated permit, a SWPPP would be reviewed by the State Water Board.

California Department of Public Health Drinking Water Regulations

CDPH serves as the primary responsible agency for drinking water regulations. CDPH must adopt drinking water quality standards at least as stringent as federal standards, and may also regulate contaminants to more stringent standards than U.S. EPA, or develop additional standards. CDPH regulations cover over 150 contaminants, including microorganisms, particulates, inorganics, natural organics, synthetic organics, radionuclides, and DBPs. The specific regulations promulgated by CDPH, in coordination with the U.S. EPA, are summarized in **Table 6-1**.

TABLE 6-1
FEDERAL AND STATE DRINKING WATER REGULATIONS

Regulation	Promulgation Year	Contaminants Regulated
National Interim Primary Drinking Water Regulations	1975–1981	Inorganics, Organics, Physical, Radioactivity, Bacteriological
National Secondary Drinking Water Regulations	1979	Inorganics, Color, Corrosivity, Odor, Foaming Agents
Phase I Standards	1987	VOCs
Phase II Standards	1991	VOCs, SOCs, IOCs
Phase V Standards	1992	VOCs, SOCs, IOCs
Surface Water Treatment Rule	1989	Microbiological and Turbidity
Total Coliform Rule	1989	Microbiological
Lead and Copper Rule	1991 / 2003	Lead, Copper
Drinking Water Source Assessment and Protection Program	1996	Source Water Protection
Information Collection Rule	1996	Microbiological and Disinfectants / DBPs
Stage 1 Disinfectants/Disinfection Byproducts Rule	1998	Disinfectants / DBPs, Precursors
Interim Enhanced Surface Water Treatment Rule	1998	Microbiological, Turbidity
Unregulated Contaminant Monitoring Rule	1999	Organics, Microbiological
Radionuclides Rule	2000	Radionuclides
Arsenic Rule	2001	Arsenic
Filter Backwash Rule	2002	Microbiological, Turbidity
Drinking Water Candidate Contaminant List	2003	Chemical, Microbiological
Stage 2 Microbiological and Disinfection Byproducts Rules	2006	Microbiological and Disinfectants / DBPs
Secondary Maximum Contaminant Levels	2006	Metals, Color, Foaming Agents, MTBE, Odor, Thiobencarb, Turbidity, TDS, and Anions
Primary MCL for Perchlorate	2007	Perchlorate
Interim Enhanced Surface Water Treatment Rule	2008	Microbiological and Turbidity

DBP = Disinfection by-product
IOC = Inorganic Compound
MCL = Maximum Contaminant Level
MTBE = methyl tertiary-butyl ether
SOC = Synthetic Organic Compound
TDS = Total Dissolved Solids
VOC = Volatile Organic Compound

6.2 Impacts and Mitigation Measures

Approach and Methods

The evaluation of impacts and mitigation measures was performed in light of current conditions in the project area, applicable regulations and guidelines, and typical construction activities and operations of anaerobic digester(AD) facilities including pre-processing and post-processing operations. In determining the level of significance, the analysis assumed that the AD facilities would comply with relevant federal, state, and local ordinances and regulations. As discussed in Chapter 2, Project Description, the project does not consider dairy manure co-digesters or co-digesters at wastewater treatment plants (WWTP).

Disposal of digestate would in many cases require acquisition of WDRs, as discussed throughout the impact analysis below. However, some AD facilities may be installed on site at a location/facility that already maintains active WDRs. Pre-existing WDRs have a variety of site-specific requirements and are not considered in detail in the ensuing impact analysis. However, installation of new AD facilities at a facility where existing WDRs are already applicable, could require modification to the existing WDRs or require obtaining new WDRs for new waste discharges.

Thresholds of Significance

The significance criteria for this analysis were adapted from criteria presented in Appendix G of the CEQA Guidelines. The project would result in a significant impact if it would:

- Violate any water quality standards or waste discharge requirements.
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there should be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted.
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site.
- Substantially alter the existing drainage pattern of the site or area, including through alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site.
- Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff.
- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.
- Place within a 100-year flood hazard area structures which would impede or redirect flood flows.
- Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam.
- Inundation by seiche, tsunami, or mudflow.

Based on the scope of the project and its geographical location, the project would not result in impacts related to the following criteria. No impact discussion is provided for these topics for the following reasons:

Failure of Levee or Dam. AD facilities that would be installed under the Program EIR would not require the construction of a levee or dam, and are not anticipated to result in alteration of existing levees or dams. Therefore, no increase in potential levee or dam failure would occur.

Exposure of People or Structures to Flooding. AD facilities proposed for implementation under the Program EIR are not expected to be installed within existing flood zones. In the event that an AD facility were proposed for installation within a flood zone, the facility would be required to adhere to state and local building requirements and regulations regarding construction in flood zones, including applicable building and design restrictions, and worker safety and evacuation measures. Therefore, although some facilities may be constructed in a potential inundation area, there would be no potential impact of loss, death or injury.

Placement of Housing within a 100-Year Flood Zone. Implementation of the project would not include or result in the construction of any housing. Therefore, the project would not include or result in the construction of housing within a 100-year flood zone. No impact would occur.

Impact Analysis

Impact 6.1: Construction of AD Facilities could generate loose, erodible soils and other water quality pollutants that may impair water quality. (Less than Significant)

During site grading and construction activities related to installation of AD facilities, including pre-processing and post-processing facilities, large areas of bare soil could be exposed to erosion by wind and water for extended periods of time. Bare soil surfaces are more likely to erode than vegetated areas due to the lack of dispersion, infiltration, and retention created by covering vegetation. Soil disturbance, excavation, cutting/filling, stockpiling, and grading activities could increase erosion and sedimentation to storm drains that empty to local surface waters. Construction water quality impacts are temporary and managed through the standard, industry-accepted BMPs, which are managed and monitored by the contractor conducting the work.

For individual projects that would disturb less than one acre, the amount of disturbance required for the construction of digester facilities would be considered relatively minor, and current standard construction practices would be sufficient to reduce the potential for impacting receiving waters. Thus, AD facility construction activities that disturb less than one acre would have a less-than-significant impact on water quality.

For projects that disturb more than one acre, the proponent of the project is required to comply with the revised NPDES General Construction Permit. As discussed previously, permit requirements include the following measures or their equivalent:

- Preparation of a site-specific SWPPP;
- Preparation of hazardous material spill control and countermeasure programs;

- Sampling, monitoring, and compliance reporting for stormwater runoff;
- Development and adherence to a Rain Event Action Plan;
- Adherence to numeric action levels and effluent limits for pH and turbidity;
- Monitoring of soil characteristics;
- Mandatory training under a specific curriculum; and
- Mandatory implementation of BMPs, which could include, but would not be limited to:
  - Physical barriers to prevent erosion and sedimentation including setbacks and buffers, rooftop and impervious surface disconnection, rain gardens and cisterns, and other installations;
  - Construction and maintenance of sedimentation basins;
  - Limitations on construction work during storm events;
  - Use of swales, mechanical, or chemical means of stormwater treatment during construction, including vegetated swales, bioretention cells, chemical treatments, and mechanical stormwater filters; and
  - Implementation of spill control, sediment control, and pollution control plans and training.

Adherence to these and/or other similar BMPs would be required as a condition of the permit, and would substantially reduce or prevent waterborne pollutants from entering natural waters. The specific set of BMPs would be determined prior to initiation of construction activities of a project, and a schedule for implementation, as well as a series of monitoring and compliance measures would be developed in coordination with the permitting agency, to meet CWA standards. Therefore, additional mitigation for stormwater quality is not required to protect water quality during construction, over and above that which is required by the revised NPDES General Construction Permit.

If precautions are not taken to contain contaminants, construction could produce contaminated stormwater runoff. Runoff from construction of AD facilities would be contained at the project sites, and would not be discharged to waters of the State. In addition, hazardous materials associated with construction equipment and practices, such as fuels, oils, antifreeze, coolants, and other substances, could adversely affect water quality if spilled or stored improperly. Potential chemical releases are regulated by the regional boards, Department of Toxic Substances Control, and local agencies so that water quality is unlikely to be affected.

Mitigation: None required.

Impact 6.2: The operation of AD facilities could adversely affect surface and groundwater quality. (Significant)

The operation of AD facilities for the treatment of wastes considered under this Program EIR could cause environmental degradation of surface water and groundwater quality. Reductions in groundwater quality could occur as a result of pre-processing, post-processing, and to a lesser extent, digestion operations. These are reviewed below. Additional discussion of the activities associated with pre-processing, digestion, and post-processing are contained in Chapter 3, Project Description.

Pre-Processing

During pre-processing, digester feedstock is separated from incoming waste streams, stored, and transported to the anaerobic digester. Feedstocks could contain high levels of organic matter, sediment, nutrients, inorganic salts, and fugitive trash. Depending on the composition of the feedstock, other potential water quality pollutants may be present in small quantities, including heavy metals, hydrocarbons, and other species. During pre-processing, wash down of equipment, feedstock wetting, and handling operations may result in the loss of a small amount of feedstock material. Pollutants associated with pre-processing operations could be accidentally released from the project site or discharged during storm events, and enter surface waters or leach into groundwater. Implementation of Mitigation Measures 6.2a and 6.2b would be required to protect water quality.

Digestion

During the digestion process, digestion occurs within tanks that are designed to prevent leakage of feedstock or digestate. Therefore, potential effects on water quality during digestion would be limited to accidental spills or accidental releases of digestate. Accidental spills could occur as a result of digestion equipment malfunction, accidental release of materials from the anaerobic digester, or spills associated with the handling of chemicals used for the digestion process. Without mitigation, such spills or accidental releases could drain into surface waters or infiltrate to groundwater, either directly or during stormwater runoff events, resulting in degradation of surface water or groundwater quality. Implementation of Mitigation Measure 6-2c would be required.

Post-Processing

During post-processing, digestate is dewatered to separate residual solids and liquids. Residual solids are then disposed in a landfill, composted, or used as soil amendment for agriculture or other beneficial use. The liquid fraction of the digestate could potentially be discharged to a municipal sewer system for treatment, treated and then discharged to either surface waters pursuant to an NPDES permit or to percolation or evaporation ponds, or used for crop irrigation or other beneficial use. Therefore, potential effects on water quality depend upon the concentration of pollutants in the liquid and solid fractions of the digestate, and in the eventual end use or disposal method that is employed for digestate handling. The potential effects are reviewed in the following text.

Residual Solids

After digestion, residual solids may contain water quality pollutants. The type and concentration of pollutants in residual solids can vary substantially depending upon the feedstock and the digestion practices. In general, residual solids are expected to contain substantial amounts of organic matter and sediment, as well as significant levels of salt, nutrients, and in some cases, heavy metals, pathogens, and toxic organic and/or inorganic pollutants. Residual solids containing high levels of heavy metals or toxins would be required to be handled as a waste and disposed of in an appropriately managed landfill where they would not have a significant potential to adversely impact surface water or groundwater.

Composting and/or direct land application as soil amendment could be an alternative management option for residual solids. Residual solids used for composting or as a soil amendment could not contain high levels of heavy metals, or other toxins. Composting of residual solids would occur at an appropriately permitted composting facility that has undergone an environmental review, and therefore would not be likely to result in a significant increase in surface or groundwater quality pollution. However, unless properly managed, land application of residual solids and compost could adversely impact the quality of surface water and groundwater. Implementation of Mitigation Measure 6.2e would be required.

Liquid Digestate

The volume and composition of liquid digestate is expected to depend substantially on the characteristics of the anaerobic digester feedstock and, to some degree, on the type of digestion process employed. In general, liquid digestate may contain elevated levels of nutrients (nitrogen and phosphorous compounds), salts (inorganic dissolved solids), microbes (some of which may be pathogenic), heavy metals, and other organic and inorganic constituents associated with the feedstock. Liquid digestate flows having high concentrations of pathogenic microbes, heavy metals, and other toxic compounds could potentially be discharged to a municipal sewer system for further treatment, or be discharged to a lined evaporation pond. Treatment at a municipal wastewater treatment plant could reduce pollutant concentrations to levels consistent with the plant’s discharge permit, and therefore would not result in a significant decrease in water quality.

Discharge to an evaporation pond would result in evaporation of the water fraction of liquid digestate, and would leave behind a slurry or solid fraction, which would include any salts, sediment, heavy metals, and other pollutants that were present in the digestate. The solid fraction would be periodically removed and disposed of in an appropriate landfill or, if appropriate, be incorporated into a soil amendments or compost. Liquid from evaporation ponds could potentially leak and adversely impact groundwater quality. To ensure that evaporation ponds would be adequately lined and groundwater adequately protected during pond operation, implementation of Mitigation Measure 6.2d would be required.

Liquid digestate that does not have substantial concentrations of nutrients, salts, heavy metals, or other pollutants that could degrade groundwater, or that has been treated to remove such constituents, could potentially be discharged to percolation ponds. Disposal of digestate via percolation ponds would require a WDR, which would impose pollutant loading limitations that would generally minimize the potential for groundwater quality pollution associated with the percolation pond. Implementation of Mitigation Measure 6.2d would be required.

Liquid digestate could be discharged to an agricultural field in support of crop production pursuant to a WDR or waiver from the relevant regional board. Liquid digestate that contains high levels of heavy metals, salts, or other pollutants could not be discharged to agricultural land without a WDR order from the appropriate regional board. The WDR order could require that the digestate be treated to reduce such constituents to levels that would not inhibit beneficial use or threaten water quality, Implementation of Mitigation Measure 6.2e would be required. For projects implemented under this Program EIR, where liquid digestate would be land applied, additional project-level review would be required in order to determine the extent of potential water-quality impacts associated with such application.

Discharge of liquid digestate to surface waters can only occur pursuant to an NPDES permit promulgated by a regional board or by the State Water Board. Adherence to the permitting requirements for such a permit would be expected to reduce or minimize the concentration of water quality pollutants discharged to surface waters. Therefore, implementation of Mitigation Measure 6.2f would be required for all projects that would include a discharge to surface water.

Mitigation Measure

> **Measure 6.2a:** During pre-processing, all water that contacts digester feedstock, including stormwater from feedstock handling and storage facilities and water from equipment washdown and feedstock wetting, shall be contained until appropriately disposed or utilized. Best Management Practices (BMPs) may be used to reduce loading of sediment, nutrients, trash, organic matter, and other pollutants. These BMPs may include, but are not limited to, trash grates and filters, oil-water separators, mechanical filters such as sand filters, vegetated swales, engineered wastewater treatment wetlands, settling ponds, and other facilities to reduce the potential loading of pollutants into surface waters or groundwater. All discharges of stormwater are prohibited unless covered under the General Industrial Stormwater Permit, other National Pollutant Discharge Elimination System (NPDES) permit, or are exempted from NPDES permitting requirements. The NPDES permits will generally require implementation of management measures to achieve a performance standard of best available technology economically achievable (BAT) and best conventional pollutant control technology (BCT), as appropriate. The General Industrial Stormwater Permit also requires the development of a storm water pollution prevention plan (SWPPP) and a monitoring plan, in compliance with permit requirements.[3] Other liquid and solid wastes may only be discharged pursuant to an NPDES permit or waste discharge requirement (WDR) order.
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> **Measure 6.2b**: In order to minimize the amount of fugitive trash or feedstock released to surface waters, the following measures shall be implemented. When feasible, the project proponent shall preferentially select feedstocks that contain minimal amounts of trash that could become entrained in surface water, either via direct contact with stormwater flows or via other accidental release, such as due to wind. Processing of such feedstocks may, however, be unavoidable, such as in support of an AD facility that processes MSW. Therefore, the project applicant shall ensure that (1) drainage from all feedstock loading, unloading, and storage areas is contained onsite or treated to remove trash and stray feedstock, and sediment prior to release; (2) in all feedstock loading and unloading areas, and all areas where feedstock is moved by front loaders or other uncovered or uncontained transport machinery, the applicant shall ensure that mechanical sweeping and/or equivalent trash control operational procedures are performed at least daily, during operations; and (3) the facility operator shall train all employees involved in feedstock handling so as to discourage, avoid, and minimize the release of feedstock or trash during operations.

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[3] For more information, please refer to: http://www.swrcb.ca.gov/water_issues/programs/stormwater/industrial.shtml

Measure 6.2c: In order to minimize water quality degradation associated with accidental spills at AD facilities, the applicant for individual projects that would be implemented under the Program EIR shall require project proponents to complete and adhere to the requirements of a Spill Prevention, Control, and Countermeasure Plan (SPCC). The SPCC shall contain measures to prevent, contain, and otherwise minimize potential spills of pollutants during facility operation, in accordance with federal, state, and local requirements. Additionally, the project applicant shall adhere to the requirements and recommendations of WDRs, which would be provided for the project by the applicable regional board. Requirements under WDRs include implementation of measures to minimize water quality degradation, including but not limited to restrictions on the concentration of water quality pollutants discharged from a proposed facility, and maximum acceptable flow volumes for a given facility.

Measure 6.2d: Any proposed discharge to a pond for an individual project would require the project applicant to acquire WDRs from the appropriate regional board. The project applicant shall ensure that all ponds and discharges to such ponds adhere to all requirements under applicable WDRs. The need for pond liners in order to protect groundwater quality would be assessed during the regional board's review of the project, and requirements for pond liners would be included in the WDRs, as warranted. If appropriate, the WDRs would impose requirements for Class II surface impoundments as presented in Title 27 of the California Code of Regulations. Requirements include, but are not limited to, groundwater monitoring, double liner systems with leachate collection, water balance, a preliminary closure plan for clean closure, seismic analysis, and financial assurances. Compliance with WDRs may require the installation of facilities such as tanks and containers to store and process the digestate, the use of filter presses, and implementation of other water quality protection practices.

Measure 6.2e: This measure would reduce potential for the movement of nutrients and other pollutants to groundwater and surface water for individual projects that would employ land application for liquid digestate or residual solids. The operators of individual projects implemented under this Program EIR shall ensure that land application of liquid digestate and/or residual solids adheres to all requirements of applicable WDRs. WDR requirements include but are not limited to, groundwater monitoring, completion of an anti-degradation analysis, and in some cases best practicable treatment and control to achieve salinity reduction in materials prior to discharge to land. WDRs would be issued by the appropriate regional board, and would consider site-specific conditions and waste characteristics, in order to determine applicable control measures and procedures that protect water quality.

Measure 6.2f: This measure would reduce the potential for water quality degradation from projects that include discharge of liquid digestate to surface waters. The applicant for individual projects implemented under this Program EIR shall ensure that the discharge of liquid digestate to surface waters adheres to all NPDES permitting recommendations and requirements, as established by the appropriate regional board. Specific measures may include, but are not limited to, limitations on discharge volumes, seasonal discharge restrictions, limitations on loading rates and/or concentrations of specific constituents, and other facility-specific water quality control measures designed to protect receiving water quality and preserve beneficial uses identified in Basin Plans.

Impact Significance After Mitigation: Less than Significant

Implementation of the prescribed mitigation would reduce the potential for water quality pollution associated with operation of AD facilities that would be implemented under this Program EIR. Specific measures and regulatory limits would be employed during the permitting process, and adherence to applicable WDRs and other permitting requirements would protect the beneficial uses of waters of the State.

Impact 6.3: AD facilities could be exposed to flooding hazards. (Significant)

Many areas of California are prone to flooding, especially low-lying portions of the Central Valley, the Sacramento-San Joaquin Delta, the Russian River Watershed, low-lying coastal areas without sufficient protection from surf and/or storms, desert washes located in California's desert areas, and additional areas where levees, dams, stormwater containment, and other flood containment infrastructure is not sufficient to protect housing and other facilities. Even areas protected by levees are susceptible to flooding in the event of high-intensity storms of long duration.

The Federal Emergency Management Agency (FEMA) provides information on flood hazard and frequency for cities and counties on its Flood Insurance Rate Maps (FIRMs).[4] FEMA identifies designated zones to indicate flood hazard potential. AD facilities proposed under this project could be located in areas that have been identified as subject to 100-year floods.[5] AD facilities, including feedstock and digestate storage areas, could be damaged if located in flood hazard areas. Workers at these facilities could also be subject to injury or death as a result of flooding hazards. Given the widespread extent of potential flooding hazards in many areas of California, the risk of flooding may not be completely unavoidable. However, protection measures and design requirements can minimize potential impacts. With implementation of Mitigation Measure 6.3, the potential impacts from flooding can be reduced to less-than-significant levels.

Mitigation Measure

Measure 6.3: Individual applicants seeking coverage under this Program EIR shall ensure that, for their proposed AD facilities including pre-processing areas, feedstock storage areas, and digestate handling facilities, are protected from FEMA-defined 100-year flood events. Design measures may include, but are not limited to: facility siting, access placement, grading, elevated foundations, and site protection such as installation of levees or other protective features.

Impact Significance After Mitigation: Less than Significant

Implementation of the prescribed mitigation would ensure that individual proposed facilities are not located within 100-year floodplains, or are sufficiently protected from 100-year flood events.

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[4] FEMA FIRMs are downloadable at: http://msc.fema.gov

[5] A 100-year floodplain is defined as an area calculated to have a one percent chance of flooding in any given year.

Impact 6.4: Construction of AD facilities could change drainage and flooding patterns (Significant)

Construction of AD facilities would involve operation of heavy equipment, grading, earth moving, stockpiling of spoils, and other activities that would alter existing topographic and drainage features located at sites where facility installation would occur. Compaction of soils by heavy equipment could decrease the infiltration rates for surface sediments, causing increased runoff. This could in turn result in changes to drainage located onsite and, unless properly managed, result in altered or increased flooding onsite and downstream.

Installation and operation of the proposed facilities could also result in removal or realignment of minor drainages located onsite, which in most cases would eventually be tributary to natural waters. In lieu of these existing drainages, engineered swales, retention ponds, discharge channels, stormwater drains and/or other stormwater infrastructure would be installed in order to convey stormwater from AD facilities. Unless designed and managed properly, AD facilities could result in increased ponding or flooding, onsite or downstream.

Asphalt, roofs, sidewalks, concrete surfaces, and other surfaces prevent the natural drainage and infiltration of stormwater through soil. Surface water runoff has a greater volume and rate when the site is paved or otherwise covered by an impervious surface, because surface water infiltration rates are reduced or eliminated compared to undeveloped, unpaved areas. As a result, increases in impervious surfaces result in increased surface runoff volumes and peak flow rates. These can in turn produce considerable changes to downstream hydrology, as compared to pre-development conditions, resulting in increased or exacerbated flooding on site or downstream, such as by exceeding existing or proposed drainage system capacities. These impacts would be potentially significant, and implementation of Mitigation Measure 6.4 would be required.

Mitigation Measure

> **Measure 6.4:** In order to ensure that the AD facilities would not result in detrimental increases in stormwater flow or flooding on site or downstream, the Applicant for each AD facility project shall prepare a comprehensive drainage plan (prior to construction) and implement the plan during construction. The comprehensive drainage plan shall include engineered stormwater retention facility designs, such as retention basins, flood control channels, storm drainage facilities, and other features as needed to ensure that, at a minimum, no net increase in stormwater discharge would occur during a 10-year, 24-hour storm event, as a result of project implementation. Project related increases in stormwater flows shall be assessed based on proposed changes in impervious surface coverage on site, as well as proposed grading and related changes in site topography.
>
> **Impact Significance after Mitigation:** Less than Significant.
>
> The effect of potential changes in drainage and flooding patterns would be minimized on a site-by-site basis by implementation and adherence to a comprehensive drainage plan that would in turn ensure that the AD facilities would minimize potential changes in stormwater discharge rates and minimize onsite flooding.

Impact 6.5: AD facilities could require additional water supplies resulting in depletion of groundwater. (Less than Significant)

The volume of water required to operate AD facilities, including pre-processing, digestion, and post-processing, is expected to vary widely depending upon the anaerobic digester and digester feedstock’s characteristics. Generally speaking, the digestion process is enabled by substantial water content during digestion. The amount of water that would need to be added in order to support digestion activities would, however, vary primarily as a function of the type of feedstock used. For instance, very wet feedstocks, such as liquid food processing wastes, may not require any additional water to support digestion. However, drier feedstocks, such as greenwaste, may require more substantial addition of water to support digestion.

For anaerobic digesters using feedstock that requires the addition of water, the total volume of water required would also be substantially influenced by the capacity of the digester. Larger capacity anaerobic digesters would generally require larger volumes of water for processing, as compared to smaller capacity digesters. Thus a larger anaerobic digester using dry feedstock is expected to have substantially higher water use requirements as compared to a smaller digester using dry or wet feedstocks.

Post-processing of liquid wastes from the anaerobic digester may require water as a diluent prior to reuse or disposal. The volume of water needed for dilution purposes is expected to vary substantially, based on project design, effluent flow rates, and levels of water quality pollutants contained in the effluent.

As discussed in Chapter 3, Project Description, most AD facilities are anticipated to be co-located with permitted solid waste facilities or located in areas zoned for industrial or solid waste handling activities, which would have existing water uses on site. The volume of water required for digester operation is expected to be minor in comparison to the total volume of water required for the indicated waste handling facilities or that should be available in industrial zoned areas. Therefore, it is assumed that digesters implemented under this Program EIR would rely on municipal water supplies, or water available onsite from sources such as wastewater produced onsite, stormwater, high-moisture feedstocks, or water made available through increased water use efficiency. Therefore, it is anticipated that AD facilities operated under this Program EIR would not require new or additional water supplies that would be sourced from groundwater. In the unlikely event that a digester implemented under this Program EIR would require the use of new or additional groundwater supplies, including the installation of new wells or increases in production of existing wells, the potential effects on groundwater levels must be evaluated separately, under subsequent environmental review. Therefore, this impact is considered less than significant.

Mitigation: None required.

Impact 6.6: AD facilities could become inundated as a result of seiche, tsunami, or mudflow. (Significant)

Although most areas of California where AD facilities would be installed are not susceptible to seiche, tsunami, or mudflow, installation of facilities in some areas could result in increased risk of inundation as a result of these hazards. Seiche occurs as a result of seismic, mass movement, or other events that cause formation of a standing wave within an enclosed water body, such as a lake, reservoir, or nearly closed embayment. Seiche can potentially result in the formation of surface waves up to several feet in height, which could result in inundation of low-lying areas located near susceptible water bodies. Tsunami are ocean-borne waves that result from seismic movement, often at a distant location. Tsunami can be transmitted across long distances, and can result in inundation of low-lying areas of California, that are in close proximity to the Pacific Ocean and associated inland bays.[6] Mudflows are mass movements of water and sediments that may occur as a result of a geologic event, such as volcanic eruption, or as a result of heavy rain and flooding across extensive areas that have been denuded of vegetation, such as during a forest fire. Mudflows in California are thus rare, but can still potentially occur in some areas, especially those areas having high risk of volcanic activity, and areas having fire-prone, often scrub type vegetation that is located on fine-grained sedimentary formations having high topographic relief. Siting of facilities in these areas could result in potentially significant impacts associated with seiche, tsunami, or mudflow. Implementation of Mitigation Measure 6.6 would be required.

Mitigation Measure

Measure 6.6: To ensure that proposed AD facilities would not incur impacts associated with seiche, tsunami, or mudflow, the applicant for each individual project shall ensure that all facilities are located outside of potential risk areas for seiche, tsunami, and mudflow. In the event that a proposed facility would be sited within a potential risk area for one of these hazards, the facility shall be raised above projected maximum base inundation elevations, or shall be protected from inundation by the installation of berms, levees, or other protective facilities.

Impact Significance after Mitigation: Less than Significant.

Implementation of the proposed mitigation would ensure that AD facilities are located outside of areas that would be affected by seiche, tsunami, or mudflow, or would alternatively ensure that proposed AD facilities would be protected from such hazards.

Impact 6.7: AD facilities could contribute to cumulative impacts to water quality. (Significant)

The geographic scope of potential cumulative water quality impacts includes all of California. As discussed previously, many existing sources of surface water and groundwater have water quality impairment. For example, groundwater in the Tulare Lake Basin has been degraded by salt loading through a combination of natural processes and human activities. Surface waters along the Sacramento

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[6] Statewide tsunami inundation maps can be found here: http://www.conservation.ca.gov/cgs/geologic_hazards/Tsunami/Inundation_Maps/Pages/Statewide_Maps.aspx

River and the Sacramento-San Joaquin Delta have been substantially affected by urban-related point and nonpoint discharges, including wastewater treatment effluents, industrial effluents, urban runoff, and agricultural runoff. Naturally intermittent water courses in metropolitan areas of southern California have become perennial streams, with dry season flows being comprised almost entirely of wastewater treatment effluent and summertime urban runoff.

On a cumulative basis, on-going activities, including waste management and energy production have the potential for additional cumulative degradation of surface water and groundwater. However, the operation of AD facilities, as required by Mitigation Measures 6.2 (a-f), would be prohibited from discharging into surface waters unless covered by a separate NPDES permit with effluent limitations to protect surface water quality. Mitigation Measures 6.2 (a-f) would also provide for protection of water quality associated with discharges of digester wastes to land, evaporation ponds, infiltration ponds, and other facilities, as described previously. Adherence to WDRs and other permit conditions, as required under Mitigation Measures 6.2 (a-f) would help to ensure that discharges from AD facilities would not degrade water quality to the point that beneficial use would be affected. Therefore, the cumulative contribution of AD facilities on water quality is not expected to be cumulatively considerable.

The existing regulatory environment for California, including state and federal antidegradation provisions, as well as resolutions, orders, conditional waivers, end enforcement actions promulgated by the State Water Board and regional boards, impose measures designed to protect water quality. In recent years, a large percentage of existing projects that have caused environmental impact have come under more stringent regulatory requirements, which include measures designed to reduce the impacts to surface waters and groundwater. Regional boards are also implementing various efforts aimed at reducing water quality pollution through basin planning efforts and implementation plans to achieve water quality objectives.

The AD facilities that would be developed under this project have the potential to contribute pollutants to groundwater through waste handling and disposal procedures. An analysis of the range of potential impacts to groundwater has already been presented in this chapter. As discussed under Impact 6.2, potential groundwater impacts will vary from constituent to constituent. For most constituents of concern, the addition of AD facilities with associated mitigation practices will be effective in reducing the pollutant loading that might otherwise occur.

In certain areas in California, the management of salts is critical for achieving water quality goals identified by the regional boards. For instance, salt concentrations in the San Joaquin Valley are highly managed, yet in many areas remain above existing planning goals.

Any increase in salt loading resulting from AD facility operations that could cause degradation or affect beneficial use, as defined under State Water Board Resolution No. 68-16 (see previous discussion of California State Nondegradation Policy), would be required to implement Best Practicable Treatment and Control Technology to prevent water quality degradation, or must be regulated under Title 27 of the California Code of Regulations (CCR) to install liner systems to protect beneficial uses. Measures that could be implemented in order to minimize salt loading may include control of salt loads in incoming feedstock, export of digester effluents or digestate to regional disposal facilities, and/or on-site or off-site treatment options such as vacuum distillation or deionization for liquid effluents.

Specific treatment measures applicable to a specific project site would be identified via required coordination with the applicable regional board. Treatment would ensure that salt loads emanating from the proposed facility are consistent with regional basin planning, as promulgated by the relevant regional board. Adherence to these requirements, along with Mitigation Measures 6.2 (a-f) and 6.3, would be required.

Mitigation Measure

> **Measure 6.7:** Implement Mitigation Measures 6.2 (a-f) and 6.3.
>
> **Impact Significance After Mitigation:** Not Cumulatively Considerable
>
> Implementation of the mitigation measures discussed in impacts 6.2 and 6.3, combined with adherence to the requirements of the California State Nondegradation Policy and CCR Title 27 would reduce the impacts to a less than significant level on an incremental project basis. With implementation of these measures, this impact would not be cumulatively considerable.

6.3 References

California Department of Water Resources (DWR), 2003. California's Groundwater Bulletin 118, Update 2003. Available at http://www.water.ca.gov/groundwater/bulletin118/gwbasin_maps_descriptions.cfm Accessed on October 5, 2010.

CHAPTER 7
Noise

7.1 Environmental Setting

Environmental Noise Fundamentals

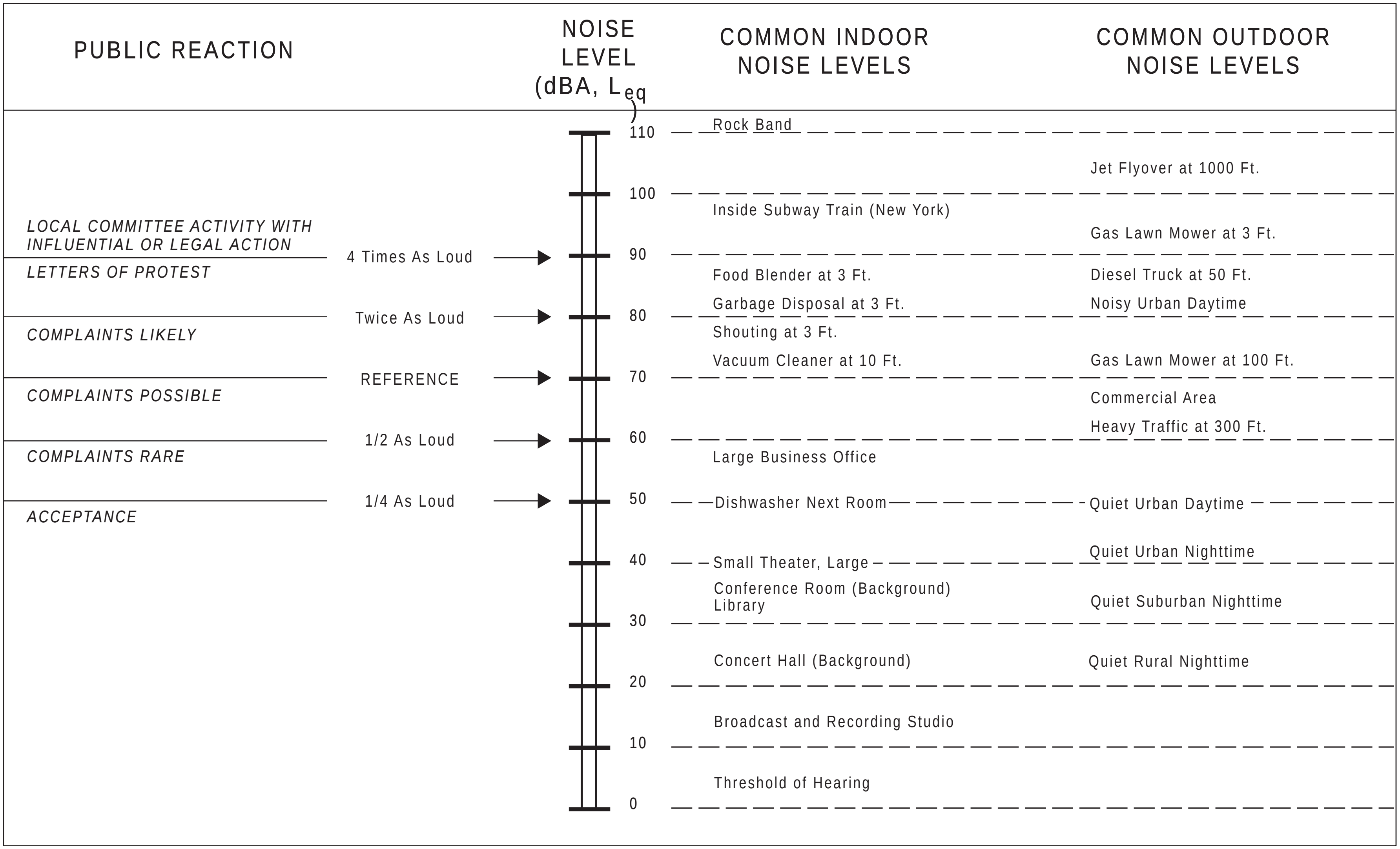
Noise is defined as unwanted sound. Sound, traveling in the form of waves from a source, exerts a sound pressure level (referred to as sound level) which is measured in decibels (dB), with zero dB corresponding roughly to the threshold of human hearing, and 120 to 140 dB corresponding to the threshold of pain. Pressure waves traveling through air exert a force registered by the human ear as sound.

Sound pressure fluctuations can be measured in units of hertz (Hz), which correspond to the frequency of a particular sound. Typically, sound does not consist of a single frequency, but rather a broad band of frequencies varying in levels of magnitude (sound power). When all the audible frequencies of a sound are measured, a sound spectrum is plotted consisting of a range of frequencies spanning 20 to 20,000 Hz. The sound pressure level, therefore, constitutes the additive force exerted by a sound corresponding to the sound frequency/sound power level spectrum.

The typical human ear is not equally sensitive to all frequencies of the audible sound spectrum. As a consequence, when assessing potential noise impacts, sound is measured using an electronic filter that de-emphasizes the frequencies below 1,000 Hz and above 5,000 Hz in a manner corresponding to the human ear's decreased sensitivity to extremely low and extremely high frequencies. This method of frequency weighting is referred to as A-weighting and is expressed in units of A-weighted decibels (dBA). Frequency A-weighting follows an international standard methodology of frequency de-emphasis and is typically applied to community noise measurements. Some representative noise sources and their corresponding A-weighted noise levels are shown in **Figure 7-1**.

Noise Exposure and Community Noise

An individual's noise exposure is a measure of noise over a period of time. A noise level is a measure of noise at a given instant in time. The noise levels presented in **Figure 7-1** are representative of measured noise at a given instant in time, however, they rarely persist consistently over a long period of time. Rather, community noise varies continuously over a period of time with respect to the contributing sound sources of the community noise environment. Community noise is primarily the product of many distant noise sources, which constitute a relatively stable background noise exposure, with the individual contributors unidentifiable.



SOURCE: ESA, 2007

Figure 7-1
Effect of Noise on People

The background noise level changes throughout a typical day, but does so gradually, corresponding with the addition and subtraction of distant noise sources such as traffic and atmospheric conditions. What makes community noise constantly variable throughout a day, besides the slowly changing background noise, is the addition of short duration single event noise sources (e.g., aircraft flyovers, motor vehicles, sirens), which are readily identifiable to the individual.

These successive additions of sound to the community noise environment varies the community noise level from instant to instant requiring the measurement of noise exposure over a period of time to legitimately characterize a community noise environment and evaluate cumulative noise impacts. This time-varying characteristic of environmental noise is described using statistical noise descriptors. The most frequently used noise descriptors are summarized below:

Leq	the equivalent sound level is used to describe noise over a specified period of time, typically one hour, in terms of a single numerical value. The Leq is the constant sound level which would contain the same acoustic energy as the varying sound level, during the same time period (i.e., the average noise exposure level for the given time period).
Lmax	the instantaneous maximum noise level for a specified period of time.
L50	the noise level that is equaled or exceeded 50 percent of the specified time period. The L50 represents the median sound level.
L90	the noise level that is equaled or exceeded 90 percent of the specified time period. The L90 is sometimes used to represent the background sound level.
Ldn	24-hour day and night A-weighted noise exposure level which accounts for the greater sensitivity of most people to nighttime noise by weighting noise levels at night (“penalizing” nighttime noises). Noise between 10:00 PM and 7:00 AM is weighted (penalized) by adding 10 dBA to take into account the greater annoyance of nighttime noises.
CNEL	similar to the Ldn, the Community Noise Equivalent Level (CNEL) adds a 5-dBA penalty during the evening hours between 7:00 PM and 10:00 PM in addition to a 10-dBA penalty between the hours of 10:00 PM and 7:00 AM

As a general rule, in areas where the noise environment is dominated by traffic, the Leq during the peak-hour is generally equivalent to the Ldn at that location (within +/- 2 dBA) (Caltrans, 1998).

Effects of Noise on People

The effects of noise on people can be placed into three categories:

- subjective effects of annoyance, nuisance, dissatisfaction;
- interference with activities such as speech, sleep, learning; and
- physiological effects such as hearing loss or sudden startling.

Environmental noise typically produces effects in the first two categories. Workers in industrial plants can experience noise in the last category. There is no completely satisfactory way to measure the subjective effects of noise, or the corresponding reactions of annoyance and dissatisfaction. A

wide variation in individual thresholds of annoyance exists, and different tolerances to noise tend to develop based on an individual's past experiences with noise.

Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted: the so called "ambient noise" level. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged by those hearing it. With regard to increases in A-weighted noise level, the following relationships occur (Caltrans, 1998):

- except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived;
- outside of the laboratory, a 3 dBA change is considered a just-perceivable difference;
- a change in level of at least 5 dBA is required before any noticeable change in human response would be expected; and
- a 10 dBA change is subjectively heard as approximately a doubling in loudness, and can cause adverse response.

These relationships occur in part because of the logarithmic nature of sound and the decibel system. The human ear perceives sound in a non-linear fashion, hence the decibel scale was developed. Because the decibel scale is based on logarithms, two noise sources do not combine in a simple additive fashion, rather logarithmically. For example, if two identical noise sources produce noise levels of 50 dBA the combined sound level would be 53 dBA, not 100 dBA.

Noise Attenuation

Stationary point sources of noise, including stationary mobile sources such as idling vehicles, attenuate (lessen) at a rate between 6 dBA for hard sites and 7.5 dBA for soft sites for each doubling of distance from the reference measurement. Hard sites are those with a reflective surface between the source and the receiver such as parking lots or smooth bodies of water. No excess ground attenuation is assumed for hard sites and the changes in noise levels with distance (drop-off rate) is simply the geometric spreading of the noise from the source. Soft sites have an absorptive ground surface such as soft dirt, grass or scattered bushes and trees. In addition to geometric spreading, an excess ground attenuation value of 1.5 dBA (per doubling distance) is normally assumed for soft sites. Line sources (such at traffic noise from vehicles) attenuate at a rate between 3 dBA for hard sites and 4.5 dBA for soft sites for each doubling of distance from the reference measurement (Caltrans, 1998).

Sensitive Receptors

Some land uses are considered more sensitive to ambient noise levels than others because of the amount of noise exposure (in terms of both exposure duration and insulation from noise) and the types of activities typically involved. Residences, hotels, schools, rest homes, and hospitals are generally more sensitive to noise than commercial and industrial land uses. The location of anaerobic digester (AD) facilities considered in this Program EIR would be at permitted solid waste facilities and within areas zoned for industrial or solid waste handling activities. However, these areas may be near noise-sensitive land uses, and sensitive receptors could be located along the truck routes leading to the AD facilities.

Existing Noise Environment

The noise near AD facilities would be expected to be typical of solid waste facilities such as Material Recovery Facilities (MRFs) and transfer stations. **Table 7-1** shows reference noise levels near the tipping floor of a large-scale MRF/transfer station in the City of Industry, California. Another important noise source at large scale solid waste facilities is the noise along local access routes from trucks entering and exiting solid waste facilities. As shown in **Figure 7-2** the normal acceptable decibel range in industrial areas (including solid waste facilities) would be up to 75 dBA, CNEL and the conditionally acceptable decibel range would be up to 80 dBA, CNEL.

TABLE 7-1
REFERENCE NOISE LEVELS (DBA) 50 FEET FROM THE ENTRANCE OF TIPPING FLOOR AT THE CITY OF INDUSTRY MRF/TRANSFER STATION

Source	Lmax	L2	L8	L25	L50
Truck Movements*	75	75	75	72	-
Backup Alarm*	85	-	-	-	-
Hydraulic Pumps	73	73	70	-	-
Truck Unloading	75	75	72	-	-
Air Brake*	85	-	-	-	-
Loader	72	72	72	72	69
Conveyor	65	65	65	65	65
Alarms	82	82	79	-	-
Voices	62	62	62	62	62
Sorting	68	68	68	68	65
Sweepers*	83	83	-	-	-
Total Day	**90**	**87**	**82**	**76**	**73**
Total Night	**89**	**84**	**82**	**76**	**73**

Lmax = maximum
L2 = duration of one minute in any hour
L8 = duration of 5 minutes in any hour
L25 = duration of 15 minutes in any hour
L50 = duration of 30 minutes in any hour
The total is the logarithmic sum of all sources in all categories except the Lmax metric.
The total is the highest individual event for the Lmax metric.
The MRF/TS size analyzed for the City of Industry would have a capacity of 8,500 TPD Asterisk denotes use is restricted to between 10:00 am and 7:00 pm.

SOURCE: Gordon Bricken & Associates, 2003

Regulatory Requirements

Federal

Federal regulations establish noise limits for medium and heavy trucks (more than 4.5 tons, gross vehicle weight rating) under 40 Code of Federal Regulations (CFR), Part 205, Subpart B. The federal truck pass-by noise standard is 80 dBA at 15 meters from the vehicle pathway centerline. These controls are implemented through regulatory controls on truck manufacturers. Federal OSHA regulations also protect workers from excessive occupational noise exposure (29 CFR § 1910.95, Code of Federal Regulations).

State

The California Department of Health Services' Office of Noise Control studied the correlation of noise levels and their effects on various land uses and published land use compatibility guidelines for the noise elements of local general plans. The guidelines are the basis for most noise element land use compatibility guidelines in California.

The land use compatibility for community noise environment chart identifies the normally acceptable range for several different land uses, as shown in **Figure 7-2** below. Persons in low-density residential settings are most sensitive to noise intrusion, with noise levels of 60 dBA CNEL and below considered "acceptable". For land uses such as schools, libraries, churches, hospitals, and parks, acceptable noise levels go up to 70 dBA CNEL. Industrial areas (including solid waste facilities) are land uses that can tolerate higher ambient noise level, with conditionally acceptable noise levels being up to 80 dBA CNEL.

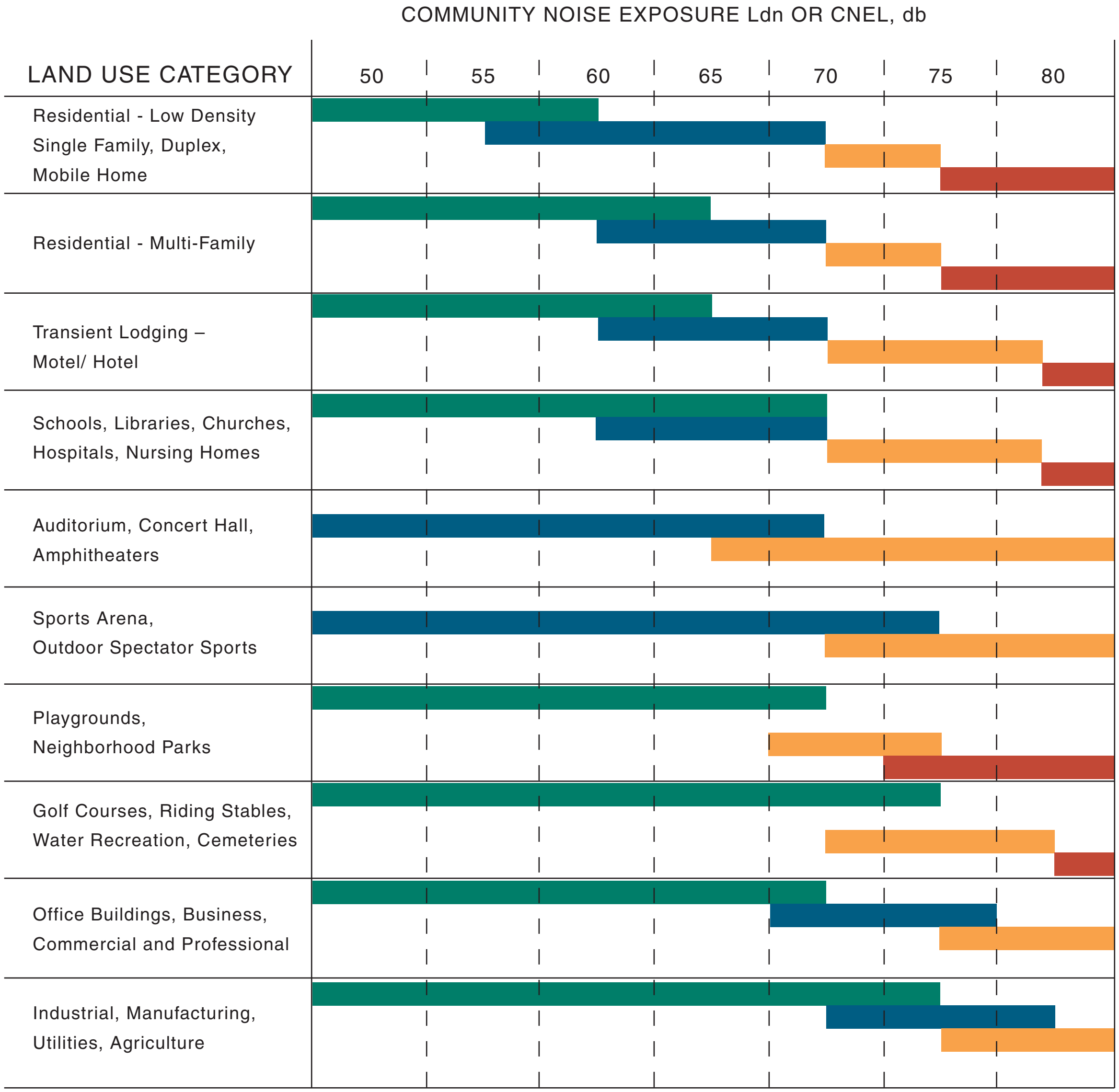
The State of California also establishes noise limits for vehicles licensed to operate on public roads. For heavy trucks, the State pass-by standard is consistent with the federal limit of 80 dB at 15 meters.

The State pass-by standard for light trucks and passenger cars (less than 4.5 tons, gross vehicle rating) is also 80 dBA at 15 meters from the centerline. These standards are implemented through controls on vehicle manufacturers and by legal sanction of vehicle operators by State and local law enforcement officials.

The State has also established noise insulation standards for new multi-family residential units, hotels, and motels that would be subject to relatively high levels of transportation-related noise. These requirements are collectively known as the California Noise Insulation Standards (Title 24, California Code of Regulations). The noise insulation standards set forth an interior standard of DNL 45 dBA in any habitable room. They require an acoustical analysis demonstrating how dwelling units have been designed to meet this interior standard where such units are proposed in areas subject to noise levels greater than DNL 60 dBA. Title 24 standards are typically enforced by local jurisdictions through the building permit application process.

Local Jurisdictions

In California, most cities and counties have noise ordinances serve as enforcement mechanisms for controlling noise. Jurisdictions also have General Plan. Noise Elements that are used as planning guidelines to ensure that long-term noise generated by a source is compatible with adjacent land uses. Both the noise ordinances and General Plan Noise Elements may include limits for industrial areas and limits for sensitive receptor noise levels.



INTERPRETATION

🟩 NORMALLY ACCEPTABLE
Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

🟦 CONDITIONALLY ACCEPTABLE
New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.

🟧 NORMALLY UNACCEPTABLE
New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirement must be made and needed noise insulation features included in the design.

🟥 CLEARLY UNACCEPTABLE
New construction or development should generally not be undertaken.

SOURCE: State of California General Plan Guidelines, Office of Planning and Research, 1998; and ESA, 2010

Figure 7-2
Land Use Compatibility for Community Noise Environment

7.2 Impacts and Mitigation Measures

Approach and Methods

The evaluation was performed in light of applicable regulations and guidelines, and typical construction activities and operations of AD facilities. In determining the level of significance, the analysis assumed that the AD facilities would comply with relevant federal, State, and local ordinances and regulations.

Noise impacts associated with implementation of the project have been evaluated at a program level of detail using standard acoustical modeling techniques that consider typical noise levels from various equipment. Potential noise levels were then compared to typical noise ordinance standards and incompatible noise levels (see Figure 7-2).

Thresholds of Significance

CEQA defines a significant effect on the environment as a substantial, or potentially substantial, adverse change in the physical conditions of the area affected by the project. An impact related to noise would be considered significant if it would result in any of the following, which are adapted from Appendix G of the CEQA *Guidelines*:

- Exposure of persons to or generation of noise levels in excess of standards established in any applicable plan or noise ordinance, or applicable standards of other agencies;
- Exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels;
- A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;
- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above existing levels existing without the project;
- Exposure of people residing or working in the project area to excessive noise levels, for a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport; or
- Expose people residing or working in the project area to excessive noise levels if the project is located in the vicinity of a private airstrip.

Site preparation and construction may result in ground borne vibration associated with earth movement and similar activities. Although these temporary activities may cause perceptible ground borne vibration, such impacts are anticipated to be minimal and limited to the project sites. Operation of the project would not involve any activity that would produce any substantial groundborne noise or vibration. This issue will not be further evaluated in the Program EIR.

Even if AD facilities were near an airport or private airstrip, the noise from the aircraft activities would be unlikely to expose people at the AD facility to excessive noise levels. AD facilities would not be considered sensitive receptors with regard to noise generated by off-site activities. Any potential impact from aircraft noise would be easy to recognize and avoid during the facility siting process. This issue will not be further evaluated in the Program EIR.

Some guidance as to the significance of changes in ambient noise levels is provided by the 1992 findings of the Federal Interagency Committee on Noise (FICON), which assessed the annoyance effects of changes in ambient noise levels resulting from aircraft operations. The recommendations are based upon studies that relate aircraft noise levels to the percentage of persons highly annoyed by the noise. Annoyance is a summary measure of the general adverse reaction of people to noise that generates speech interference, sleep disturbance, or interference with the desire for a tranquil environment. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, it has been asserted that they are applicable to all sources of noise described in terms of cumulative noise exposure metrics such as the Ldn, as shown in **Table 7-2**.

TABLE 7-2
MEASURES OF SUBSTANTIAL INCREASE FOR NOISE EXPOSURE

Ambient Noise Level without Project (Ldn)	Significant Impact Assumed to Occur if the Project Increases Ambient Noise Levels By:
<60 dB	+ 5.0 dB or more
60-65 dB	+ 3.0 dB or more
>65 dB	+ 1.5 dB or more

SOURCE: Federal Interagency Committee on Noise (FICON), 1992.

The rationale for the **Table 7-1** criteria is that the quieter the ambient noise level is, the more the noise can increase (in decibels) before it causes significant annoyance.

Construction Noise

Typically, most jurisdictions in California with Noise Ordinances exempt construction noise when it occurs during daytime hours. Noise impacts from short-term construction activities could exceed noise thresholds and could result in a significant construction impact if short-term construction activity occurred outside of the daytime hours permitted by local noise ordinances.

Stationary Noise

Operational equipment, especially those that run 24-hours a day, the appropriate noise level would be in compliance with local noise ordinances; or 45 dBA at the location of the nearest sensitive receptor. See **Table7-1** above for typical equipment noise levels. Various other grinders may be used for preprocessing and can be expected to have noise levels up to an Lmax of 80 – 90 dBA at a distance of 50 feet.

Traffic Noise

The proposed project would result in a significant traffic noise impact if traffic noise would result in an increase at the location of sensitive receptors beyond levels described in **Table 7-1** above.

Impact 7.1: Construction of AD facilities could temporarily increase noise levels at nearby sensitive receptor locations or result in noise levels in excess of standards in local general plans, noise ordinances, or other applicable standards. (Significant)

Construction of facilities could generate noise at sensitive receptors that exceed local regulations and codes. The construction-related noise levels may be from, but not necessarily limited to, the use of heavy equipment at the AD site or pipeline construction areas, or vehicles transporting material to or from the construction site. Noise levels may fluctuate depending on the distance of the sensitive receptor from the construction activity and the particular type, number, and duration of uses of various pieces of construction equipment. Construction-related material haul trips would raise ambient noise levels along haul routes, depending on the number of haul trips made and types of vehicles used. **Table 7-3** shows typical noise levels during different construction stages and **Table 7-4** shows noise levels produced by various types of construction equipment.

Although construction activities would likely occur during daytime hours, construction noise could still be considered substantially disruptive to residents. However, periods of intensive noise exposure would be temporary, and noise generated by project construction would be partially masked by other background noise such as traffic noise. Note that construction noise often varies significantly on a day-to-day basis, and the noise levels shown in **Table 7-3** represent a worst-case scenario. Such worst-case scenarios would likely exist only for short periods at any particular residence on a given day. During these times, outdoor activities at the affected residences would be negatively affected by noise and indoor activities (typically 20 to 25 dBA quieter than outdoor noise levels) could be negatively affected. These construction noise levels, especially if they were to occur during the nighttime hours, could cause sleep disturbance to nearby residences. Construction noise on typical days off including Sundays and Holidays could also be annoying to nearby residences and therefore this impact would be potentially significant.

TABLE 7-3
TYPICAL NOISE LEVELS FROM CONSTRUCTION ACTIVITIES

Construction Phase	Noise Level[a] (dBA, Leq)
Ground clearing	84
Excavation	89
Foundations	78
Erection	85
Finishing	89

[a] Average noise levels correspond to a distance of 50 feet from the noisiest piece of equipment associated with a given phase of construction and 200 feet from the rest of the equipment associated with that phase.

SOURCE: Bolt, Baranek, and Newman, 1971; Cunniff, 1977.

TABLE 7-4
TYPICAL NOISE LEVELS FROM CONSTRUCTION EQUIPMENT

Construction Equipment	Noise Level[a] (dBA, Leq at 50 Feet)
Dump truck	88
Portable air compressor	81
Concrete mixer (truck)	85
Scraper	88
Jackhammer	88
Dozer	87
Paver	89
Generator	76
Backhoe	85
Rock Drilling	98

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a Average noise levels correspond to a distance of 50 feet from the noisiest piece of equipment associated with a given phase of construction and 200 feet from the rest of the equipment associated with that phase.

SOURCE: Bolt, Baranek, and Newman, 1971; Cunniff, 1977.

Mitigation Measures

Measure 7.1a: Construction activities shall be limited to the hours between 7 a.m. and 7 p.m., Monday through Saturday, or an alternative schedule established by the local jurisdiction, or other limits to construction hours normally enforced by the local jurisdiction (see Measure 7.1d below).

Measure 7.1b: Construction equipment noise shall be minimized by muffling and shielding intakes and exhaust on construction equipment to a level no less effective than the manufacture's specifications, and by shrouding or shielding impact tools.

Measure 7.1c: Construction contractors within 750 feet of sensitive receptors shall locate fixed construction equipment, such as compressors and generators, and construction staging areas as far as possible from nearby sensitive receptors.

Measure 7.1d: Construction contractors shall comply with all local noise ordinances and regulations.

Impact Significance After Mitigation: Less than Significant

Implementation of the mitigation measures listed 7.1a-d would significantly reduce construction-related noise impacts by locating staging areas away from adjacent residences when necessary, and prohibiting construction activities during the most noise-sensitive hours of the day. Implementation of these mitigation measures would reduce this impact to less than significant.

Impact 7.2: Noise from operation of AD facilities could substantially increase ambient noise levels at nearby land uses or result in noise levels in excess of standards in local general plans, local noise ordinances, or other applicable standards. (Significant)

Stationary Noise

Operations of facilities could generate noise at sensitive receptors that exceed local regulations and codes. Operational activities associated with the project that would generate noise include pre-processing, vehicle circulation, and the operation of certain mechanical equipment such as stationary pumps, motors, compressors, fans, generators, and other equipment. Operation of pipelines would not result in any discernible noise. Noise impacts would be limited to inspection of pipelines during daytime hours and would be temporary.

Pre-processing activities include noise generating steps such as sorting and grinding. The amount of pre-processing equipment would differ from facility to facility; furthermore, pre-processing activities could occur prior to delivery to the AD facility, thus eliminating pre-processing noise at these locations. Some equipment such as electrical generators operates 24-hours a day, creating operational noise during night time hours. In areas with local general plans, ordinances, or where other applicable standards are available, they shall apply to project operations. Where regulations are not available, continuous noise levels should not exceed the constant background level (for sites near traffic noise) or 45 decibels at sensitive receptors.

Mitigation Measure

> **Measure 7.2:** AD facilities located within 2,000 feet of a sensitive receptor shall conduct a site specific noise study. If operational sound levels would exceed local regulations, or 45 dBA at a sensitive receptor (if no regulations are available), additional sound-proofing such as enclosures, muffling, shielding, or other attenuation measures shall be installed to meet the required sound level.
>
> **Impact Significance After Mitigation:** Less than Significant
>
> Implementation of the mitigation measures 7.2 would reduce operation-related noise to below local regulations, and would reduce this impact to less than significant.

Impact 7.3: AD facility operational activities associated with transportation would not increase ambient noise levels at nearby land uses. (Less than Significant)

Transportation Noise

It is not anticipated that implementation of the project would result in large numbers of new employees or truck trips. Therefore operational vehicle trip increases would be minimal and would not generate a substantial increase in noise along local roadways. Because of the low number of trips associated with the AD facilities, noise levels on roadways would not be expected to increase by more than 3 dBA. This impact would be less than significant.

Mitigation: None required.

Impact 7.4: Development of AD facilities could result in a cumulative increase in noise levels. (Significant)

Cumulative impacts refer to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts (CEQA Guidelines §15355).

The scope of cumulative construction noise impacts is construction noise from AD facilities, and pipelines combined with construction noise from other projects within the vicinity of the project area. This combination of noise could affect existing ambient noise conditions at or near the construction site. If construction of the project coincides with and affects the same sensitive receptors as construction noise from other projects, this cumulative impact could be significant. Mitigation Measure 7.4 would restrict construction activities to daytime hours for AD facilities, and would reduce the cumulative construction noise impact to less than significant.

The scope of cumulative operational noise impacts is operational noise from AD facilities combined with operational noise from other stationary or mobile sources in the project area. These other sources may contribute considerably to unacceptable ambient noise levels. However, with implementation of Mitigation Measure 7.4, operation of AD facilities would not result in significant increases in operational noise. Therefore, the contribution of noise from AD facilities would not contribute to any cumulative operational noise impact and would be less than significant.

Mitigation Measure

Measure 7.4: Implement Mitigation Measures 7.1a through 7.1d and Measure 7.2.

Impact Significance After Mitigation: Less than Significant

7.3 References

Caltrans, 1998. Technical Noise Supplement by the California Department of Transportation Environmental Program Environmental Engineering-Noise, Air Quality, and Hazardous Waste Management Office. October 1998.

ESA, 2010. Field Measurement Results: Dairy Digestion Facility Tour (Fiscalini, Castelanelli Brothers, and Tollenaar Holsteins Dairies) April 8, 2010. Compiled by Donald Ambroziak (ESA). April 2010.

Federal Interagency Committee on Noise, 1992. *Effects of Aviation Noise of Awakenings from Sleep*. Washington, DC: FICON.

Federal Transit Administration (FTA). 2006. *Transit Noise and Vibration Impact Assessment,* May 2006.

Gordon Bricken & Associates. 2003. *Acoustical Analysis Materials Recovery Facility Second MRF Building Bin Manufacturing Facility and Maintenance Building County of Los Angeles.*

U.S. Department of Transportation, Federal Transit Administration, 2006.Transit Noise and Vibration Impact assessment, FTA-VA-90-1003-06, May 2006.

U.S. Environmental Protection Agency,1978. Protective Noise Levels Condensed Version of EPA Levels Document.

CHAPTER 8

Public Services and Utilities

8.1 Environmental Setting

The following is a discussion of the impact of the project on public services and utilities. Setting information and impact analysis is provided for relevant issues including water, wastewater, stormwater drainage, solid waste, natural gas, electricity, and fire protection.

Water Supply

Potable water and non-potable water within California are supplied by many purveyors. Public or quasi-public facilities in urban/developed areas typically receive water from a municipal system and may receive reclaimed water if it is available. Public or quasi-public facilities located in urban transition areas may have on-site water facilities such as groundwater wells if water infrastructure from a municipal system has not been extended to the site.

Wastewater

Wastewater service within California may be provided by either a public or private system. Public or quasi-public facilities within urban/developed area are typically connected to a municipal system. Public or quasi-public facilities in urban transition areas may use on-site septic systems for domestic wastewater (such as restroom facilities) if wastewater infrastructure for a municipal system has not been extended to the site.

Stormwater Drainage

Urban/developed areas typically contain linked storm drain systems where stormwater is aggregated and treated by the local jurisdiction. Water quality treatment and flow reduction measures are incorporated into projects as required by local ordinances and the Regional Water Quality Control Board (RWQCB). Rural areas are not typically connected to public storm drain system and incorporate facilities on site in accordance with local ordinances and the RWQCB. These may include vegetated swales, oil/water separators, sediment detention/retention basins, among others.

Solid Waste

According to the California 2008 Statewide Solid Waste Characterization Study, approximately 35 million tons of waste are disposed annually in California landfills (CalRecycle, 2009a). The compostable organic portion comprises approximately 25% (CalRecycle, 2009b). CalRecycle is the State agency which administers programs formerly managed by the State's Integrated Waste Management Board and Division of Recycling. Under its Strategic Directive 6.1, CalRecycle seeks to reduce by 50 percent the amount of organic waste disposed in the state's landfills by 2020.

One technology for reducing organic waste in landfills is anaerobic digester (AD) facilities, for which this Program EIR has been prepared. There are currently no full-scale AD facilities in California devoted to processing the organic portion of municipal solid waste, though they are used in other countries and pilot-scale projects have been developed in California and other parts of the U.S. As discussed more extensively in Section 3.13, the proposed AD facilities could be regulated under CalRecycle's existing composting and transfer/processing regulations.

Natural Gas

Natural gas service is provided by several providers in California. The largest providers include Pacific Gas and Electric (PG&E), Southern California Gas Company, San Diego Gas and Electric (SDG&E) and Southwest Gas Corporation (CEC, 2008). Most properties in rural areas do not utilize natural gas, as they are not connected to a distribution network, though they may be located in proximity to a larger transmission pipeline. The California Energy Commission (CEC) publishes an updated map of major natural gas transmission pipelines in California on its website (CEC, 2010a).

Electricity

There are several electricity providers in California that serve both urban and rural areas. The largest providers in the State include PG&E, Southern California Edison, Los Angeles Department of Water & Power, SDG&E, and Sacramento Municipal Utility District, though there are many smaller providers (CEC, 2010b). As with natural gas, CEC publishes an update map of major electric transmission facilities.

Fire Protection

Local fire protection services are provided by many agencies within the California, including municipal fire departments, California Department of Forestry and Fire, fire districts, and volunteer departments. Services provided by fire protection services include building inspections during construction, fire suppression, emergency medical response, and hazardous materials response (CSFM, 2010).

Regulatory Requirements

Federal

There are no federal regulations which apply to this discussion.

State

California Composting and Transfer/Processing Regulations

CalRecycle’s existing composting and transfer/processing regulations apply to the proposed project. These regulations are discussed in more detail in Section 3.13. CalRecycle’s compostable material handling, design and operations regulatory requirements are located at Title 14 California Code of Regulations (CCR) Section 17850 et seq. The transfer/processing regulatory requirements are located at Title 14 CCR Section 17400 et seq.

California Public Utilities Commission

The California Public Utilities Commission (CPUC) primarily regulates the provision of investor owned utilities in California. These utilities include privately owned telecommunications, electric, natural gas, water, railroad, rail transit, and passenger transportation companies. The CPUC is responsible for assuring that California utility customers have safe, reliable utility services at reasonable rates, protecting utility customers from fraud, and promoting the health of California’s economy (CPUC, 2010). General Order No. 112-E includes the State rules on Testing, Operation and Maintenance of Gas Gathering, Transmission and Distribution Piping Systems.

Local Jurisdictions

Local agencies that regulate public services and publicly-owned utility systems include county fire departments and fire districts, county water departments and water districts, county environmental health departments for wells and septic systems, and county flood management departments and drainage districts for flood protection and drainage services. Local agencies regulate facilities within their jurisdiction by enforcing State and local laws and ordinances. Local agencies currently adopt and enforce the 2007 California Fire Code (Title 24 California Code of Regulations Part 9; CBSC, 2010). Local jurisdictions also provide goals, objectives and policies related to public services and utilities in the jurisdiction’s general plan.

8.2 Impacts and Mitigation Measures

Approach and Methods

This evaluation was performed considering the potential locations (co-located with permitted solid waste facilities or located in areas zoned for industrial or solid waste handling activities), applicable regulations and guidelines and typical construction activities and operations of AD facilities. In determining the level of significance, the analysis assumed that the AD facilities would comply with relevant federal, State, and local laws, regulations, ordinances and guidance.

To assess potential impacts, ESA completed a literature review of documents including feasibility studies and overviews of AD facilities. ESA also consulted with members of the Technical Advisory Group for the EIR including persons currently involved in the permitting or environmental documentation for siting AD facilities.

Thresholds of Significance

An impact related to public services and utilities would be considered significant if it would result in any of the following, which are adapted from Appendix G of the CEQA *Guidelines*:

- Result in substantial adverse physical impacts associated with the provision of, or the need for, new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for fire protection, police protection, schools, parks or other public facilities
- Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board
- Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects
- Require or result in the construction of new storm water drainage facilities, or expansion of existing facilities, the construction of which could cause significant environmental effects
- Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed
- Result in a determination by the wastewater treatment provider that would serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments
- Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs
- Comply with federal, state and local statutes and regulations related to solid waste
- Require or result in the construction of new sources of energy supplies or additional energy infrastructure capacity the construction of which could cause significant environmental effects
- Conflict with applicable energy policies or standards

The discussion of environmental impacts is limited to those potential impacts that could result in some level of potentially significant environmental change, as defined by CEQA Guidelines (§15382). The following issues were evaluated to have less than significant or no impact and will not be discussed further within the EIR for the following reasons:

> *Police Protection.* AD facilities would require law enforcement services to a similar extent as other businesses, such as patrol services and infrequent calls for service; the project does not present unique issues which would create significant demands on law enforcement services.
>
> *Schools and Parks.* The proposed AD facilities are not anticipated to increase demands for schools or parks as the project is proposed to divert organics from the existing waste stream and not to induce new growth; thus, the project would not increase demands for school or park facilities.
>
> *Solid Waste Facilities.* The AD process results in mass reduction of solid waste, and thus by using AD facilities, there would be a net decrease in the amount of waste which would normally be sent to landfills or other solid waste facilities. Additionally, while landfill disposal or composting is an option for disposal or reuse of digestate, there are other options including use as a soil amendment and discharge to a wastewater treatment facility which would further reduce demands on solid waste facilities from what they are currently.
>
> *Solid Waste Regulations.* As discussed in Section 3.13, the proposed AD facilities could be regulated under CalRecycle's existing compostable material handling and transfer/processing regulations and thus no conflict with existing regulations would occur from the project.
>
> *Energy Policies or Standards*. The project may indirectly facilitate the production of biogas and biomethane within the project area. This would be beneficial in helping to meet the California's Renewable Portfolio Standard. If a facility proposes to inject conditioned biogas into a natural gas pipeline, the developer is required to provide evidence to the purchasing utility that the biogas meets the utilities quality standards. No conflicts with existing energy policy or standards would occur and thus there would be no impact.

This chapter discusses the impacts to water, wastewater treatment and stormwater treatment facilities and utility requirements from a utilities capacity perspective. The anticipated impacts upon surface water quality and groundwater quality from AD facilities are discussed within **Chapter 6**, Hydrology.

Impact Analysis

Impact 8.1: The project would not substantially increase demands on fire protection services. (Less than Significant)

Construction and operation of AD facilities would need to adhere to the building code and the fire code adopted by the relevant local jurisdiction. Building and fire inspections would be conducted during construction of AD facilities to ensure code compliance and thereby reduce the risk of fire/explosion hazards associated with new facilities. Hazardous issues associated with biogas production and distribution are addressed in Chapter 11, Hazards and Hazardous Materials.

The project would require similar fire protection services as other businesses. Fire protection services are funded though local impact/mitigation fees and property taxes, to which the project would contribute. The on-site flare periodically required for burning excess gas may be visible at night from off-site areas leading to increased calls to the local fire district/department from concern of a potential fire; however, no physical response would be required. Because the project is not likely to require a substantial need for additional response from local fire service providers, this impact is considered less than significant. However, calls to local fire agencies can be reduced through implementation of Mitigation Measures 10.1b and 10.3c as discussed below.

Mitigation: None required.

While no mitigation is required, Mitigation Measures 10.1b and 10.3c recommend the use of berms or landscaping to minimize views of the facility and the enclosure of flares, which would reduce the likelihood of calls from the general public related to the flare. After implementation of these mitigation measures this would remain a less-than-significant impact.

Impact 8.2: The project could potentially exceed wastewater treatment requirements of the Regional Water Quality Control Board (RWQCB). (Significant)

There are various options for reuse or disposal of the digestate by-product from operation of the proposed facilities. One option is to send a portion or all of the digestate by-product to a wastewater treatment plant via trucks or sewer line. The quality of the digestate is dependent on many factors including feedstocks used, pre-processing methods, and the specific AD technology which is in use. The digestate may require pre-treatment prior to acceptance by a municipal wastewater treatment provider, for example, to reduce biological oxygen demands or remove contaminants, in order for the wastewater treatment facility to meet the treatment/disposal requirements of the RWQCB. For this reason, this is a potentially significant issue for projects proposing to convey digestate to a wastewater treatment provider. It should be noted that AD facilities which do not propose to send digestate by-product to a wastewater treatment plant would have a less-than-significant impact.

Mitigation Measures

Measure 8.2a: Implement Mitigation Measure 8.3b if the operator does not have an existing agreement, such as for co-located facilities.

Measure 8.2b: In addition to an agreement for service, coordination with the wastewater treatment provider would be needed to determine if pre-treatment would be required to meet the RWQCB requirements for the existing wastewater treatment facility.

Impact Significance After Mitigation: Less than Significant

With an agreement for service and coordination regarding the quality of the digestate conveyed to the wastewater treatment facility, this impact would be reduced to a less-than-significant level.

Impact 8.3: The project could result in significant environmental effects from the construction and operation of new water and wastewater treatment facilities or expansion of existing facilities. (Significant)

Development of AD facilities co-located with existing permitted solid waste facilities would not increase water or wastewater treatment demands substantially above those levels already needed for the existing facilities. Potential new sources of water and wastewater treatment demands include the following:

- Water for Feedstock – Due to the high liquid content of organics, it is unlikely that a significant amount of water would be needed for pre-processing or during the AD process. Non-potable or recycled water could also be used, for example from liquid produced after dewatering digestate in the post-processing phase.
- Wastewater Treatment – The digestate (liquid and solid waste) produced from the AD facility would receive anaerobic treatment. Depending on the feedstocks and process used, the digestate may require additional treatment. A facility operator may choose to send digestate to a wastewater treatment plant which would require coordination with the wastewater treatment provider. This impact is assessed separately under Impact 8.2. There are other options for digestate disposal including disposal to agricultural crops or use as a soil amendment, and thus coordination would not be required for all cases.
- Domestic Water and Wastewater Demands for Employee Facilities (such as restrooms) – Due to the limited number of employees, these demands could be satisfied by the facilities needed for existing solid waste facilities and would not likely require additional treatment capacity.
- Water for Fire Suppression – Fire suppression demands could be satisfied by water already needed for the existing facilities.

Thus, for co-located facilities, the demand for new water and wastewater treatment and expansion facilities is anticipated to be less than significant as water and wastewater service is provided to an existing facility on-site, and the project represents a minor increase in demands.

The development of independent AD facilities could require new water and wastewater treatment facilities or connection to a municipal system. Potential new sources of water and wastewater treatment demands include water for feedstock, wastewater treatment for digestate (see Impact 8.2), domestic water/wastewater demands, and water for fire suppression as discussed above for co-located facilities. Private water and wastewater facilities (such as an on-site groundwater wells or septic systems) would need to be evaluated at the project level. It is assumed these types of facilities would be part of a project plan submitted for local site plan review and would be constructed to the standards of the applicable local jurisdiction which would reduce impacts to a less-than-significant level. For service from a municipal system, the developer would need to ensure that service is available with adequate treatment capacity and thus this impact is potentially significant.

Mitigation Measures

Measure 8.3a: If the project proposes to obtain water from a water supplier (municipal system or other public water entity), the developer would enter into an agreement for service with the supplier.

Measure 8.3b: If the project proposes to obtain wastewater service from a wastewater treatment provider (municipal or other public entity), the developer would enter into an agreement for service with the provider.

Impact Significance After Mitigation: Less than Significant

Impact 8.4: The project would not result in significant environmental effects from the construction of new stormwater treatment facilities or expansion of existing facilities. (Less than Significant)

The development of an AD facility would increase impermeable surfaces. On-site water quality treatment and flow control would be needed through development of on-site stormwater treatment facilities or expansion of facilities at a co-located facility. These facilities would be sized based on the individual project and would need to be evaluated further at the project level. Stormwater facilities would be part of the project plans submitted for local site plan review and would be constructed to the standards of the applicable jurisdiction and RWQCB. As this condition must be met, the impact would be less than significant.

Mitigation: None required.

Impact 8.5: The project would not require significant levels of new or expanded water supply resources or entitlements. (Less than Significant)

As discussed in Impact 8.3, there would be little to no increase in water demands for AD facilities co-located with permitted solid waste facilities, and thus these types of facilities would have a less-than-significant effect on expanded water supplies or entitlements.

As discussed in Impact 8.3, development of independent AD facilities could create water demands for dilution of feedstock, domestic water uses and fire suppression. These demands are similar to other businesses which could be established in an industrial area. New or expanded water supply resources or entitlements could be needed for projects without access to a municipal provider which would need to establish a groundwater well. The establishment of a groundwater well would need to be evaluated at the project level. It is assumed these types of facilities would be part of a project plan submitted for local site plan review and would be constructed to the standards of the applicable local jurisdiction which would reduce impacts to a less-than-significant level. However, most facilities would not require establishment of a groundwater well as most industrial properties have or are near a municipal water connection.

Mitigation: None required.

Impact 8.6: The project could result in exceeding the capacity of a wastewater treatment provider. (Significant)

As discussed in Impact 8.3, use of a wastewater treatment provider is an option for digestate disposal in addition to demands from domestic uses (such as restrooms). As the developer would need to ensure that adequate wastewater conveyance and treatment capacity is available, this impact is potentially significant.

Mitigation Measure

> **Measure 8.6:** If the project proposes to obtain wastewater service from a wastewater treatment provider (municipal or other public entity), implement Mitigation Measure 8.3b.
>
> **Impact Significance After Mitigation:** Less than Significant

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Impact 8.7: The project could result in the construction of new energy supplies and could require additional energy infrastructure. (Significant)

The project could facilitate the construction of new energy supplies within the project area through the production of biogas as part of the AD process. The energy created from biogas at AD facilities is considered renewable. As there is currently a demand for renewable energy in California, there is a beneficial effect to providing energy from renewable resources. It is assumed that projects located in existing facilities or in industrial areas would be in proximity to electricity infrastructure, however accessing additional power on-site or generating electricity to export from the project could require additional energy infrastructure, with potentially significant impacts from construction.

The amount of energy infrastructure needed would be dependent on how the biogas is used. As an energy source, biogas may be used in internal combustion engines to produce electricity, conditioned to biomethane for use in fuel cells or in natural gas vehicles, or conditioned to biomethane for injection into natural gas pipelines. The need for additional infrastructure for each of these uses is described in greater detail below.

Biogas uses that would not require substantial off-site infrastructure improvements include the production of electricity through the combustion of biogas in internal combustion engines and the upgrading of biogas to biomethane for use in fuel cells or in natural gas vehicles. The construction of the facilities for each of these options could have less-than-significant environmental effects.

As described previously, biogas may also be conditioned to biomethane and then injected into existing and future natural gas pipelines. The conditioning of biogas could occur at AD facilities, or it may be collected as raw biogas and conditioned at an off-site facility. After processing, the biomethane would then likely need to be piped (at least short distances) from the facility to natural gas pipelines. Each of these production scenarios would require the construction of new energy infrastructure, such as pipelines, to connect to the existing gas utility network. Likewise, if biogas is converted into electricity on site and sold to a utility provider, then off-site infrastructure, or upgrades to existing off-site electrical distribution infrastructure, may be needed.

The development of new energy infrastructure or expansion of existing energy infrastructure on-site or off-site has the potential to cause significant impacts to biological, cultural, air quality, and/or other environmental resources. Typically, energy infrastructure can be located within existing easements or rights-of-way (i.e., public roads or utility easements). Specific impacts associated with off-site energy improvements would be evaluated at the project level during the local project review process. Mitigation Measure 8.7 would reduce impacts associated with the construction of off-site energy infrastructure improvements to less than significant.

Mitigation Measure

> **Measure 8.7:** Projects requiring off-site energy infrastructure must complete CEQA review for the proposed energy improvements as a separate project. Infrastructure improvements may qualify as a categorical exemption pursuant to CEQA.
>
> **Impact Significance After Mitigation:** Less than Significant

Impact 8.8: Development of AD facilities would not contribute to cumulative impacts to public services and utilities. (Less than Significant)

AD facilities are anticipated to be dispersed throughout California similar to existing solid waste facilities. As with other types of development, the development of an AD facility may have cumulatively significant impacts when considered with other past, present and future actions in the vicinity of the project as detailed below. Implementation of the applicable mitigation measures above would reduce the project's contribution to cumulative impacts to a less-than-significant level.

Mitigation: None required.

8.3 References

California Building Standards Commission (CBSC), 2010. California Building and Fire Code, available online at: http://www.bsc.ca.gov/default.htm, accessed June 01, 2010.

California Energy Commission (CEC), 2008. California Natural Gas Detailed Utility Service Areas Map, September 2008, available online at: http://www.energy.ca.gov/maps/gasmap.html, accessed June 01, 2010.

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California State Fire Marshall (CSFM), 2010. Mission and Programs of the State of California Office of the State Fire Marshall, available online at: http://osfm.fire.ca.gov/, accessed June 01, 2010.

CHAPTER 9

Transportation

9.1 Environmental Setting

Regional and Local Roadways

The network of regional and local roadways in areas potentially affected by the project consists of Interstate freeways, state highways, and numerous local roads that are under the jurisdiction of a particular city or county public works department. Local roads provide access to adjacent parcels and also provide a connection between local land uses and major thoroughfares.

Public Transit

Public transit service varies from area to area throughout the state, and while buses might operate in areas potentially affected by the project, the transit service in less built-up areas tends to be less frequent than in urban areas.

Bikeways/Pedestrian Circulation

In built-up areas, bicycle facilities consist of Class I (bicycle paths), Class II (bicycle lanes, striped in roads), and Class III (bicycle routes without striping) bikeways, and pedestrian facilities consist of sidewalks and intersection crosswalks. While rural areas tend to have less of these bicycle and pedestrian facilities, bicyclists often travel on local roads without designated bikeways.

Truck Routes

Cities often develop a truck route plan, which designates truck routes to provide contractors with the preferred travel roadways to and from connecting local roadways. Typically, counties do not develop a similar system of truck routes for unincorporated areas.

Regulatory Requirements

Federal and State

The California Department of Transportation (Caltrans) is responsible for planning, designing, constructing, operating, and maintaining all State-owned roadways. Federal highway standards for interstates are implemented in California by Caltrans. Caltrans' construction practices require temporary traffic control planning "during any time the normal function of a roadway is suspended". In addition, Caltrans has the discretionary authority to issue special permits for the movement of vehicles/loads exceeding statutory limitations on the size, weight, and loading of vehicles contained in Division 15 of the California Vehicle Code. Requests for such special permits require the completion of an application for a Transportation Permit. The California Highway Patrol is notified about transportation of oversize/overweight loads.

State highway weight and load limitations are specified in the California Vehicle Code, Sections 35550 to 35559. The following general provisions would apply to the project:

- The gross weight imposed upon the highway by the wheels on any axle of a vehicle shall not exceed 20,000 pounds, and the gross weight upon any one wheel, or wheels, supporting one end of an axle, and resting upon the roadway, shall not exceed 10,500 pounds.
- The maximum wheel load is the lesser of the following: (a) the load limit established by the tire manufacturer, or (b) a load of 620 pounds per lateral inch of tire width, as determined by the manufacturer's rated tire width.

For vehicles with trailers or semi-trailer, the following provision applies:

- The gross weight imposed upon the highway by the wheels on any one axle of a vehicle shall not exceed 18,000 pounds, and the gross weight upon any one wheel, or wheels, supporting one end of an axle and resting upon the roadway, shall not exceed 9,500 pounds, except that the gross weight imposed upon the highway by the wheels on any front steering axle of a motor vehicle shall not exceed 12,500 pounds, according to California Vehicle Code Sections 35550-35559.

These weight and load limitations for state highways would also apply to county or city roadways if no limitations are specified by the local jurisdiction.

Local Jurisdictions

County and City Land Use Regulations and Ordinances

Local regulations and ordinances vary widely from area to area. Typically, local jurisdictions adopt building, grading, and erosion control ordinances, but no specific ordinances for anaerobic digester (AD) facilities. In addition, local jurisdictions typically require a traffic safety / traffic management plan for any project that includes lane closures, partial road closures, and road closures with detours. An encroachment permit is required for any work to be performed in the roadway right-of-way.

9.2 Impacts and Mitigation Measures

Approach and Methods

This chapter assesses the transportation impacts that could result from the adoption of a comprehensive program to foster the development of AD facilities that process the organic fraction of municipal solid waste and other organic wastes throughout the State of California. As described in Chapter 3, Project Description, the AD Initiative will encourage the establishment of in-vessel digester facilities co-located with permitted solid waste facilities or located in areas zoned for industrial or solid waste handling activities.

Construction and operations of AD facilities would result in increased traffic on roads that provide access to those facility sites. The traffic increases would be greatest for AD facilities developed at new locations, and less when the AD facilities are located at existing solid waste facilities that already receive and handle the mixed solid waste to be used as feedstock for the digester. Due to the geographic scale of the project area and the range of actions that fall within the scope of development of future facilities, this impact analysis was conducted at a programmatic level, and impacts are discussed on a qualitative basis. Assumptions regarding the types of transport and the types of roads used to haul materials were used to assess the overall significance of project impacts. In determining the level of significance, the analysis assumed that the facilities would comply with relevant federal, state, and local ordinances and regulations. It also is assumed that project-level analysis of transportation-related safety hazards (associated with turning movements by large trucks) would be required for site-specific facilities as they are designed and constructed.

Thresholds of Significance

CEQA defines a significant effect on the environment as a substantial, or potentially substantial, adverse change in the physical conditions of the area affected by the project. An impact related to transportation would be considered significant if it would result in any of the following, which are from Appendix G of the CEQA *Guidelines*:

- Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit;
- Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways;
- Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks;
- Substantially increase hazards due to a design feature (e.g. sharp curves or dangerous intersections) or incompatible uses (e.g. farm equipment);
- Result in inadequate emergency access;

- Conflict with adopted policies, plans or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.

Additionally, the Institute of Transportation Engineers recommends the following screening criterion for assessing the effects of development projects that create permanent traffic increases (ITE, 1991):

- In lieu of other locally preferred thresholds, a traffic access/impact study should be conducted whenever a proposed development will generate 100 or more added (new) peak direction trips to or from the site during the adjacent roadway's peak hours or the development's peak hours.

The above criterion is intended to assess the effect of a traffic mix consisting primarily of automobiles and lightweight trucks. To account for the large percentage of heavy trucks associated with the project, the threshold level would reasonably be reduced to 50 new peak-direction trips. Therefore, project-related traffic is considered significant if transporting materials to an off-site location would cause a substantial increase in traffic volumes, defined as the generation of 50 or more trips per hour. Trips using private roads are not counted because that type of travel activity would not affect state, county or other public roadways.

The following discussion of environmental impacts is limited to those potential impacts that could result in some level of potentially significant environmental change, as defined by CEQA. Implementation of the project would not affect air traffic patterns of airports in the project area (bullet 3 above). In addition, implementation of the project would neither directly or indirectly eliminate existing or planned alternative transportation corridors or facilities (e.g., bike paths, lanes, bus turnouts, etc.), include changes in policies or programs that support alternative transportation, nor construct facilities in locations in which future alternative transportation facilities are planned (bullet 6 above). Therefore, no impact would occur under either of these two categories, and these two categories are not discussed further within this section. It is noted, however, that the potential effect of project construction on bus transit service is discussed in Impact 9.1.

Impact Analysis

Impact 9.1: Construction of AD facilities would intermittently and temporarily increase traffic congestion due to vehicle trips generated by construction workers and construction vehicles on area roadways. (Significant)

Although the project being evaluated under this Program EIR does not directly include construction of specific AD facilities, general information about construction is evaluated for facilities that could be developed as a result of the project. The analysis is based on the construction of project facilities as presented in Chapter 3, Project Description. The intensity and nature of the construction activity would vary over the construction period, and the number of vehicle trips generated by that activity would similarly vary. Vehicle trips would be generated primarily by construction workers commuting to and from the AD facility sites, and by trucks hauling materials and equipment to and from the sites.

Construction equipment would be delivered to and removed from each AD facility site in phases for site clearing, grading, excavation and foundation work; structure and building construction; interior, mechanical and electrical work; and finally, for road work, utilities and site finishing / landscaping. Earthwork (cut and fill) is expected to be balanced on-site (i.e., any excavated material cut would be used as fill on-site during the construction process), resulting in no off-hauling of cut or fill material, but that assumption will need to be confirmed during site-specific design of each AD facility.

If biogas at an AD facility is delivered by pipeline offsite, construction activities could include surface preparation, excavation, trench shoring, pipeline installation, trench backfilling, and surface restoration, which may include paving if the pipelines are constructed within roadway rights-of-way. Trenches would be temporarily closed at the end of each work day, by covering with steel trench plates and installing barricades to restrict access to staging areas. Jack and bore drilling may also be required for some areas of pipeline installation.

The primary offsite impacts resulting from the movement of construction trucks would include a short-term and intermittent lessening of roadway capacities due to the slower movements and larger turning radii of the trucks compared to passenger vehicles. Drivers could experience delays if they were traveling behind a heavy truck. The added traffic would be mostly apparent on the minor roadways serving the AD facility sites. Although project-related traffic is unlikely to exceed the threshold of significance of 50 or more trips per hour, project-level analysis of site-specific facilities could determine that addition of project-generated traffic would be considered substantial in relation to traffic flow conditions on local roadways. For this program level analysis, this impact is considered potentially **significant**.

Mitigation Measures

> **Measure 9.1:** The contractor(s) will obtain any necessary road encroachment permits prior to installation of pipelines within the existing roadway right-of-way. As part of the road encroachment permit process, the contractor(s) will submit a traffic safety / traffic management plan (for work in the public right-of-way) to the agencies having jurisdiction over the affected roads. Elements of the plan will likely include, but are not necessarily limited to, the following:
>
> - Develop circulation and detour plans to minimize impacts to local street circulation. Use haul routes minimizing truck traffic on local roadways to the extent possible. Use flaggers and/or signage to guide vehicles through and/or around the construction zone.
> - To the extent feasible, and as needed to avoid adverse impacts on traffic flow, schedule truck trips outside of peak morning and evening commute hours.
> - Limit lane closures during peak traffic hours to the extent possible. Restore roads and streets to normal operation by covering trenches with steel plates outside of allowed working hours or when work is not in progress.
> - Limit, where possible, the pipeline construction work zone to a width that, at a minimum, maintains alternate one-way traffic flow past the construction zone.
> - Install traffic control devices as specified in Caltrans' Manual of Traffic Controls for Construction and Maintenance Work Zones where needed to maintain safe

driving conditions. Use flaggers and/or signage to safely direct traffic through construction work zones.

- Coordinate with facility owners or administrators of sensitive land uses such as police and fire stations, hospitals, and schools. Provide advance notification to the facility owner or operator of the timing, location, and duration of construction activities.
- Coordinate with the local public transit providers so that bus routes or bus stops in work zones can be temporarily relocated as the service provider deems necessary.

Impact Significance After Mitigation: Less Than Significant

Implementation of Mitigation Measure 9.1 would lessen the impacts to traffic flow and congestion on area roadways to a less-than-significant level by avoiding as needed truck trips during peak commute hours, minimizing use of local roads by haul trucks, and coordinating with emergency service providers, schools, and transit providers.

Impact 9.2: AD facility operations would not substantially increase on-going (operational) traffic volumes on roadways serving the facilities. (Significant)

The AD facilities would operate 24 hours a day, but most of the digestion process would be automated, and most traffic activities limited to daytime hours. The expectation is that development of AD facilities (new facilities or located at existing solid waste facilities) would generate fewer than 50 vehicle trips (combined trucks and employee) per hour, which is the threshold of significance. For existing facilities, it is reasonable to expect that most of the traffic will already be coming to the facility, reducing the net increase in traffic volumes on area roads compared to AD facilities sited at new locations in areas zoned for industrial or solid waste handling activities. The trips generated by AD facilities would be assessed under subsequent environmental documents as specific facilities are defined and submitted for approval. As part of those assessments, mitigation measures would be identified, as needed, to reduce impacts to a less-than-significant level. For this program level analysis, this impact is considered potentially **significant**, but reliance on the site-specific analysis and identification of facility-required mitigation measures permits a program-level determination of a less-than-significant impact after mitigation.

Mitigation Measures

Measure 9.2: Measures will be imposed by applicable local agencies, as needed, to address site-specific significant traffic impacts identified during subsequent facility-specific analyses, implementation of which would reduce those impacts to a less-than-significant level.

Impact Significance After Mitigation: Less Than Significant

Implementation of Mitigation Measure 9.2 would lessen the impacts to traffic flow and congestion on area roadways to a less-than-significant level by requiring implementation of measures, as needed, to address site-specific significant traffic impacts identified during subsequent facility-specific analyses.

Impact 9.3: AD facilities could potentially cause traffic safety hazards for vehicles, bicyclists, and pedestrians on public roadways, and could increase traffic hazards due to possible road wear or to accidental spills of digestate (liquids and solids). (Significant)

Neither construction nor operation of AD facilities would likely alter the physical configuration of the existing roadway network serving the area, and would likely not introduce unsafe design features, but trucks generated by the project would interact with other vehicles on project area roadways. Creation of a construction work zone on high-volume roadways would potentially create traffic safety hazards where traffic is routed into the travel lane adjacent to the work zone. Potential conflicts could also occur between construction traffic and bicyclists and pedestrians. For this program level analysis, this impact is considered potentially **significant**.

In addition, construction activity along roads as well as heavy truck traffic delivering equipment and materials to AD facilities sites could result in road wear and damage that result in a driving safety hazard. The degree to which this impact would occur depends on the existing roadway design (pavement type and thickness) and existing condition of the road. Freeways, major arterials and collectors are designed to accommodate a mix of vehicle types, including heavy trucks. The project’s impacts are expected to be negligible on those roads. However, rural roadways may not have been constructed to support the weight and use of large construction equipment. For this program level analysis, this impact is considered potentially **significant**.

The accidental spill of digestate along project-related access roads could create potential safety hazards for other motorists. Although the probability of accidental spills during the transport of materials is anticipated to be low, the consequences of a spill could be substantial, and this impact is considered potentially **significant**.

Mitigation Measures

Measure 9.3a: Implement Measure 9.1, which stipulates actions required of the contractor(s) to reduce potential traffic safety impacts to a less-than-significant level.

Measure 9.3b: Prior to construction, the contractor(s), in cooperation with the agencies having jurisdiction over the affected roadways, will survey and describe the pre-construction roadway conditions on rural roadways and residential streets. Within 30 days after construction is completed, the affected agencies will survey these same roadways and residential streets in order to identify any damage that has occurred. Roads damaged by construction will be repaired to a structural condition equal to the condition that existed prior to construction activity.

Measure 9.3c: Prior to initiation of project operations, the project sponsor(s) will submit a Spill Prevention Plan to the appropriate local agency. The Spill Prevention Plan will include, among other provisions, a requirement that each truck driver know how to carry out the emergency measures described in the Spill Prevention Plan (therefore reducing roadway hazards if an accidental spill were to occur).

Impact Significance After Mitigation: Less Than Significant

> Implementation of Mitigation Measures 9.1, 9.3b and 9.3c would lessen the impacts to traffic safety on area roadways to a less than significant level by using traffic control devices to safely direct vehicular movements through the construction area, by repairing damage to roadway pavement caused by project-generated heavy trucks, and by requiring submittal of a Spill Prevention Plan, as well as by avoiding as needed truck trips during peak commute hours, minimizing use of local roads by haul trucks, and coordinating with emergency service providers, schools, and transit providers.

Impact 9.4: AD facilities could intermittently and temporarily impede access to local streets or adjacent uses (including access for emergency vehicles), as well as disruption to bicycle/pedestrian access and circulation. (Significant)

Operations of project facilities would have no effect on access to local streets or adjacent uses (including access for emergency vehicles). Nor would bicycle/pedestrian access and circulation be adversely affected by facility operations. The project could, however, result in construction of new pipelines within right-of-way of the public roadways. Such construction activity could result in road restrictions that affect the vehicle travel lanes in order to provide adequate construction work area, and could temporarily block vehicle, bicycle and pedestrian access to local streets or property driveways, including access for emergency vehicles. For this program level analysis, this impact is considered potentially **significant**.

Mitigation Measures

> **Measure 9.4:** Implement Measure 9.1, which stipulates actions required of the contractor(s) to reduce potential access impacts to a less-than-significant level.
>
> **Impact Significance After Mitigation:** Less Than Significant
>
> Implementation of Mitigation Measure 9.1 would lessen the impacts to access to local streets or adjacent uses to a less than significant level by coordinating with emergency service providers, including advance notification of the timing, location, and duration of construction activities.

Impact 9.5: The project could contribute to cumulative impacts to traffic and transportation (traffic congestion, traffic safety, and emergency vehicle access). (Significant)

The geographic scope of potential cumulative traffic impacts includes access routes to regional and local roadways used for haul routes and construction equipment/vehicle access throughout the project area. As described under Impact 9.2, operating the facilities associated with the project is expected to generate less-than-substantial increases in traffic volumes on area roadways for various reasons, including the fact that if an AD facility were already an existing solid waste facility, most of the traffic will already be coming to the facility, reducing the net increase in traffic volumes on area roads. While the less-than-substantial increase in traffic volumes associated with individual AD facilities is reasonable for this program-level analysis, determination of the cumulative impact related to the increase in traffic volumes generated by the total number of AD facilities (of different types and character) is speculative at this time. However, given the dispersion of truck trips over the statewide network of roads, and the fact that the vehicle trips would occur over the course of a day, the expectation is that project-related traffic would not exceed the threshold of significance of 50 or more trips per hour, and the contribution to cumulative traffic conditions would be less than significant. As described under Impact 9.2, there would be assessment of cumulative traffic increases under subsequent environmental documents as specific facilities are defined and submitted for approval. As part of those assessments, mitigation measures would be identified, as needed, to reduce impacts to a less-than-significant level.

However, constructing those facilities, also described above, could result in intermittent and temporary traffic-related impacts in the cumulative context. Traffic impacts include temporary increases in traffic congestion, increased potential for traffic safety hazards, and temporary and intermittent impedances to access.

The project has the potential to contribute to potentially significant cumulative construction-related impacts as a result of (1) cumulative projects (such as land development projects) that generate increased traffic at the same time on the same roads as would the proposed project, causing increased congestion and delays; and (2) infrastructure projects in roads that would be used by project construction workers and trucks, which could affect detour routes around project work zones or could delay project-generated vehicles past the work zones of those other projects.

Implementation of circulation and detour plans, installing traffic control devices, and scheduling (to the extent feasible) truck trips outside of peak morning and evening commute hours (as identified in Mitigation Measures 9.1, 9.3b and 9.3c) would reduce the project's contribution to the cumulative impacts. However, some traffic disruption and increased delays would still occur during project construction, even with mitigation. Given the lack of certainty about the timing (and identification) of development of AD facilities, as well as that for other projects within the AD project's vicinity (specifically projects that would overlap), it is prudent to conclude for this program-level analysis that significant cumulative traffic and circulation impacts could occur.

Mitigation Measures

Measure 9.5a: Prior to construction, the project sponsor will coordinate with the appropriate local government departments, Caltrans, and utility districts and agencies regarding the timing of construction projects that would occur near AD project sites. Specific measures to mitigate potential significant impacts will be determined as part of the interagency coordination, and could include measures such as employing flaggers during key construction periods, designating alternate haul routes, and providing more outreach and community noticing.

Measure 9.5b: Implement Mitigation Measure 9.2.

Measure 9.5c: Implement Mitigation Measures 9.1, 9.3b and 9.3c.

Impact Significance After Mitigation: Less than Significant.

Implementation of Mitigation Measure 9.5 would lessen the cumulative impacts to a less than significant level by coordinating mitigating strategies among the concurrent projects.

9.3 References

Institute of Transportation Engineers (ITE), 1991. *Traffic Access and Impact Studies for Site Development – A Recommended Practice*, 1991.

CHAPTER 10
Aesthetics

10.1 Environmental Setting

Visual Landscape

California contains a number of distinct types of landscapes with varying levels of development. For the purposes of the EIR, the visual environment has been divided into several categories based on typical land uses: urban/developed, urban transition, agricultural, and natural open space.

Urban/Developed – Urban/developed areas are typical for incorporated areas within California. These areas include existing commercial, industrial, public and/or residential uses.

Urban Transition – Urban transition or urban fringe areas are located on the edge of urban development and provide a buffer between urban and agricultural or open space uses. Transitional land uses on the edge of urban fringe areas may include commercial, industrial or public uses compatible with agricultural or open space uses.

Agricultural - Agricultural areas are typified by broad open agricultural fields including dairies, cropland, vineyards, orchards, and grazing land. Typical elements include farm structures and equipment and scattered rural residences.

Natural Open Space - Undeveloped natural areas include expanses of valleys, foothills, mountains, deserts, forests, wetlands, and coastal resources among others which are not utilized for agriculture. Some natural open space areas are designated as federal, state or local parklands or recreation areas.

Scenic Roadways

A highway may be designated scenic under California's Scenic Highway Program depending upon how much of the natural landscape can be seen by travelers, the scenic quality of the landscape, and the extent to which development intrudes upon the traveler's enjoyment of the view. The corridor protection program does not preclude development, but seeks to encourage quality development that does not degrade the scenic value of the corridor. Scenic Highways are identified as either eligible (E) for listing or officially designated (OD). A list of eligible and officially designated routes is available on the California Department of Transportation website (Caltrans, 2010).

Anaerobic Digester (AD) Facilities

Descriptions and photographs of typical wet and dry AD facility components are included within Chapter 3, Project Description.

Sensitive Receptors

Sensitive receptors subject to the potential effects of visual changes resulting from the project include travelers along local roadways and regional highways as well as residents living near new AD facilities. Given the programmatic nature of this analysis, specific locations of potential receptors cannot be identified at this time.

Regulatory Requirements

Federal

There are no federal aesthetic regulations applicable to this program.

State

California Department of Transportation – California Scenic Highways Program

California's Scenic Highway Program, run by Caltrans, was created by the Legislature in 1963. Its purpose is to protect and enhance the natural scenic beauty of California highways and adjacent corridors, through special conservation treatment. The State laws governing the Scenic Highway Program are found in the Streets and Highways Code, §260 through §263. Responsibility for the development of scenic highways, and the establishment and application of specific planning and design standards and procedures falls to State and local agencies.

Local Jurisdictions

California counties and cities have general plan documents which provide guidance and policies related to land use. Some general plans may designate scenic vistas or corridors in addition to those recognized at the state level. Local zoning ordinances establish design guidelines such as minimum setbacks, maximum height requirements, maximum density and/or landscaping requirements.

10.2 Impacts and Mitigation Measures

Approach and Methods

The following program-level evaluation of aesthetic impacts was conducted using available research and consultation with technical professionals who have visited pilot-scale and full-scale AD facilities.

The impact analysis focuses on foreseeable changes to existing conditions attributable to the project. At the program-level site-specific conditions are unknown but it is assumed that most projects would be proposed in urban/developed or urban transition areas or co-located with other solid waste facilities.

The evaluation assumes that individual projects would perform required design review (including review of minimum setbacks, maximum height requirements, maximum density and/or landscaping requirements) although specific requirements are unknown as they vary by jurisdiction. The evaluation also assumes individual projects would comply with applicable ordinances related to lighting (such as night-sky ordinances).

Thresholds of Significance

An impact related to aesthetics would be considered significant if it would result in any of the following, which are adapted from Appendix G of the CEQA *Guidelines*:

- Have a substantial adverse effect on a scenic vista;
- Substantially damage scenic resources, including but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway;
- Substantially degrade the existing visual character or quality of the site and its surroundings; or
- Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

Impact Analysis

Impact 10.1: AD facilities could have adverse effects on a scenic vista and/or scenic resources. (Significant)

If AD facilities are located in an urban/developed, urban transition, or other area with an existing permitted solid waste facility, significant effects to scenic vistas or resources would not be expected due to existing development or planned development on the site and in the vicinity. However, this impact must be evaluated further at the individual project level. At the individual project level, impacts to scenic vistas and resources could occur from construction, pre-processing equipment (grinding, screening, sorting, etc.), buildings and/or structures (digester, administrative facilities), or biogas equipment (gas boosters, fuel cells, flares, IC engines, etc). These activities and facilities could interfere with existing views of scenic vistas or resources and thus this impact is potentially significant.

Mitigation Measures

Measure 10.1a: Avoid siting AD facilities near scenic vistas and corridors designated within an applicable land use plan and the State Scenic Highway Program.

Measure 10.1b: Landscaping and/or vegetated berms should be used to minimize views of facilities from sensitive views.

Impact Significance After Mitigation: Less than Significant

Implementation of these mitigation measures would reduce impacts to scenic vistas and resources to a less-than-significant level.

Impact 10.2: AD facilities could degrade the existing visual character/quality of the site and its surroundings. (Significant)

The visual character of an AD facility would be similar to many large-scale permitted solid waste facilities. Pre-processing and post-processing may be done either on a pad or in a building. The digestion process would occur within a tank (wet processes) or other enclosed facility (dry processes). AD activities and facilities could potentially affect sensitive viewsheds such as residences or views along a scenic corridor. Potential concerns include the following:

- Litter - Any facility receiving solid waste needs to be concerned with the potential for blowing litter. This is particularly true if the facility uses an outdoor or unenclosed tipping area. Outdoor pre-processing equipment (grinding, screening, sorting, etc) can also be a source of blowing litter.
- Piling - Handling and storage of feedstock and digester byproducts can create visibly deteriorated site conditions if outdoor piling occurs.
- Buildings – AD facilities could include administrative buildings or buildings that enclose operations. These buildings have the potential to degrade visual quality based on the height and design of the buildings.
- Cylindrical Tanks (Wet processes) – The tanks that enclose wet digester processes can be large in order to hold substantial processed feedstock. These tanks have the potential to degrade the character of areas without existing facilities of this scale. An extensive literature review shows variations of tanks ranging from 20 feet to 75 feet in height. Tank size is dependent on a number of factors including planned capacity, specific technology, number of tanks and diameter. For example, based on a range of digester technologies it is estimated that an 18,000 ton per year digester would be approximately 25 to 33 feet in height (Remade Scotland, 2003). The Ecoparc Montcada in Barcelona, an example of a large AD facility, has a treatment capacity of 240,000 tons per year (Valorga International, 2011) and includes three digester tanks which are 75 feet in height (Columbia University, 2005).
- Flare - Outdoor processing of biogas could also affect surrounding views. Post-processing facilities would require an outdoor gas booster pump and flare to combust raw biogas; facilities conditioning biogas would still require flare facilities in the event of equipment failure. Effects from flare are specifically addressed in Impact 10.3.

This is a potentially significant impact to the site character that would be reduced through mitigation to less than significant.

Mitigation Measures

Measure 10.2a: Implement Mitigation Measures 10.1a and 10.1b above.

Measure 10.2b: Facilities using truck tippers or other un-enclosed unloading should consider using litter fences to manage blowing litter. Facilities should educate haulers delivering materials to the AD facility through literature, web links, or provide training on the acceptance of waste at the facilities to minimize litter. Facility operators should develop a protocol to identify feedstocks that are severely contaminated with potential litter and reject unacceptable loads.

Measure 10.2c: Clean-up crews can be used as necessary to control litter.

Measure 10.2d: Feedstocks and digestate byproducts should be stored in enclosed facilities or processed in a timely manner to prevent visibly deteriorated site conditions.

Measure 10.2e: Project operators should consider enclosure of pre-processing operations if it provides an aesthetic and/or noise attenuating benefit.

Impact Significance After Mitigation: Less than Significant

The implementation of these mitigation measures would reduce impacts to the visual character/quality of the site and surroundings to a less-than-significant level.

Impact 10.3: AD facilities could create a new source of light or glare with adverse affects to daytime and/or nighttime views. (Significant)

Project operations may require the use of portable or permanent outdoor lighting during low light conditions or nighttime for safe operations. This may be a source of concern in light sensitive areas (such as areas near observatories, residences, roads or in rural locations). Additionally, flares from biogas processing may be visible, particularly at night. An example of a flare from an AD facility can be seen below in **Figure 10-1**. This impact is potentially significant.

Mitigation Measures

Measure 10.3a: Implement 10.1b above.

Measure 10.3b: Any lighting (portable or permanent) should be hooded and directed onto the project site. This would reduce effects to nighttime skies from uplighting, reduce glare, and prevent light from spilling onto adjoining properties and roads.

Measure 10.3c: Flares may be enclosed to reduce the visibility of flames during operation.

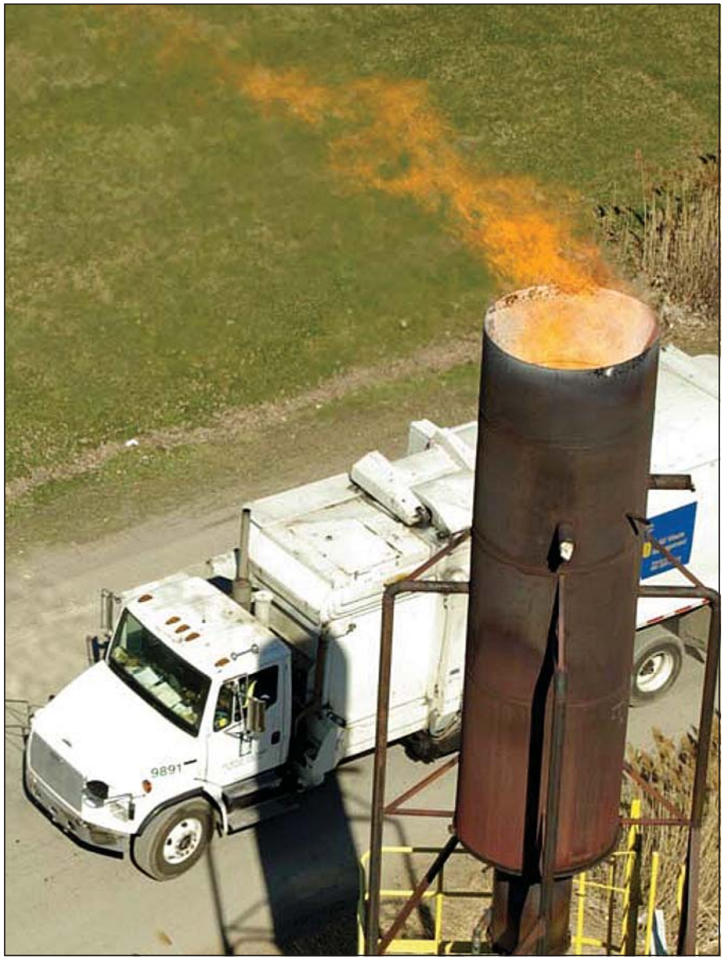
Impact Significance After Mitigation: Less than Significant

The implementation of these mitigation measures would reduce impacts from light and glare to a less-than-significant level.

Impact 10.4: The project could result in cumulative impacts to visual resources. (Significant)

Future development is guided by city and county General Plans, and other applicable planning and environmental documents. New development would be subject to the local jurisdiction’s design review process and lighting regulations if established. While AD facilities would be spread throughout the State, individual projects have the potential to cumulatively impact visual resources at the project-

PHOTOGRAPH 1. Dufferin facility in Toronto, Canada (City of Toronto, 2009).



PHOTOGRAPH 2. Flare at Dufferin facility (City of Toronto, 2009).

SOURCE: ESA, 2010

Figure 10-1
Dufferin Facility Photographs

level when combined with other development in the vicinity of the proposed AD facility. For example, several projects including an AD facility may be proposed in a previously undeveloped area or within a scenic area. While these cumulative impacts have the potential to be significant, incorporation of the mitigation measures in this chapter (10.1a, 10.1b, 10.2a, 10.2b, 10.2c, 10.2d, 10.2e, 10.3a, 10.3b, 10.3c) would reduce the project's contribution to a less-than-significant level.

Mitigation Measures

> **Measure 10.4:** Implement Mitigation Measures 10.1a, 10.1b, 10.2a, 10.2b, 10.2c, 10.2d, 10.2e, 10.3a, 10.3b, and 10.3c, above.
>
> **Impact Significance After Mitigation:** Less than Significant
>
> The implementation of these mitigation measures would reduce the project's contribution to cumulative aesthetic impacts to a less-than-significant level.

10.3 References

Caltrans, 2010. Eligible (E) And Officially Designated (OD) Routes http://www.dot.ca.gov/hq/LandArch/scenic/cahisys.htm. Last updated May 19, 2008.

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CHAPTER 11
Hazards and Hazardous Materials

11.1 Environmental Setting

For the purposes of this analysis, the term “hazardous materials” refers to both hazardous materials and hazardous wastes. Under federal and State laws, any material, including wastes, may be considered hazardous if it is specifically listed by statute as such or if it is toxic (causes adverse human health effects), ignitable (has the ability to burn), corrosive (causes severe burns or damage to materials), or reactive (causes explosions or generates toxic gases). The term “hazardous material” is defined as any material that, because of quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment.[1]

Potential Presence of Hazardous Materials in Soil and Groundwater

Hazardous materials, including but not limited to pesticides and herbicides, heavy metals, volatile organic compounds, oil and gas, may be present in soil and groundwater in areas where land uses have resulted in leaking fuel or chemical storage tanks or other releases of hazardous materials have occurred. Land uses that typically involve the handling of hazardous materials include commercial or industrial operations, as well as agricultural areas where soils may contain pesticides and herbicides.

Various federal, State, and local regulatory agencies maintain lists of hazardous materials sites where soil and/or groundwater contamination is known or suspected to have occurred, typically as a result of leaking storage tanks or other spills. These facilities are readily identified through regulatory agency database searches, such as the State Water Resources Control Board (SWRCB) GeoTracker online database, the California Environmental Protection Agency (CalEPA) Department of Toxic Substances Control (DTSC) Envirostor online database, and several other federal, State and local regulatory agency databases. **Table 11-1** includes these, and other database references.

For this project, a search of the GeoTracker database was conducted. This database alone identified over 60,000 cleanup sites within the California Regional Water Quality Control Board (RWQCB) regions, as shown in **Table 11-2**. These facilities included hazardous materials cleanup sites, leaking underground storage tank (LUST) cleanup sites, land disposal cleanup sites, and cleanups on military properties.

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[1] State of California, Health and Safety Code, Chapter 6.95, Section 25501(o).

TABLE 11-1
DESCRIPTION OF REGULATORY AGENCY LISTS

Regulatory Agency Database List	Description
National Priorities List (NPL)	Compilation of over 1,200 sites for priority cleanup under the Federal Superfund Program.
Proposed National Priorities List (PNPL)	Sites considered for NPL listing.
Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS)	Contains data on potentially hazardous waste sites that have been reported to the USEPA by California. CERCLIS contains sites which are either proposed to or on the NPL and sites which are in the screening and assessment phase for possible inclusion on the NPL.
CERCLIS No Further Remedial Action Planned (CERC-NFRAP)	CERC-NFRAP are archived sites which indicate an assessment of the site has been completed and that the EPA has determined no further steps will be taken to list the site on NPL.
Resource Conservation and Recovery Act (RCRA) Corrective Action Plan (CORRACTS)	The Resource Conservation and Recovery Act database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste. Identifies hazardous waste handlers with RCRA corrective action activity.
Resource Conservation and Recovery Information System - Treatment, Storage or Disposal Facilities (RCRIS-TSDF)	TSDF's treat, store, or dispose of waste from sites which generate, transport, store, treat and/or dispose of hazardous waste.
RCRA Registered Large and Small Quantity Generators of Hazardous Waste (LQG/SQG)	Registered generators of hazardous waste.
Emergency Response Notification System (ERNS)	The ERNS records and stores information on reported releases of oil and hazardous substances. The source of the ERNS information is from the USEPA.
Formerly Used Defense Sites Properties (FUDS)	Includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.
Cal-Sites	Previously referred to as the Abandoned Sites Program Information System, this list identifies potential hazardous waste sites, which are then screened by the Department of Toxic Substances Control (DTSC) to evaluate the need for further action.
California Hazardous Materials Incident Report System (CHMIRS)	Spills and other incidents gathered from the California Office of Emergency Services.
Hazardous Wastes & Substances Sites List (Cortese)	Historical compilation of sites listed in the LUST, SWF/LF and CALSITES databases. No longer maintained as an active database.
Proposition 65 Records (Notify 65)	This database, maintained by the State Water Resources Control Board (SWRCB), contains facility notifications about any release that could impact drinking water and thereby expose the public to a potential health risk.
Toxic Pits Cleanup Act Sites (Toxic Pits)	Sites suspected of containing hazardous substances that have not yet been cleaned up. Maintained by SWRCB.
Solid Waste Facilities/Landfill Sites (SW/LF)	Solid waste facilities and landfills that are active, inactive or closed.
Waste Management Unit Database (WMUDS/SWAT)	Waste Management Unit Database System (WMUDS) is used by the State Water Resources Control Board staff and the Regional Water Quality Control Boards for program tracking and inventory of waste management units.
Leaking Storage Tanks (LUST)	List of LUSTs compiled by the SWRCB.
Registered Underground Storage Tanks (USTs)	Active UST facilities gathered from the local regulatory agencies.
Facility Inventory Database (CA FID UST)	The Facility Inventory Database (FID) contains a historical listing of active and inactive underground storage tank locations from the State Water Resource Control Board.
Hazardous Substance Storage Container Database (HIST UST)	The Hazardous Substance Storage Container Database is a historical listing of UST sites.

TABLE 11-1
DESCRIPTION OF REGULATORY AGENCY LISTS

Regulatory Agency Database List	Description
Aboveground Storage Tank database (AST)	Registered Aboveground Storage Tanks.
Statewide Environmental Evaluation and Planning System (SWEEPS)	Statewide Environmental Evaluation and Planning System (SWEEPS) is an underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1980's.
Dry Cleaners	A list of drycleaner related facilities that have EPA ID numbers.
California Spills, Leaks, Investigation and Cleanup Cost Recovery Listing (CA SLIC)	This database, maintained by the SWRCB, lists spills, leaks, investigation and cleanup costs from sites.
Haznet	The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000 - 1,000,000 annually, representing approximately 350,000 - 500,000 shipments.
Response	Identifies confirmed release sites where DTSC is involved in remediation, either in a lead or oversight capacity.
Envirostor	EnviroStor database identifies sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites.

SOURCE: EDR 2006.

TABLE 11-2
SWRCB GEOTRACKER LISTED CLEANUP SITES IN CALIFORNIA

ORGANIZATION NAME	Cleanup Program Site	LUST Cleanup Site	Land Disposal Site	Military Cleanup Site	Military Privatized Site	Military UST Site
NORTH COAST RWQCB (REGION 1)	771	2220	159	64	0	52
SAN FRANCISCO BAY RWQCB (REGION 2)	2013	10222	140	295	78	548
CENTRAL COAST RWQCB (REGION 3)	310	1963	77	107	9	311
LOS ANGELES RWQCB (REGION 4)	3334	8417	213	476	0	79
CENTRAL VALLEY RWQCB (REGION 5F)	634	2920	711	60	0	50
CENTRAL VALLEY RWQCB (REGION 5R)	183	887	44	0	0	3
CENTRAL VALLEY RWQCB (REGION 5S)	1465	4515	313	689	54	559
LAHONTAN RWQCB (REGION 6T)	80	429	26	37	0	7
LAHONTAN RWQCB (REGION 6V)	37	564	105	952	0	236
COLORADO RIVER BASIN RWQCB (REGION 7)	53	856	97	135	0	109
SANTA ANA RWQCB (REGION 8)	446	4181	163	170	0	174
SAN DIEGO RWQCB (REGION 9)	2196	3370	146	546	0	704
NO REGIONAL BOARD SPECIFIED	0	1	4	0	0	0
Total	**11522**	**40545**	**2198**	**3531**	**141**	**2832**

SOURCE: State Water Resources Control Board GeoTracker website, 2010

Anaerobic Digester and Biogas Hazards

Anaerobic digesters are confined spaces that pose a potential immediate threat to human life. They are designed to seal out oxygen making death by asphyxiation possible within seconds of entry. Further, gases such as hydrogen sulfide and ammonia accumulate inside a digester. Notably, Cal/OSHA is responsible for developing and enforcing workplace safety standards, including confined space and lockout procedures.

Biogas consists primarily of methane, carbon dioxide, with small amounts of hydrogen sulfide, and ammonia. Typically, biogas is saturated with water vapor and may have trace amounts of hydrogen, nitrogen, oxygen, dust and siloxanes (Greer, 2010). Theoretically, two-stage digester systems could be used to produce biogas richer in hydrogen if isolated after the first stage of the process, and a methane rich biogas after the second stage. Although the hydrogen rich biogas would have potentially greater concentrations of hydrogen than the typical biogas generated through anaerobic digestion, the hydrogen would still be in low concentrations and would not pose a substantial combustion hazard. There are no known commercial systems that are designed to produce hydrogen-rich biogas. However, biogas can be reformulated into hydrogen if fuel cells are used to generate heat and electricity. For the typical anaerobic digestion process, the majority of hydrogen is converted into methane through hydrogenotrophic methanogenesis. Methane is not toxic, but is classified as a simple asphyxiate, possessing a slight inhalation hazard. If breathed in high concentration, oxygen deficiency can result in serious injury or death. Biogas itself is not explosive and will not burn unless oxygen is available at low concentrations. Biogas is explosive when mixed with air in concentrations of 5 to 15 percent. A leak in a gas line can create a fire hazard if an ignition source is present and the concentration of flammable constituents is at a hazardous level, however, in open spaces biogas readily mixes with air reducing its potential to reach flammable concentrations. The risk of fire hazard is generally low because anaerobic digestion (AD) facilities and biogas transmission lines operate with very low pressures, similar to residential natural gas distribution lines. Typical construction standards for AD facilities include redundant fire safety relief valves to prevent over pressurizing, flame arresters, gas detectors and physical barriers to minimize fire and explosion hazards.

Wildfire Hazards

While all of California is subject to some degree of wildfire hazard, there are specific features that make certain areas more hazardous. The California Department of Forestry and Fire Protection (CAL FIRE) is required by law to map areas of significant fire hazards based on fuels, terrain, weather, and other relevant factors (PRC 4201-4204 and Govt. Code 51175-89). Factors that increase an area’s susceptibility to fire hazards include slope, vegetation type and condition, and atmospheric conditions. CAL FIRE has created maps of each county that depict the fire hazard severity zoning of the area. These maps can be obtained at:

http://www.fire.ca.gov/fire_prevention/fire_prevention_wildland_zones.php.

These maps identify high fire hazard areas that are subject to regulations designed to minimize fire potential and assist local planning agencies to develop policies and programs for these high risk areas.

Pathogens and Vectors

Pathogens are disease-causing organisms, such as certain bacteria, viruses and parasites. Vectors are organisms, such as flies, mosquitoes, rodents and birds that can spread disease by carrying and transferring pathogens (U.S. EPA, 1994). Vectors can transmit pathogens to humans and other hosts physically through contact or biologically by playing a specific role in the life cycle of the pathogen.

Regulatory Requirements

There are numerous federal, State, and local laws, regulations, ordinances and guidance intended to protect public health and safety and the environment. The U.S. Environmental Protection Agency (U.S. EPA), CalEPA, DTSC, RWQCB, California Air Resources Board (CARB), federal and California Occupational Safety and Health Administration (OSHA), California Department of Resources Recycling and Recovery (CalRecycle), CAL FIRE and the local oversight agencies are the major federal, State, and regional agencies that enforce these regulations. The main focus of OSHA is to prevent work-related injuries and illnesses, including from exposures to hazardous materials. CalRecycle is mandated to reduce waste, promote the management of materials to their highest and best use, and protect public health and safety and the environment (CalRecycle, 2010). CAL FIRE implements fire safety regulations. In accordance with Chapter 6.11 of the California Health and Safety Code (§ 25404, et seq.), local regulatory agencies enforce many federal and state regulatory programs through the Certified Unified Program Agency (CUPA) program, including:

- Hazardous materials business plans (Chapter 6.95 of the Health and Safety Code, §25501 et seq.).
- State Uniform Fire Code requirements (§80.103 of the Uniform Fire Code as adopted by the state fire marshal pursuant to Health and Safety Code §13143.9).
- Underground storage tanks (Chapter 6.7 of the Health and Safety Code, §25280 et seq.).
- Aboveground storage tanks (Health and Safety Code §25270.5[c]).
- Hazardous waste generator requirements (Chapter 6.5 of the Health and Safety Code, §25100 et seq.).

The following is a summary of how hazardous materials and public health and safety are regulated by applicable topic. Within each summary is a discussion of the relevant federal, State and local regulatory structure.

AD Facilities and Operations

CalRecycle regulates AD facilities as either compost facilities or transfer and processing facilities, depending upon whether the feedstock is compostable (CIWMB, 2009). Regulations regarding solid waste facilities and compostable materials handling, operations, and regulatory requirements are established in California Code of Regulations Title 14 and can be obtained at:

> http://www.calrecycle.ca.gov/Laws/Regulations/title14/default.htm.

These regulations are overseen by CalRecycle and its designated local enforcement agencies (LEAs). These regulations include, but are not limited to, the following for compost facility operations: establishes permitting and inspection requirements; prohibits acceptance of hazardous wastes, liquids and sludges; outlines general operating standards; provides for removal of contaminants from compost and feedstock; requires materials handling in a manner that minimizes vectors and prevents unauthorized access by individuals and animals; outlines pathogen reduction and sampling requirements; establishes recordkeeping and facility closure requirements.

Specific regulations that provide LEAs the means to address issues regarding vectors, odor, and other nuisances include the following for composting operations and transfer/processing operations respectively:

1. “All handling activities shall be conducted in a manner that minimizes vectors, odor impacts, litter, hazards, nuisances, and noise impacts; and minimizes human contact with, inhalation, ingestion, and transportation of dust, particulates, and pathogenic organisms” (Composting Operating Standards in CA Title 14, Division 7, Chapter 3.1, Article 6, Section 17867); and,
2. “The operator shall take adequate steps to control or prevent the propagation, harborage and attraction of flies, rodents, or other vectors, and animals, and to minimize bird attraction” (Minimum Standards for Solid Waste Handling and Disposal are in CA Title 14, Division 7, Chapter 3. Article 6.1, Section 17410.4).

LEAs perform routine inspections to certify compliance with permit conditions to ensure that State programs are effectively implemented. CalRecycle can also initiate enforcement actions in addition to, or in lieu of, the LEA.

Soil and Groundwater Contamination

Remediation of contaminated sites is generally performed under the oversight of the local CUPA, or in some instances, the RWQCB and/or DTSC. At sites where contamination is suspected or known to have occurred, the site owner is required to perform a site investigation and perform site remediation, if necessary. Site remediation or development may also be subject to regulation by other agencies. For example, if a project required dewatering near a hazardous waste site, the project sponsor might be required to obtain a permit from the municipal sewer agency before discharging the water to the sewer system, or a National Pollutant Discharge Elimination System (NPDES) permit from the RWQCB before discharging to the storm water collection system.

Worker Safety Requirements

The federal Occupational Safety and Health Administration (Fed-OSHA) and the California Occupational Safety and Health Administration (Cal-OSHA) are the agencies responsible for assuring worker safety in the handling and use of chemicals in the workplace. The federal regulations pertaining to worker safety are contained in Title 29 of the Code of Federal Regulations (CFR), as authorized in the Occupational Safety and Health Act of 1970. They provide standards for safe workplaces and work practices, including standards relating to hazardous materials handling. In California, Cal-OSHA assumes primary responsibility for developing and enforcing workplace safety regulations; Cal-OSHA standards are generally more stringent than federal regulations.

The state regulations concerning the use of hazardous materials in the workplace are included in Title 8 of the California Code of Regulations, which contain requirements for safety training, availability of safety equipment, accident and illness prevention programs, hazardous substance exposure warnings, and emergency action and fire prevention plan preparation. Cal-OSHA also enforces hazard communication program regulations, which contain worker safety training and hazard information requirements, such as procedures for identifying and labeling hazardous substances, communicating hazard information related to hazardous substances and their handling, and preparation of health and safety plans to protect workers and employees.

At sites where hazardous materials are present, workers must receive training in hazardous materials operations and a site health and safety plan must be prepared. The health and safety plan establishes policies and procedures to protect workers and the public from exposure to potential hazards at the site.

Hazardous Materials Business Plans

State and federal laws require detailed planning to ensure that hazardous materials are properly handled, used, stored, and disposed of, and, in the event that such materials are accidentally released, to prevent or to mitigate injury to health or the environment. California's Hazardous Materials Release Response Plans and Inventory Law, sometimes called the "Business Plan Act," aims to minimize the potential for accidents involving hazardous materials and to facilitate an appropriate response to possible hazardous materials emergencies. The law requires businesses that use hazardous materials to provide inventories of those materials to designated emergency response agencies, to illustrate on a diagram where the materials are stored on-site, to prepare an emergency response plan, and to train employees to use the materials safely.

Use and Storage of Hazardous Materials

State and federal laws require detailed planning and management to ensure that hazardous materials are properly handled, used, stored, and disposed of, and, in the event that such materials are accidentally released, to reduce risks to human health and the environment. Hazardous waste regulations establish criteria for identifying, packaging, and labeling hazardous wastes; dictate the management of hazardous waste; establish permit requirements for hazardous waste treatment, storage, disposal, and transportation; and identify hazardous wastes that cannot be disposed of in landfills.

State laws governing underground storage tanks (USTs) specify requirements for permitting, monitoring, closure, and cleanup of these facilities. Regulations set forth construction and monitoring standards for existing tanks, release reporting requirements, and closure requirements. In general, the local CUPA has regulatory authority for permitting, inspection, and removal of USTs. Any entity proposing to remove a UST must submit a closure plan to the CUPA prior to tank removal. Upon approval of the UST closure plan, the CUPA would issue a permit, oversee removal of the UST, require additional subsurface sampling if necessary, and issue a site closure letter when the appropriate removal and/or remediation has been completed. USTs are not typically associated with AD facilities; however, these regulations are relevant due to the potential of leaking USTs to affect subsurface conditions at potential project sites.

The Aboveground Petroleum Storage Act of 1990 requires facilities storing petroleum products in a single tank greater than 1,320 gallons, or facilities storing petroleum in aboveground tanks or containers with a cumulative storage capacity of greater than 1,320 gallons to file a storage statement with the State Water Board and prepare a spill prevention, control, and countermeasure plan. The plan must identify appropriate spill containment or equipment for diverting spills from sensitive areas, as well as discuss facility-specific requirements for the storage system, inspections, recordkeeping, security, and personnel training.

Transport of Hazardous Materials

The United States Department of Transportation (DOT) regulates hazardous materials transportation on all interstate roads. Within California, the state agencies with primary responsibility for enforcing federal and State regulations and for responding to transportation emergencies are the CHP and Caltrans. Together, federal and State agencies determine driver-training requirements, load labeling procedures, and container specifications. Although special requirements apply to transporting hazardous materials, requirements for transporting hazardous waste are more stringent, and hazardous waste haulers must be licensed to transport hazardous waste on public roads.

Emergency Response

California has developed an emergency response plan to coordinate emergency services provided by federal, State, and local government and private agencies. Responding to hazardous materials incidents is one part of this plan. The plan is administered by the State Office of Emergency Services (OES), which coordinates the responses of other agencies. The local Emergency Response Team (ERT) coordinates response to hazardous materials emergencies within the project area. ERT members respond and work with local fire and police agencies, emergency medical providers, California Highway Patrol (CHP), California Department of Fish and Game, and California Department of Transportation (Caltrans).

Natural Gas Pipelines

The DOT also provides oversight for the nation’s natural gas pipeline transportation system. Its responsibilities are promulgated under Title 49, United States Code (USC) Chapter 601. The Pipeline and Hazardous Materials Safety Administration (PHMSA), Office of Pipeline Safety (OPS), administers the national regulatory program to ensure the safe transportation of gas and other hazardous materials by pipeline.

The OPS shares portions of this responsibility with State agency partners and others at the federal, State, and local levels. The State of California is certified under 49 USC Subtitle VIII, Chapter 601, §60105. The State has the authority to regulate intrastate natural and other gas pipeline facilities. The California Public Utilities Commission has rules governing design construction, testing, operation, and maintenance of gas gathering, transmission, and distribution piping systems (General Order No. 112-E). The State requirements for designing, constructing, testing, operating, and maintaining gas piping systems are stated in CPUC General Order Number 112. These rules incorporate the federal regulations by reference, but for natural gas pipelines, they do not impose any additional requirements affecting public safety. The federal pipeline regulations are published in Title 49 CFR, Parts 190 through 199.49 CFR 192 specifically addresses natural and other gas pipelines. These regulations include specific standards for material selection and qualification, design requirements, protection from corrosion, worker training, safety and provisions for safety standards specific to the location of the pipeline relative to population densities and sensitive land uses.

Fire Hazards

The California Uniform Fire Code (CCR, Title 24, Part 9) and local building codes establish requirements for the construction and maintenance of structures for fire safety. The National Fire Protection Association (NFPA) develops and publishes consensus codes and standards intended to minimize the possibility and effects of fire and other risks. While not regulations, these codes and standards are industry-accepted guidelines for construction and fire protection systems. NFPA Code 820 establishes the standard for fire protection in waste water treatment and collection facilities, which would be applicable to all AD facilities. Additional relevant codes include a fuel gas code, standard on explosion prevention systems, standards for fire prevention during welding, etc.

The California Public Resources Code (PRC) includes fire safety regulations that restrict the use of equipment that may produce a spark, flame, or fire; require the use of spark arrestors[2] on construction equipment that use an internal combustion engine; specify requirements for the safe use of gasoline-powered tools in fire hazard areas; and specify fire suppression equipment that must be provided onsite for various types of work in fire-prone areas during the time of high fire danger to reduce the risk of wildland fires.

Wildlife-Related Aviation Hazards

Section 503 of the Wendell H. Ford Aviation Investment and Reform Act for the 21st Century (Public Law 106-181) limits the construction or establishment of new municipal solid waste landfill (MSWLF) facilities[3] within 6 statute miles of certain public-use airports, when both the airport and the landfill meet very specific conditions. The Federal Aviation Administration (FAA) Advisory Circular No. 150/5200-34A (FAA, 2006) describes these requirements.

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[2] A spark arrestor is a device that prohibits exhaust gases from an internal combustion engine from passing through the impeller blades where they could cause a spark. A carbon trap is commonly used to retain carbon particles from the exhaust.

[3] Municipal Solid Waste Landfill Facility is defined by the FAA Advisory Circular as “publicly or privately owned discrete area of land or an excavation that receives household waste, and that is not a land application unit, surface impoundment, injection well, or waste pile.”

The U.S. EPA requires any MSWLF operator proposing a new or expanded waste disposal operation within 5 statute miles of a runway end to notify the appropriate FAA Regional Airports Division Office and the airport operator of the proposal (40 CFR 258, Criteria for Municipal Solid Waste Landfills, Section 258.10, Airport Safety). The U.S. EPA also requires owners or operators of new MSWLF units, or lateral expansions of existing MSWLF units, that are located within 10,000 feet of any airport runway end used by turbojet aircraft, or within 5,000 feet of any airport runway end used only by piston-type aircraft, to demonstrate successfully that such units are not hazards to aircraft. When new or expanded MSWLF are being proposed near airports, MSWLF operators must notify the airport operator and the FAA of the proposal as early as possible pursuant to 40 CFR 258.

FAA Advisory Circular No. 150-5200-33B (FAA, 2007) provides guidance regarding hazardous wildlife attractants near airports. Separation distances depend on the type of airport (serving piston vs. turbine powered aircraft) and the proposed land use. Guidance applies to composting operations, transfer stations, other municipal solid waste facilities and associated stormwater detention facilities. Exceptions to separation criteria for waste facilities include off-airport property composting operations and fully-enclosed transfer stations. Off-airport property composting operations that do not accept food waste or other municipal solid waste (green waste only) are permissible at distances no closer than 1,200 feet from the airport operations area. Transfer stations are compatible with safe airport operations provided these facilities (1) are not located on airport property or in the runway protection zone, and (2) meet the FAA's definition of a fully enclosed trash transfer station[4]. Facilities not meeting these requirements are subject to greater separation distances.

Pest Control

Under the State Health and Safety Code, local vector control agencies (often public health departments or mosquito abatement districts) have the authority to conduct surveillance for vectors, prevent the occurrence of vectors, and abate production of vectors. These agencies also have the authority to review, comment, and make recommendations during planning and environmental quality processes, permits, licenses, etc, regarding the potential effects related to vector production of proposed projects. Additionally, agencies have broad authority to enforce abatement of vector sources on public and private property.

11.2 Impacts and Mitigation Measures

Approach and Methods

The evaluation was performed in light of applicable laws, regulations and guidelines, and typical construction activities and operations anticipated for AD facilities. In many cases, compliance with laws, regulations, and mandatory regulatory permits prescribe actions that would reduce the adverse

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[4] "These facilities should not handle or store putrescible waste outside or in a partially enclosed structure accessible to hazardous wildlife. Trash transfer facilities that are open on one or more sides; that store uncovered quantities of municipal solid waste outside, even if only for a short time; that use semi-trailers that leak or have trash clinging to the outside; or that do not control odors by ventilation and filtration systems (odor masking is not acceptable) do not meet the FAA's definition of fully enclosed trash transfer stations" (FAA, 2007).

effects of implementation of future AD facilities. Should potential impacts remain significant or potentially significant under CEQA, even after compliance with legal requirements, mitigation measures are proposed to reduce project impacts to less-than-significant levels.

Thresholds of Significance

CEQA defines a significant effect on the environment as a substantial, or potentially substantial, adverse change in the physical conditions of the area affected by the project. An impact related to hazards and hazardous materials, including fire hazards, would be considered significant if it would result in any of the following, which are adapted from Appendix G of the CEQA *Guidelines*:

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials;
- Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment;
- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one quarter mile of an existing or proposed school;
- Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code §65962.5 and, as a result, would create a significant hazard to the public or the environment;
- Be located within an area covered by an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, and would result in a safety hazard for people residing or working in the project area;
- Be located within the vicinity of a private airstrip and would result in a safety hazard for people residing or working in the project area;
- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan;
- Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands; or,
- Generate vectors (flies, mosquitoes, rodents, etc) to such an extent that the applicable enforcement agency determines that any of the vectors occurs in numbers considerably in excess of those found in the surrounding environment, disseminate widely from the property, and cause harmful effects on the public health of the surrounding population.

Impact 11.1: Construction of AD facilities could result in the potential exposure of construction workers, the public and the environment to preexisting soil and/or groundwater contamination. (Significant)

Construction activities associated with development of projects could involve excavation and trenching to install AD facilities and pipelines. If hazardous materials, such as pesticides or herbicides, VOC or other hazardous materials are present in excavated soil or groundwater, hazardous materials could be released to the environment resulting in exposures to construction workers or the public to potential health risks depending on the nature and extent of any contamination encountered.

Contaminated soil or groundwater could also require disposal as a hazardous waste. This is considered a significant impact.

The greatest potential for encountering contaminated soil and groundwater during project construction would be in areas where past or current land uses have resulted in leaks from fuel or chemical storage tanks or other releases of hazardous materials have occurred. Federal, State and local agencies maintain databases of hazardous materials sites including those listed in **Table 11-1.** As shown in **Table 11-2**, the GeoTracker database identified thousands of hazardous materials sites within California. If sites with soil and/or groundwater contamination are located at or in close proximity to proposed project facilities, hazardous materials could be encountered in the subsurface during excavation and grading activities. Encountering hazardous materials in soil or groundwater during construction could further disperse existing contamination into the environment and expose construction workers or the public to contaminants, potentially resulting in health and safety risks to workers and the public.

Hazardous materials in soil and groundwater, if identified, could be managed appropriately according to applicable laws and regulations to reduce the risks associated with exposures to individuals or releases to the environment. Cal/OSHA regulations require the preparation and implementation of a site health and safety plan to protect workers who could encounter hazardous materials, ensure that construction workers have specialized training and appropriate personal protective equipment. Regulations also require that excavated materials suspected of contamination be segregated, sampled and hauled to a landfill licensed for this type of waste. If groundwater dewatering is required for excavation of subsurface facilities, the groundwater may require treatment prior to discharge, in accordance with regulations.

Mitigation Measure

> **Mitigation Measure 11.1:** Prior to final project design and any earth disturbing activities, the applicant or agency(ies) responsible shall conduct a Phase I Environmental Site Assessment (ESA). The Phase I ESA shall be prepared by a Registered Environmental Assessor (REA) or other qualified professional to assess the potential for contaminated soil or groundwater conditions at the project site; specifically in the area proposed for construction of AD facilities. The Phase I ESA shall include a review of appropriate federal, State and local hazardous materials databases to identify hazardous waste sites at on-site and off-site locations within a one quarter mile radius of the project location. This Phase I ESA shall also include a review of existing and past land uses through aerial photographs, historical records, interviews of owners and/or operators of the property, observations during a reconnaissance site visit, and review of other relevant existing information that could identify the potential existence of contaminated soil or groundwater.
>
> If no contaminated soil or groundwater is identified or if the Phase I ESA does not recommend any further investigation then the project applicant or agency(ies) responsible shall proceed with final project design and construction.
>
> OR
>
> If existing soil or groundwater contamination is identified, and if the Phase I ESA recommends further review, the applicant or agency(ies) responsible shall retain a REA to conduct follow-up sampling to characterize the contamination and to identify any required remediation that

shall be conducted consistent with applicable regulations prior to any earth disturbing activities. The environmental professional shall prepare a report that includes, but is not limited to, activities performed for the assessment, summary of anticipated contaminants and contaminant concentrations at the proposed construction site, and recommendations for appropriate handling of any contaminated materials during construction.

Impact Significance After Mitigation: Less than Significant

Mitigation Measure 11.1 requires preparation of a Phase I ESA to identify the potential for known soil or groundwater contamination on or in the vicinity of proposed construction of AD facilities. If no contamination is identified, then construction can proceed. If contaminated sites are identified that could affect construction, then the applicant shall conduct follow-up sampling to characterize soil and groundwater contamination and would conduct any remediation consistent with applicable laws, regulations, ordinances and guidance. With implementation of Mitigation Measure 11.1, and regulatory compliance, the potential for exposure to hazardous materials during construction activities would be reduced to a less-than-significant level.

Impact 11.2: Transportation, use, disposal or accidental spill of hazardous materials during construction of AD facilities would not result in the potential exposure of construction workers, the public and the environment to hazardous materials. (Less than Significant)

Construction activities would likely require use of limited quantities of hazardous materials such as fuels for construction equipment, oils, and lubricants. The types and quantities of hazardous materials would vary at each proposed AD facility. The improper use, storage, handling, transport or disposal of hazardous materials could result in accidental release of hazardous materials, thereby exposing construction workers, the public and the environment, including soil and/or ground or surface water, to hazardous materials contamination.

As discussed in the Regulatory Setting above, numerous laws and regulations govern the transport, use, storage, handling and disposal of hazardous materials to reduce the potential hazards associated with these activities. Cal/OSHA is responsible for developing and enforcing workplace safety standards, including the handling and use of hazardous materials. Transportation of hazardous materials is regulated by the DOT and Caltrans. Together, federal and State agencies determine driver-training requirements, load labeling procedures, and container specifications designed to minimize the risk of accidental release. Construction activities would also be required to comply with the California fire code to reduce the risk of potential fire hazards. The local fire agency would be responsible for enforcing the provisions of the fire code.

As described in Chapter 6, Hydrology and Water Quality, the federal Clean Water Act prohibits discharges of stormwater from construction projects unless the discharge is in compliance with a National Pollutant Discharge Elimination System (NPDES) permit. The State Water Resources Control Board is the permitting authority in California and has adopted a Statewide General Permit for Stormwater Discharges Associated with Construction Activity (Construction General Permit, Order No. 99-08) that encompasses one or more acres of soil disturbance. Because soil surface disturbance for AD projects would generally be greater than one acre, specific erosion control measures would be identified as part of the NPDES permit and Storm Water Pollution Prevention Plan (SWPPP) required for construction. During construction, erosion control measures would be implemented that utilize Construction Water Quality Best Management Practices (BMPs) to avoid or minimize soil erosion and off-site sediment or hazardous materials transport. Examples of typical construction BMPs include scheduling or limiting activities to certain times of the year; installing sediment barriers such as silt fence and fiber rolls along the perimeter of the construction area; maintaining equipment and vehicles used for construction; developing and implementing a spill prevention and cleanup plan; and construction worker training. The SWPPP (and associated BMPs) would be prepared and implemented prior to commencing construction, and BMP effectiveness would be ensured through the sampling, monitoring, reporting, and record keeping requirements contained in the construction general permit.

Because numerous laws and regulations govern the transport, use, storage, handling and disposal of hazardous materials to reduce the potential hazards associated with these activities, this impact would be less than significant.

Mitigation: None required.

Impact 11.3: Transportation, use, disposal or accidental spill of hazardous materials during the operation and maintenance of AD facilities would not result in potential harmful exposures of the public or the environment to hazardous materials. (Less than Significant)

Operation and maintenance of AD facilities would involve the transport, use, storage and disposal of hazardous materials such as fuels, lubricants and hydraulic fluids for vehicles and onsite equipment. The phases of AD operations are discussed below.

Pre-Processing

Pre-processing involves the activities necessary to prepare the feedstocks for delivery into the AD vessel. Pre-processing could include screens, picking lines or mechanical removal of glass and plastic, magnetic separation, eddy current separation, and wet separation. Mixed solid wastes must be sorted prior to delivery to remove any household hazardous wastes, as these materials cannot be accepted. AD facilities would be responsible for load checking of deliveries to ensure that hazardous wastes are not received.

Digestion

As described in the project description, AD processes vary and include both dry digestion and wet digestion. These processes would take place within enclosed tanks or vessels.

Post-Processing

Digestate: Upon completion of the digestion process, the digestate would probably undergo a solids separation process. The water could also be further processed for beneficial uses (recycled) or be routed to a wastewater treatment facility. The dewatered solid digestate could require additional aerobic curing (composting) to ensure stabilization and pathogen reduction. When cured and tested according to regulatory requirements, the digestate or compost produced with the digestate could be suitable for land application. The Waste Discharge Requirements (WDRs) for each permitted facility would set the specific criteria for digestate handling. If the solid digestate does not meet these requirements, it could require disposal at a landfill.

Biogas: The biogas resulting from the AD process could be used for internal combustion or flared. If biogas conditioning is required for use either in a fuel cell or production of liquefied biogas, scrubber facilities would be needed to clean the biogas to remove sulfides. Flushing of the scrubbers would produce sulfide effluent that would require appropriate disposal. Biogas presents an inhalation hazard that, if breathed in high concentration, can result in serious injury or death. Biogas itself is not explosive and will not burn unless oxygen is available at low concentrations.

Handling of hazardous materials and hazardous wastes is covered by federal and State laws that minimize worker safety risks from both physical and chemical hazards in the workplace. Cal/OSHA is responsible for developing and enforcing workplace safety standards, including the handling and use of hazardous materials, including gases. Workers must be trained to understand the hazards and appropriate work procedures associated with confined spaces, flammable gases, etc. Businesses that use hazardous materials are required to submit a Hazardous Materials Business Plan to the local CUPA, which performs inspections to ensure compliance with hazardous materials labeling, training, and storage regulations. For example, hazardous materials must be stored in containers according to the manufacturer’s guidelines and appropriately labeled. The Material Safety Data Sheet for each chemical must be available for review. Employers must inform workers of the hazards associated with the materials they handle and maintain records documenting training. Hazardous wastes must be segregated, sampled and disposed of at appropriately licensed landfill facilities. Transportation of hazardous materials is regulated by the DOT and Caltrans. Together, federal and State agencies determine driver-training requirements, load labeling procedures, and container specifications designed to minimize the risk of accidental release.

Because numerous laws and regulations govern the transport, use, storage, handling and disposal of hazardous materials to reduce the potential hazards associated with these activities, this impact would be less than significant.

Mitigation: None required.

Impact 11.4: Operation of AD facilities could increase the risk of fire hazards due to the potential release of biogas. (Significant)

The proposed program involves the production of biogas generated through AD processes. The biogas would be captured and could be combusted in a flare, used directly in internal combustion engines to produce electricity and heat, or upgraded to biomethane through the removal of hydrogen sulfide, carbon dioxide (CO_2), and moisture. Biomethane could be used in place of natural gas for various processes, including use by utility companies. The biomethane could be transported through pipelines to the end user. As described in the environmental setting, biogas is comprised primarily of methane, which can be flammable. Methane itself is not explosive and will not burn unless oxygen is available at low concentrations. Methane has an ignition temperature of 1,000 degrees Fahrenheit (°F) and is flammable at concentrations between 5 percent and 15 percent in air. Because methane is buoyant at atmospheric temperatures and disperses rapidly in air, unconfined mixtures of methane in air are not explosive. However, a flammable concentration within an enclosed space in the presence of an ignition source can explode, potentially resulting in property damage, injuries, and/or death. Although biogas has the potential to ignite or explode, the risk of fire hazard is generally low because all factors must be present for ignition: a methane concentration between 5 and 15 percent, generally requiring a confining space, and an ignition source. As discussed above, a leak to the atmosphere would disperse into the air rather than ignite or explode. Further, AD facilities and transmission lines operate with very low pressures, similar to residential natural gas distribution lines, which minimizes the potential for reaching flammable concentrations.

Compliance with existing safety regulations and widely-accepted industry standards would minimize the hazard to the public and the environment. With respect to the flaring of biogas and potential fire hazards associated with the storage and transport of methane and small quantities of other materials used in operations, the NFPA has established standards for fire protection which would be applicable to the construction of AD facilities. These standards have been successfully implemented by numerous wastewater treatment facilities across the country. Construction and operation of facilities would comply with the California fire code, local building codes (including requirements for the installation of fire suppression systems), and gas pipeline regulations. The local fire agency would be responsible for enforcing the provisions of the fire code. The OPS and CPUC regulate the safety of gas transmission pipelines. Standard safety features of AD facilities that would minimize the potential for exposure to biogas include leak detection systems, redundant safety relief valves, warning signals, physical barriers and safety flares to reduce excess gas capacity. Additional safety measures would prohibit the use of spark-producing equipment within a designated area surrounding flammable materials, worker safety training, routine inspections and recordkeeping.

Any biogas transmission pipelines would be designed, constructed and operated consistent with State and federal regulations to minimize the risk of rupture and accidental release. As described in the Regulatory Setting, the CPUC has rules governing design construction, testing, operation, and maintenance of gas gathering, transmission, and distribution piping systems. These rules incorporate the federal regulations by reference, but for natural gas pipelines, they do not impose any additional requirements affecting public safety. The federal pipeline regulations include specific standards for material selection and qualification, design requirements, protection from corrosion, worker training, safety and provisions for safety standards specific to the location of the pipeline relative to population densities and sensitive land uses.

The project considers AD facilities located at existing or new solid waste facilities and in areas zoned for industrial or solid waste handling activities. Due to odor and other siting considerations, AD facilities at these locations would not be expected to be adjacent to residential structures. Compliance with existing laws and regulations would reduce the potential for fires and explosions associated with AD facilities; however, in the unlikely event of a fire, it would have the potential to expose nearby people or structures to a significant risk. This impact could be reduced to a less than significant level with implementation of Mitigation Measure 11.4.

Mitigation Measure

Mitigation Measure 11.4a: Prior to project approval, AD facility operators shall prepare and implement a Fire Safety Plan that outlines fire hazards, describes facility operations procedures to prevent ignition of fires, requires regular inspection of fire suppression systems, and provides for worker training in safety procedures as well as protocols for responding to fire incidents. The Fire Safety Plan shall be reviewed and approved by the local fire enforcement agency.

Mitigation Measure 11.4b: Implement Mitigation Measure 11.5.

Impact Significance after Mitigation: Less than significant.

Implementation of Mitigation Measure 11.4a requires worker training in fire safety procedures, reducing the potential for fire incidents and providing for prompt response in the event of a fire. Mitigation Measure 11.5 restricts locating AD facilities within one quarter mile of sensitive land use, and would reduce the potential for exposure to fire hazards.

Impact 11.5: AD facilities could be located within one quarter mile of a school resulting in potential hazards associated with accidental release of hazardous materials, including biogas. (Less than Significant)

Existing compost facilities, waste transfer facilities and landfills are typically not sited within close proximity to schools. Because AD facilities would most likely be associated with existing facilities, potential AD facilities would be unlikely to be located within one quarter mile of a school. However, as the location of AD facilities and biogas pipelines that could be constructed under this program have not been identified, it is possible that AD facilities could be located within one quarter mile of a school.

As discussed above under Impacts 11.2 and 11.3, small quantities of hazardous materials could be used in the construction and operation AD facilities. Compliance with environmental laws and regulations would reduce the potential for an accidental release of those materials to affect nearby schools. Anaerobic digesters and biogas transmission pipelines would not emit hazardous emissions, such as biogas, under normal operating conditions and biogas transmission pipelines and ancillary facilities would be designed, constructed, operated, and maintained in accordance with State and federal regulations. Although leak detection systems would minimize the potential for substantial biogas releases, any such releases would mix readily in the air and would not present a health risk at nearby properties. As a result potential fire hazards associated with siting AD facilities within one quarter mile of a school would be less than significant.

Although not required, to further reduce the magnitude of this less-than-significant impact, Mitigation Measure 11.5 recommends that AD facilities not be constructed and operated within one quarter mile of existing or proposed schools and other sensitive land uses.

Mitigation Measure

Mitigation Measure 11.5: AD facilities shall be sited at least one quarter mile from existing or proposed schools, daycare facilities, hospitals and other sensitive land uses.

Impact Significance After Mitigation: Less than Significant

Implementation of Mitigation Measure 11.5 would ensure that AD facilities would be located more than one quarter mile from sensitive land uses; therefore, further reducing the potential for exposure to hazardous materials and fire hazards.

Impact 11.6: AD facility operations could generate vectors (flies, mosquitoes, rodents, etc.) exceeding regulatory agency thresholds for the presence of vectors. (Less than Significant)

Incoming food wastes, green wastes and mixed solid wastes would be deposited on a tipping floor for sorting and pre-processing or placed directly in containers. The pre-processing operations of AD facilities could provide an attractive environment for pests such as flies, cockroaches, rodents, etc. These pests could be present in the waste material and transported to the facility or attracted to the facility from the surrounding area. Digestion and post-processing would be largely contained within vessels, diminishing the potential for vector access. Storage or aerobic curing of the digestate may occur outside of enclosed vessels, such as in windrows on adjacent parcels, which could be an attractant to vectors. It is also possible that some AD facilities may have associated stormwater detention ponds or effluent ponds which could provide a fertile mosquito breeding habitat.

Pathogens may be present in incoming waste feedstock and digestate (depending upon the temperature of digestion). Regulations for composting operations, enforced by CalRecycle, require reducing pathogen concentrations in composted material to acceptable levels. These regulations (Title 14, Chapter 3.1, Article 7) outline maximum acceptable pathogen (e.g., fecal coliform and Salmonella sp. Bacteria) concentrations and requirements for pathogen reduction at composting facilities. These requirements establish methods for enclosed vessel, windrow, and static pile composting processes to meet pathogen reduction criteria by maintaining a temperature of 55 degrees Celsius (131 degrees Fahrenheit) for varying durations, as well as sampling and record keeping criteria.

For facilities designated as compost facilities, Title 14, Chapter 3.1, Article 6, Section 17867 stipulates that “all activities shall be conducted in a manner that minimizes vectors, odor impacts, litter, hazards, nuisances and noise impacts…”. If regulated as a transfer processing facility, the AD site would be required to “take adequate steps to control or prevent the propagation, harborage and attraction of flies, rodents, or other vectors, and animals, and to minimize bird attraction” (CA Title 14, Division 7, Chapter 3. Article 6.1, Section 17410.4). These articles give the LEA and CalRecycle broad discretion to ensure that AD facilities do not provide a suitable environment to promote the generation of vectors. In addition, local pest management agencies (i.e., mosquito abatement districts, environmental health departments) have the authority to inspect facilities and enforce compliance with vector control. Vector populations can be kept under control with implementation of best management practices such as enclosing waste storage areas within a building, routine cleaning, insect traps, rodent control services, chemical treatment, and minimizing stagnant waters. With compliance with existing laws and regulations, this impact would be less than significant.

Mitigation: None required.

Impact 11.7: AD facilities could be located within five miles of a public airport or private airstrip and create an aviation hazard. (Significant)

Waste disposal facilities, such as proposed AD operations that include food wastes, can provide wildlife with ideal locations for feeding, loafing, reproduction and escape. Even small facilities can produce substantial attractions for hazardous wildlife. During the past century, wildlife-aircraft strikes have resulted in the loss of hundreds of lives worldwide, as well as billions of dollars in aircraft damage.

AD facilities would include food materials that could result in increased numbers of scavenging birds at the site, thus increasing the risk of bird strikes for aircraft departing or approaching any nearby airports. The FAA Advisory Circular 150/5200-33B recommends minimum separation criteria for various land uses practices that attract wildlife in the vicinity of airports. For all airports, the FAA recommends a distance of 5 statute miles between the farthest edge of the airport's air operations area and the hazardous wildlife attractant if the attractant could cause hazardous wildlife movement into or across the approach or departure airspace. The FAA discourages the development of waste disposal and other facilities located within 5,000/10,000-feet of airports serving piston-powered and turbine-powered aircraft, respectively. For projects that are located outside the 5,000/10,000-foot criteria but within 5 statute miles of the airport's air operations area, the FAA may review development plans, proposed land-use changes or operational changes, to determine if such changes present potential wildlife hazards to aircraft operations and if further investigation is warranted.

The U.S. EPA requires any Municipal Solid Waste Landfill (MSWLF) operator proposing a new or expanded waste disposal operation within 5 statute miles of a runway end to notify the appropriate FAA Regional Airports Division Office and the airport operator of the proposal. The U.S. EPA also requires owners or operators of new MSWLF units, or lateral expansions of existing MSWLF units, that are located within 10,000 feet of any airport runway end used by turbojet aircraft, or within 5,000 feet of any airport runway end used only by piston-type aircraft, to demonstrate successfully that such units are not hazards to aircraft.

Proposed AD facilities would not be subject to the same regulations as MSWLFs; however AD facility operations could create a hazardous wildlife attractant and a potential safety hazard to aviation if located within 5 miles of an airport.

As identified in Impact 11.6, for facilities designated as compost facilities, Title 14, Chapter 3.1, Article 6, Section 17867 stipulates that "all activities shall be conducted in a manner that minimizes vectors, odor impacts, litter, hazards, nuisances and noise impacts…". If regulated as a transfer processing facility, the AD site would be required to "take adequate steps to control or prevent the propagation, harborage and attraction of flies, rodents, or other vectors, and animals, and to minimize bird attraction" (CA Title 14, Division 7, Chapter 3. Article 6.1, Section 17410.4). These articles give the LEA and CalRecycle broad discretion to ensure that AD facilities minimize bird attraction.

This potential impact would be significant, but could be reduced to a less-than-significant level with implementation of Mitigation Measure 11.7.

Mitigation Measures

> **Mitigation Measure 11.7:** For any AD facility proposed within 5 statute miles of an airport's air operations area, the operator will notify the Federal Aviation Administration (FAA) Regional Airports Division office and the airport operator of the proposed facility as early in the process as possible. Such AD facilities must receive an FAA Determination of No Hazard prior to project approval.
>
> **Significance after Mitigation:** With FAA review and approval of proposed AD facility operations, the potential hazard to aviation safety from wildlife would be less than significant.

Impact 11.8: Development of AD facilities could contribute to cumulative impacts related to hazardous materials. (Less than Significant)

The context for potential cumulative hazards and hazardous materials impacts is projects that could result in an increased risk of exposure due to a release of hazardous materials in the project area. The potential for cumulative projects to result in a release resulting in an increased risk of exposure and the project's contribution would be limited. Exposure to existing soil and groundwater contamination is generally site-specific and depends on past, present, and future uses and existing soil, sediment, and groundwater conditions. Any hazardous materials uncovered during construction activities would be managed consistent with applicable federal, State and local laws to limit exposure and clean up the contamination. In addition, the storage, handling and transport of hazardous materials are also regulated by federal, State and local regulatory agencies to limit risk of exposure.

The contribution of the project to cumulative risk of exposure would not be considerable. While construction and operational activities could result in accidental spills or leaks in the vicinity, the extent of the contamination is not likely to extend beyond the project site boundaries due to the type and limited quantities of hazardous materials likely to be used (for example, motor fuels, hydraulic oils, paint, and lubricants). Furthermore, as identified above, all AD facility activities associated with the use, storage and transportation of hazardous materials would be required to adhere to all applicable laws and regulations. Operation of AD facilities would capture and use biogas for energy production or the gas would be flared in accordance with a local air quality permit. Handling of biogas could be hazardous due to its health risks and flammability. Compliance with existing laws and regulations and mitigation measures established for AD facilities would minimize the potential for harmful exposures to hazardous materials, fires associated with the handling of biogas, aviation safety hazards, and vector impacts.

In sum, the construction and operation of AD facilities in combination with other projects in the project area would not create a significant hazard to the public or the environment through the routine transport, use, disposal or accidental release of hazardous materials, vector population growth, and fire hazards due to the site-specific nature of the potential impacts and existing laws and regulations that minimize the risk of exposure, and implementation of mitigation measures for AD facilities in this Chapter of the Program EIR. Therefore, this is considered a less-than-significant cumulative impact.

Mitigation Measure

> **Mitigation Measure 11.8:** Implement Mitigation Measures 11.1, 11.4, 11.5, and 11.7.
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> **Impact Significance After Mitigation:** Less than Significant

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11.3 References

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CHAPTER 12
Other CEQA Considerations

12.1 Resources without Program Level Impacts

As required by CEQA, this Draft Program EIR focuses on expected significant or potentially significant environmental effects (CEQA Guidelines §15143). An NOP was prepared for the project to identify issues to be evaluated in this Draft Program EIR (**Appendix A**).

Resources identified with less than significant impacts during the Program EIR scoping process include agricultural and forest resources, biological resources, cultural resources, geology, soils, and seismicity, land use and land use planning, mineral resources, population and housing, and recreation. The NOP dismissed potential impacts in these resource areas as they are not anticipated to have potentially significant impacts at the program level, although they could require evaluation for individual projects due to the potential for local effects.

Agricultural and Forest Resources

Anaerobic digester (AD) facilities would be co-located with permitted solid waste facilities or located in areas zoned for industrial or solid waste handling activities and are not anticipated to adversely affect agricultural and forest resources. However, if an AD facility includes acquisition and development of undisturbed areas to expand the existing footprint, then impacts to agricultural and forest resources may need to be analyzed on a project-by-project basis to ensure compliance with land use zoning and that any loss of farmland or forest uses would be mitigated appropriately. Due to these site-specific considerations of individual facilities, further analysis would not apply at the statewide programmatic level.

Biological Resources

Since AD facilities would be co-located with permitted solid waste facilities or located in areas zoned for industrial or solid waste handling activities, they are not anticipated to adversely affect biological resources. However, if an AD facility includes footprint expansion onto undeveloped and undisturbed areas, then impacts to biological resources may need to be analyzed on a project-by-project basis. These analyses would be based on local species and habitats and would ensure compliance with any applicable conservation plans and that potential biological impacts would be mitigated. Due to these site-specific considerations of individual facilities, further analysis would not apply at the statewide programmatic level.

Cultural Resources

Since AD facilities would be co-located with permitted solid waste facilities or located in areas zoned for industrial or solid waste handling activities, they are not anticipated to adversely affect cultural resources. However, if an AD facility includes footprint expansion onto undeveloped and undisturbed areas, then impacts to cultural resources may need to be analyzed on a project-by-project basis. These analyses would be based on site-specific information and would determine any impacts to historical, archaeological, and paleontological resources on the site to be developed and would ensure that potential impacts to these cultural resources would be mitigated appropriately. Due to these site-specific considerations of individual facilities, further analysis would not apply at the statewide programmatic level.

Geology, Soils, and Seismicity

AD facilities would be co-located with permitted solid waste facilities or located in areas zoned for industrial or solid waste handling activities and are not anticipated to adversely affect, or be affected by, geology, soils, and seismicity. However, if an AD facility includes footprint expansion onto undeveloped and undisturbed areas, then geological, soil, and seismicity impacts may need to be analyzed on a project-by-project basis. This analysis would include a site-specific geotechnical study to comply with building requirements. Due to these site-specific considerations of individual facilities, further analysis of geology, soils, and seismicity would not apply at the statewide programmatic level.

Land Use and Land Use Planning

AD facilities would be co-located with permitted solid waste facilities or located in areas zoned for industrial or solid waste handling activities and are thus anticipated to comply with land use planning and zoning requirements. However, if an AD facility includes acquisition and development of undisturbed areas to expand the existing footprint, then compliance with applicable land use plans, policies, and regulations may need to be analyzed on a project-by-project basis. Due to these site-specific considerations of individual facilities, further analysis would not apply at the statewide programmatic level.

Mineral Resources

Since AD facilities would be co-located at solid waste facilities and within areas zoned for industrial or solid waste handling activities, it is anticipated that AD facilities would be located in areas which have previously been disturbed or developed. In this case, the AD facilities would not prohibit recovery of known mineral resources of value to the state and would not result in foreseeable loss in mineral resources. However, if an AD facility includes footprint expansion onto undeveloped and undisturbed areas, then impacts to mineral resources may need to be analyzed on a project-by-project basis. Due to these site-specific considerations of individual facilities, further analysis would not apply at the statewide programmatic level.

Population and Housing

AD facility operation would create a small number of jobs throughout California; however, this increase would not be considered substantial. The project does not involve the construction of features (i.e., roads, residences) that would induce population growth. Biogas generated by the AD facilities would provide for an existing need for renewable energy and is not proposed to be used for new off-site developments. In addition, AD facilities would not displace residences or people, as they would be located at either existing or new permitted solid waste facilities or in areas zoned for industrial or solid waste handling activities. Less than significant impacts to existing housing and population growth would occur. The program would not result in foreseeable displacement of populations or housing.

Recreation

AD facilities would not induce population growth, restrict recreational opportunities, or increase use or demand for recreational facilities. The project description does not include recreational facilities. Considering these factors the project would not result in foreseeable significant impacts on recreation.

12.2 Cumulative Impacts

CEQA Guidelines §15130(a) requires that an EIR discuss the cumulative impacts of a project when the project's incremental effect is "cumulatively considerable," meaning that the project's incremental effects are considerable (as defined in §15065(c)). Cumulative impacts refer to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts (CEQA Guidelines §15355). Further, such impacts can result from individual effects which may be minor, but collectively significant over time. The discussion on cumulative impacts shall reflect the severity of the impacts and their likelihood of occurrence (CEQA Guidelines §15130(b)). CEQA Guidelines note that the cumulative impacts discussion does not need to provide as much detail as is provided in the analysis of project-only impacts and should be guided by the standards of practicality and reasonableness. Considering this, CEQA Guidelines §15130(b)(1) recommends the use of a "list" or "projection" approach in the discussion of significant cumulative impacts to adequately address cumulative impacts.

The cumulative impact analysis considered the combined effect of the proposed project and other closely related, past, present and reasonably foreseeable future projects that may be constructed or commence operation during the time of activity associated with the proposed project. The cumulative impacts of the project are analyzed in detail in the final impact discussion located in each of the environmental resource chapters (Chapters 5 – 11). Please refer to those impacts for a detailed discussion.

12.3 Growth-Inducing Impacts

The CEQA Guidelines §15126.2(d) require that an EIR evaluate the growth-inducing impacts of a proposed action (Section). A growth-inducing impact is defined by the CEQA Guidelines as:

> [T]he ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth.... It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment.

A project can have direct and/or indirect growth-inducement potential. Direct growth inducement would result if a project involved construction of new housing. A project can have indirect growth-inducement potential if it would establish substantial new permanent employment opportunities (e.g., commercial, industrial or governmental enterprises) or if it would involve a substantial construction effort with substantial short-term employment opportunities and indirectly stimulate the need for additional housing and services to support the new employment demand. Similarly, under CEQA, a project would indirectly induce growth if it would remove an obstacle to additional growth and development, such as removing a constraint on a required public service. An example of this indirect effect would be the expansion of a wastewater treatment plant, which might allow for more development in service areas.

The proposed project would not result in a substantial increase in employment, and correspondingly, would not result in a substantial increase in population and associated demand for housing in the area. Mitigation of impacts resulting from the Draft Program EIR would not require the construction of any additional roadways or public services or utilities. For these reasons, the project is not anticipated to result in substantial growth inducement.

12.4 Significant and Unavoidable Environmental Impacts

CEQA §21100(b)(2) requires that any significant effect on the environment that cannot be avoided or becomes irreversible if the project is implemented must be identified in a detailed statement in the environmental impact report. CEQA Guidelines §15126.2(b) provides that an environmental impact report must discuss, preferably separately, the significant environmental effects which cannot be avoided if the proposed project is implemented. In addition, CEQA Guidelines §15093(a) requires the decision making agency to balance, as applicable, the economic, legal, social, technological, or other benefits of a proposed project against its unavoidable environmental risks when determining whether to approve a project. Benefits may include, but not be limited to, those that are region-wide or statewide. If the benefits of a proposed project outweigh the unavoidable adverse environmental effects, the adverse environmental effects may be considered: “acceptable.” If CalRecycle approves a project which would result in the occurrence of significant effects which are identified in the final EIR but are not avoided or substantially lessened, CalRecycle shall state in writing the specific reasons to support this action based on the final EIR and/or other information in the record (CEQA Guidelines §15093(b)). The Statement of Overriding Considerations shall be supported by substantial evidence in the record. CEQA Guidelines §15093 provides that if an agency makes a Statement of Overriding Consideration the statement should be included in the record of the project approval and should be mentioned in the notice of determination. This statement does not substitute for and shall be in addition to findings that CalRecycle must make before approving a project for which the EIR was prepared (CEQA Guidelines §15091). The analyses in Chapters 5 through 11 of this Draft Program EIR identify recommended mitigation measures that could reduce all potentially significant impacts to a level that would be less than significant, therefore, CalRecycle will not have to prepare a Statement of Overriding Considerations.

12.5 Significant Irreversible Environmental Changes

Section 15126.2(c) of the CEQA Guidelines requires an EIR to describe significant irreversible environmental changes that would occur if a proposed project is implemented. The guidelines further state that:

> *Uses of nonrenewable resources during the initial and continued phases of the project may be irreversible since a large commitment of such resources makes removal or nonuse thereafter unlikely. Primary impacts and, particularly, secondary impacts [such as highway improvement which provides access to a previously inaccessible area] generally commit future generations to similar uses. Also irreversible damage can result from environmental accidents associated with the project. Irretrievable commitments of resources should be evaluated to assure that such current consumption is justified.*

The proposed project would use non–renewable fuel resources during construction and such resources would also be used to some degree for the duration of the project (i.e., some petroleum for deliveries of digestion substrates and electricity generated off-site that is used for the digester facilities). The materials in the AD facilities (i.e., steel and concrete) would also be a commitment of the degree that they would not be used if the digesters are not used in the future. The materials in the AD facilities would have some potential for reuse or recovery by recycling. However, development of AD facilities would provide the ability to process the municipal solid waste and other organic substrates to generate and capture biogas, which is a flexible renewable energy source. Overall, AD facilities should have a net positive energy condition compared to the long-haul of MSW to landfills that can be expected to lose some additional energy (compared to AD facilities) due to fugitive emissions of landfill gas. In essence, the development of the AD facilities would provide future generations access to the equipment that can generate renewable energy.

CHAPTER 13

Alternatives

13.1 Introduction

CEQA Guidelines §15126(a) requires an Environmental Impact Report (EIR) to describe a range of reasonable alternatives to the project which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate comparative merits of the alternatives. A range of reasonable alternatives to the project must be addressed because the EIR will identify ways to mitigate or avoid the significant effects that a project may have on the environment (CEQA Guidelines §15126.6(b)). Consideration of a range of potentially feasible alternatives promotes informed decision making and public participation. An EIR is not required to consider infeasible alternatives, but the alternatives discussion should present alternatives to the project which are capable of avoiding or substantially lessening any significant effects of the project, even if these alternatives would impede to some degree the attainment of the project objectives, or would be more costly (CEQA Guidelines §15126.6(b)).

CEQA Guidelines §15126.2(f) provides that the range of alternatives is governed by the “rule of reason”, requiring the EIR to set forth only those alternatives necessary to permit a reasoned choice. In the evaluation of alternatives, the EIR shall contain sufficient detail to allow meaningful evaluation, analysis and comparison with the project. If an alternative would cause one or more significant effects in addition to those that would be caused by the project as proposed, the significant effects of the alternative shall be discussed, but in less detail than the significant effects of the project as proposed (CEQA Guidelines §15126.6(d)).

The EIR must evaluate a “No Project” alternative in order to provide a comparison between the impacts of approving the project with the impacts of not approving the project (CEQA Guidelines §15126.6(e)). CEQA Guidelines §15126(e) requires that the alternatives analysis must identify the “environmentally superior” alternative among those considered. If the “No Project” alternative is identified as the environmentally superior alternative, then the EIR must also identify an environmentally superior alternative among the other alternatives.

This chapter discusses the following alternatives to the project:

1. No Project Alternative
2. Co-Digestion at Wastewater Treatment Plants (WWTPs) Alternative
3. Co-Digestion at Dairy Manure Digesters Alternative
4. Increased Aerobic Composting Alternative

5. Landfill In-Ground Digester Cell Alternative
6. Bioreactor Landfill Alternative
7. Thermal Conversion Alternative
8. Source Reduction Alternative

The components of these eight alternatives are described below, including a discussion of their impacts and how they would differ from the significant impacts of the project as proposed. A discussion of the environmentally superior alternative is included in this chapter.

Factors in the Selection of Alternatives

CEQA Guidelines §15126.6(c) recommends that an EIR briefly describe the rationale for selecting the alternatives to be discussed. A reasonable range of alternatives is considered for this analysis. The following factors were considered in identifying a reasonable range of alternatives to the project:

- Does the alternative accomplish all or most of the primary project objectives?
- Is the alternative feasible, from an economic, environmental, legal, social and technological standpoint?
- Does the alternative avoid or lessen any significant environmental effects of the project?

One of the primary goals of this project is to divert organic waste from landfill disposal. There is a high diversity of organic waste in California, and it is often concentrated in areas with limited organic processing options that make it difficult to manage due to economic and environmental constraints. This geographic distribution directly affects the feasibility of organics diversion from all of the standpoints identified above; and given the high costs of transportation; the economic feasibility of organics diversion is often determined primarily by geographic considerations. The diversity of organics also plays a significant role in identifying an appropriate technology.

This is a program level EIR analyzing statewide impacts of anaerobic digester (AD) facilities, but organics management decisions are often made at the local and regional level. There is no single best, most feasible, or most environmentally benign organics management option. Ultimately, each region must analyze its own organic waste streams and determine which management options are best based on the availability of technologically and economically feasible options.

Program Objectives

As also stated in Chapter 3, Program Description, the objectives for the project covered by this Program EIR are:

- Assist in meeting CalRecycle Strategic Directive 6.1: Reduce the amount of organics in the waste stream by 50 percent by 2020.
- Support Assembly Bill 32 (AB 32), the California Global Warming Solutions Act of 2006, greenhouse gas reduction measures related to the use of AD:

  - Measures E-3. Achieve a 33 percent renewable energy mix by 2020. (AD facilities produce biogas which is a renewable energy source.)
  - RW-3. High Recycling/Zero Waste. (AD is one of five subcategories listed under this measure.)
- Assist local governments and state agencies (both lead and responsible agencies) by providing program-level analyses that will identify potential environmental effects of AD facilities and discuss mitigation measures or best management practices that can reduce or eliminate the environmental effects.

The project objectives are considered in the evaluation of each of the alternatives.

13.2 Alternatives that Were Considered but Not Further Analyzed

The CEQA Guidelines §15126.6(a) require that an EIR briefly describe the rationale for selecting the alternatives to be discussed, and suggest that an EIR also identify any alternatives that were considered by the lead agency but were rejected as infeasible (CEQA Guidelines §15126.6(c)). The following alternatives were considered, but were eliminated from further consideration and analysis for the reasons expressed below.

Bioreactor Landfill Alternative

Typical modern landfills operate on a “dry tomb” approach. This means that they are designed to exclude as much moisture as possible to limit the decomposition rate of the waste mass. Although many landfills have landfill gas systems installed to collect fugitive methane gas from the landfill, by restricting the moisture content of the mass, gas production is relatively minimized. “Bioreactor” landfills intentionally add moisture to the waste mass in an effort to accelerate anaerobic decomposition in the mass to accelerate methane production. This alternative is not further analyzed because material sent to bioreactor landfills is disposed; sending solid waste to a bioreactor landfill would not help meet the 50 percent organics diversion goal of CalRecycle Strategic Directive 6.1.

Thermal Conversion Alternative

The Thermal Conversion Alternative, including the various technologies, is discussed below in some level of detail to provide information on this subject that will be available to those that may wish to utilize the information in this EIR. It includes transformation, biomass conversion and non-combustion thermal conversion technologies (Williams, Jenkins, and Nguyen, 2003; Hacket and Williams, et al., 2004). Detailed analysis is not provided because a direct comparison of AD facilities to the Thermal Conversion Alternative technologies is not possible given that they rely on different components of the overall organics feedstock. The primary targeted organic feedstock for AD facilities is food waste which is not a primary target for thermal conversion facilities, which focus more on dryer post-MRF materials such as the paper, green waste, fossil derived organics (plastics) and wood fractions of the waste stream. The focus of the Thermal Conversion Alternative on materials that are not the key targets of AD facilities (e.g., food waste) is the reason that the Thermal Conversion Alternative (including transformation, biomass conversion and non-combustion thermal conversion technologies) is not further analyzed in this chapter.

This alternative considers thermal systems with energy recovery and includes solid fuel combustion systems (incinerators) for direct heat or electricity production via steam cycles (e.g., mass-burn or Refuse Derived Fuel [RDF] incinerators with energy recovery) and non-combustion thermal conversion technologies (i.e., gasification or pyrolysis) that can produce a range of energy products.

In California, there are currently three commercial scale mass-burn incinerators directly combusting mixed solid waste with electricity production, and approximately 30 bioenergy facilities burning woody biomass (which includes urban wood waste, agricultural residues and forest products and thinnings) for electricity production (http://www.energy.ca.gov/biomass/index.html). In addition, there is increasing interest in non-combustion thermal conversion technologies (i.e., gasification and pyrolysis).

Thermal conversion technologies vary in terms of their efficiencies, appropriate feedstock characteristics, the products (and by-products) they produce, their capital and operating costs, and how they are treated under the state's waste and energy regulatory regimes. In addition, some technologies are designed to handle a wide range of (or mix of) organic feedstocks, while others are more limited in the range of feedstocks they can process. This is of particular importance regarding Strategic Directive 6.1, which targets the subset of organics that are currently being landfilled. These disposed organics are extremely varied in energy and moisture content, and some can be separated, processed, and decontaminated more easily than others.

Thermal conversion technologies considered in this alternative include the following processes.

Transformation

Transformation is the statutory term California uses for mass-burn incineration of mixed solid waste with heat energy recovery for electricity generation. Currently there are three transformation facilities operating in California with a total permitted capacity of approximately 6,500 tons of incoming material per day producing approximately 65 MW of electricity (CalRecycle SWIS Database, 2011 & California Biomass Collaborative).

Transformation facilities are permitted under California's solid waste regulatory infrastructure. Waste processed at these sites is considered disposed. Jurisdictions are able to use material sent to the existing transformation facilities to meet up to 10 percent of their diversion requirements under the State's waste reduction and recycling laws (PRC 41783). Transformation facilities (except the facility in Stanislaus County, which was grandfathered into the renewable program) do not qualify as renewable energy facilities under the California Energy Commission's Renewable Portfolio Standard Eligibility Commission Guidebook (CEC-300-2007-006-ED3-CMF, p. 16). Pyrolysis is identified in California law as a type of transformation. Pyrolysis produces "biochar" and a pyrolitic oil in addition to a combustible gas. Biochar is known to have nutrient and water retention characteristics that can make it a valuable soil amendment.

Given that waste processed at transformation facilities is considered disposed, does not count towards diversion (after 10 percent), and is not considered a renewable source of energy, new transformation facilities might not be constructed without changes in current policies and laws.

Biomass Conversion

Biomass conversion is the controlled combustion of woody biomass (agricultural or forest product resides or source-separated urban wood) for the purpose of heat or energy production. Governor Schwarzenegger signed Executive Order S-06-06 which set a goal for biomass to consist of 20 percent of the state's renewable energy portfolio in 2010, and to maintain that goal through 2020. Currently, biomass conversion accounts for approximately 20 percent of the state's current renewable energy generation (energy.ca.gov/biomass/index.html). In California, biomass conversion facilities are not considered a solid waste facility if only the waste types identified in PRC 40106[1] are processed.

Biomass plants in California burn agricultural wastes, forest slash, urban wood waste, and lumber from construction debris. According to the most recent California waste characterization, lumber is the second most prevalent material disposed in landfills, at almost 6 million tons per year (CIWMB, 2009).

Additional amounts of lumber could be diverted to biomass plants as there is currently an excess capacity. Diverting lumber from landfills to biomass conversion could be feasible in the short term and help meet Strategic Directive 6.1 as well as the 33 percent renewable goal.

Non-combustion Thermal Conversion Technologies

Non-combustion thermal conversion technologies refer to a range of technologies that use a combination of high heat, steam, high pressure, and oxygen- reduced environments to convert organic matter into heat and/or various products, including combustible gases, oils, and charcoals, as well as noncombustible ashes and molten slags (CIWMB, 2007). These conversion technologies are different from direct incineration of organic matter in that they utilize environments with a range of sub-stoichiometric concentrations of oxygen and thus prevent immediate combustion of the product gasses. Much like AD, the resultant products can be used for a variety of uses including combustion for energy, transportation fuels, industrial chemicals, and soil amendments. Unlike some types of AD facilities, however, non-combustion thermal conversion technologies involve temperatures sufficiently high to guarantee pathogen reduction.

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[1] 40106. (a) "Biomass conversion" means the controlled combustion,when separated from other solid waste and used for producing electricity or heat, of the following materials:(1) Agricultural crop residues.(2) Bark, lawn, yard, and garden clippings.(3) Leaves, silvicultural residue, and tree and brush pruning.(4) Wood, wood chips, and wood waste.(5) Nonrecyclable pulp or nonrecyclable paper materials.(b) "Biomass conversion" does not include the controlled combustion of recyclable pulp or recyclable paper materials, or materials that contain sewage sludge, industrial sludge, medical waste, hazardous waste, or either high-level or low-level radioactive waste.(c) For purposes of this section, "nonrecyclable pulp or nonrecyclable paper materials" means either of the following, as determined by the board:(1) Paper products or fibrous materials that cannot be technically, feasibly, or legally recycled because of the manner in which the product or material has been manufactured, treated, coated, or constructed. (2) Paper products or fibrous materials that have become soiled or contaminated and as a result cannot be technically, feasibly, or legally recycled.

Gasification is a conversion technology that has been developed commercially worldwide for various applications, including generating gas from coal, oil refining, conversion of municipal solid waste (MSW) and other organic feedstocks, and charcoal production. Gasification processes have the potential to create combustible gasses and other products from the conversion of organic feedstocks, and both would likely require pre-processing to remove excess moisture from the organic feedstocks (Los Angeles County, 2007). In some cases, compression/pelletization may be required before the organic feedstocks could be thermally converted.

Pyrolysis, which is discussed above under transformation, generally operates in the near absence of oxygen and is therefore also a non-combustion thermal conversion technology.

Gasification differs from pyrolysis in that it often involves heating biomass with restricted amounts of oxygen and/or injected steam, and generally creates ash or molten slag as opposed to carbon-rich biochar (CIWMB, 2007).

Non-combustion thermal conversion facilities are capable of processing some, but not all of the organics in mixed solid wastes. Potential feedstocks for such facilities include, among others, agricultural materials, tires, or MSW (Los Angeles County, 2007). Since non-combustion thermal conversion involves driving moisture out of the feedstock, organic feedstocks such as food waste with relatively high moisture contents (around 75 percent) are not ideal feedstocks. Subsets of the organics waste stream such as mixed solid waste, yard waste and woody components of construction and demolition debris may be more suitable for non-combustion thermal conversion.

California statute distinguishes between conversion technologies for purposes of solid waste facility permitting, and diversion/disposal status. Gasification is specifically defined in California law. Gasification is also noted in the Energy Commission’s Renewables Guidebook where it is listed as an eligible technology (CEC Guidebook p. 17). The Guidebook’s definition of gasification mirrors definition of PRC 40117.

There are no large commercial scale non-combustion thermal conversion facilities currently constructed in the state. While these facilities may be able to help divert organics from landfill disposal, it is likely that it will take at least five years to fully construct and permit such a facility. Thus conversion technologies are part of the longer-term strategy for organics diversion.

Source Reduction Alternative

Source reduction refers to reducing the amount of waste that is generated. A Source Reduction Alternative for this project would focus on reducing the amount of organic wastes that are generated and enter the waste and recycling streams.

Opportunities to reduce food waste generation focus on improving consumer purchasing habits and food service industry practices. For instance, CalRecyle has an extensive list of “Food Service Waste Reduction Tips and Ideas” on their website (CalRecycle, 2011a). The CalRecycle website also identifies opportunities to redirect edible food that otherwise would be disposed, to food banks or other appropriate venues where it can be distributed (CalRecycle, 2011b). While many of these programs provide a critically important service to help feed those in need, they do not address post consumer food waste generation.

There are other opportunities for source reducing organics which focus on preventing yard waste generation. CalRecyle promotes several yard waste prevention programs, including grasscycling, and xeriscaping (CalRecycle, 2011c). Grasscycling involves letting grass clippings remain on the lawn to be naturally recycled back into the soil. Grasscycling reduces grass clippings generation. Xeriscaping means landscaping with slow-growing drought tolerant plants to help conserve water and reduce yard trimmings. Both of these programs are valuable supportive measures to help achieve Strategic Directive 6.1.

While this alternative does address the target feedstocks of AD and is another approach for removing organics from landfills, it is not further considered because it is not an alternative to AD that could address the large volumes of post consumer food waste currently being landfilled.

13.3 Alternatives Selected for Further Consideration

No Project Alternative

CEQA Guidelines §15126.6(e) provides that a No Project Alternative shall also be evaluated along with its impact. According to the CEQA Guidelines, the No Project Alternative shall discuss the existing conditions at the time the Notice of Preparation was published, as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services.

Under the No Project Alternative, CalRecycle would not undertake the AD Initiative. This would maintain the status quo for AD facilities with respect to CEQA and permitting. AD facilities would be required to comply with current CEQA and other regulatory requirements without the benefit of the project. Development of AD facilities would continue in its current form and would be regulated by CalRecycle, by other permits from responsible agencies (i.e., County Use Permits, air and water quality permits, etc.), and by local and regional governments through local ordinances and regulations. The potential for reducing disposal of organics at California landfills would be reduced.

Impacts

Under the No Project Alternative, the proposed AD Initiative would not be implemented, so development and permitting of AD facilities would continue in its current form. Currently there are no commercial sized AD facilities that process mixed solid wastes in California or the U.S. Future development of AD facilities would be analyzed on an individual basis, and would be subject to individual federal, State, and local laws, regulations, ordinances and guidance.

For projects constructed and operated under the No Project Alternative, the impacts resulting from the construction and operation of individual facilities would be similar to those described for the project. With the No-Project Alternative, development of individual AD facilities would generally result in impacts similar to the project impacts on air quality and greenhouse gas emissions, hydrology and water quality, noise, public services and utilities, transportation and traffic, aesthetic resources, and hazards and hazardous materials. However, without the implementation of the AD Initiative, the pace of proposed project can be expected to be slower than with implementation of the AD Initiative. Thus, there would be fewer AD facilities and less impacts overall (see Table 13-1).

The No Project Alternative would not assist CalRecycle in Meeting the Goals of Strategic Directive 6.1; it would slow the pace of removing organic materials from landfills and it would not support the goals of AB 32 greenhouse gas reduction goals or the development of renewable fuels.

Co-Digestion at Wastewater Treatment Plants (WWTPs) Alternative

Under the Co-Digestion at WWTPs Alternative, the AD Initiative would apply to the construction and operation of co-digestion facilities at existing AD facilities at WWTPs for the diversion of organic materials from landfills and the production of biogas from organics in the waste stream.

There are over 130 wastewater treatment facilities in California currently using AD to reduce the volume of biosolids before they are land applied, composted, used as fuel, beneficially used at landfills, or otherwise disposed. Most of these facilities are capturing the biogas for its energy value. In California approximately 137 WWTPs have anaerobic digesters and these have an overall excess capacity of 15–30 percent (EBMUD, 2008).

Some of the existing WWTPs with anaerobic digesters have successfully co-digested liquid wastes, such as fats, oils, and grease (FOG), in an effort to increase biogas production. The increased biogas associated with digesting grease at treatment plants is well-documented, and these feedstocks are becoming increasingly sought after by WWTPs operating anaerobic digesters (York and Magner, 2010).

In contrast, a smaller number of WWTPs are now experimenting with adding processed source separated organics, such as municipally generated food scraps, to their existing digesters. Like grease, food waste has been documented to increase biogas production and reduce biosolids volume (EBMUD, 2008). Adding food waste to WWTPs anaerobic digesters requires pre-processing and the use of machinery not typically found at WWTPs to remove contaminants, adjust for moisture content, and reduce particle size. These steps can add to capital and operational costs.

The East Bay Municipal Utilities District, in Oakland, CA is co-digesting food waste with municipal sewage sludge and other liquid wastes. EBMUD is among the few WWTPs adding food waste and has been adding up to 40 tons per day of food waste into their digesters for extended periods of time. Other facilities, such as the Central Marin Sanitary Agency, are preparing to increase both their FOG processing capacity as well as install food waste pre-processing capacity at their WWTP. Central Marin Sanitation Agency has the excess capacity to take up to an additional 50 tons per day of food waste (Kennedy/Jenks, 2010).

Impacts

Under the Co-Digestion at WWTPs Alternative, the proposed AD Initiative would be implemented with a focus on diverting organic feedstocks to anaerobic digesters at existing WWTPs. Construction impacts would be greatly reduced because this alternative relies upon existing anaerobic digesters and post-processing infrastructure. As seen in Table 13-1, many of the potential significant impacts would be less significant than the impact of the project. The reduced impacts result from the fact that the Co-Digestion at WWTPs Alternative largely would rely upon existing infrastructure, and the overall construction would be reduced. Construction of pre-processing infrastructure would still be needed to implement the Co-Digestion at WWTPs Alternative.

For projects constructed and operated under the Co-Digestion at WWTPs Alternative, the impacts resulting from the construction would be less than the project because the WWTP digester and post-processing equipment and operations are already in place. Additional pre-processing equipment and operations would be on-going with the Co-Digestion at WWTPs Alternative.

With the Co-Digestion at WWTPs Alternative, development of individual AD facilities would generally result in impacts similar to the proposed project with regard to air quality and greenhouse gas emissions, hydrology and water quality, noise, public services and utilities, transportation and traffic, aesthetic resources, and hazards and hazardous materials. It is even possible that the pace of AD facility development could increase under the Co-Digestion at WWTPs Alternative because the AD facilities would be developed at WWTPs with significant infrastructure in place and an operational history of running AD facilities, including electrical generation in many cases.

Co-Digestion at Dairy Manure Digesters Alternative

Under the Co-Digestion at Dairy Manure Digesters Alternative, the AD Initiative would apply to the construction and operation of co-digestion facilities at dairy manure digesters for the diversion of organic materials (as co-digestion feedstocks) from California landfills and the production of biogas from organics in the waste stream. Dairies are the only confined animal feeding operations in California that have on-going experience in operating AD facilities, it would be speculative to include other types of animals in this alternative.

Some dairies in California have manure-only anaerobic digesters. Manure digesters are generally considered to increase environmental performance of dairies, particularly in terms of water quality and methane emissions. The Central Valley Regional Water Quality Control Board prepared a Program EIR for Dairy Digester and Co-digester facilities in the Central Valley (CVRWQCB, 2010a). The Dairy Manure Digester Program EIR analyzed the impacts of the construction and operation of dairy manure digester and co-digester facilities. The Program EIR and the Waste Discharge Requirements General Order for Dairies with Manure Anaerobic Digester or Co-Digester Facilities (CVRWQCB, 2010b) were approved December 10, 2010 and are both were designed to assist in the permitting of additional dairy digesters and co-digesters in the Central Valley. Both the EIR and the General Order allow for co-digester facilities at dairies, which means the manure digesters would also accept some food waste and green materials to be added to dairy manure.

In 2009, there were 1,752 dairies operating in California (CDFA, 2010). Of these, there are approximately 11 dairies with operating dairy manure digesters. As many as 10 other dairies have operated dairy manure digesters in recent years but are no longer operating. The limited number of dairy digesters is a result of marginal economic return and a challenging regulatory environment.

Some of the existing dairies have experimented with adding additional organic materials to their dairy manure digesters to capture the additional biogas potential from co-digestion. In some instances, organics from mixed solid wastes could be co-digested with dairy manure to enhance the production of biogas. Adding food waste to dairies for co-digestion would require significant pre-processing and the use of machinery not typically found at dairies to remove contaminants, adjust for moisture content, and reduce particle size. Addition of other organics (i.e., green materials) could also add new processing requirements for dairy manure digesters. These steps can add significant capital and operational costs, as well as additional permitting steps. Another concern is that dairies are often already at or near their discharge limits for land application of nutrients and salts and additional nutrients or salts in the added co-digestion organic materials (i.e., municipal food scraps) would not be feasible at some dairies (or require changes to the Nutrient Management Plans or Salt Minimization Plans) due to the existing land application loading limitations (CVRWQCB, 2010a).. Finally, while operators of dairy manure-only digesters are optimistic about the potential for adding additional co-digestion organic feedstocks, the 11 dairies currently operating manure-only digesters do not appear to have the additional capacity to process major volumes of diverted organic solid wastes now going to landfills in California. While major expansion of dairy manure-only digesters could occur, the prospect of a larger infrastructure of such facilities, to the degree they could substantially provide an option for a major portion of the organic fraction of diverted solid waste in California, is not foreseeable. Among other challenges, dairies tend to be located remote from potential sources of other feedstocks so there would be added transportation expenses.

Impacts

The following impact analysis is provided in order to compare the impacts of the Co-Digestion at Dairy Manure Digesters Alternative to the impacts of the project. See also Table 13-1, the comparison of significant effects.

The California dairy manure digester industry is relatively undeveloped, it is impossible to know the total available additional/excess capacity that may result from maturation of that industry. What is known is that the majority of this capacity is likely to develop in California's Central Valley, where approximately 80 percent of the dairy cows reside. Given the current issues with nutrients and salt accumulation in the valley, and the limited capacity for dairies to add more nutrients to their croplands, there are significant constraints on the total amount of nutrients and salt (entrained in the co-digestion organic feedstocks) that can be imported into the Central Valley. While co-digestion is an option to help increase biogas production, and thus return on investment, there are practical limits to the total amount of food waste and other organic materials that can be economically transported to and digested at dairies within the Central Valley. There are also major constraints on the use of biogas in the Central Valley. Because of the severe ozone air pollution problems in the Central Valley, current air regulations are the strictest in the nation for the emissions from engine/electrical generators that use biogas to generate electricity.

Increased Aerobic Composting Alternative

Under the Increased Aerobic Composting Alternative, the AD Initiative would apply to the construction and/or operation changes needed at existing or new compost facilities to divert more organic materials from California landfills.

There is an existing infrastructure for aerobic composting in California. According to a recent survey, (CalRecycle, 2010a) there are over 115 permitted composting facilities handling a variety of feedstocks. There are no reliable estimates of the capacity of the existing composting facilities, but CalRecycle has estimated that if the state is to achieve the goals under Strategic Directive 6.1, then an additional 100 facilities may be needed to assist in the diversion of 50 percent of organics from landfills by 2020. Most of the existing aerobic composting facilities (about 90 percent) use an outdoor turned windrow process or other similar process. Only a small percentage of the existing windrow facilities are currently handling significant quantities of food, soiled paper, and liquid waste. Technically, there is no reason that many of these facilities could not accept increased amounts of food scraps and other organics for composting.

On balance, it is likely that there will be increased aerobic composting whether or not AD capacity is developed in California. The two systems actually complement one another. Most existing aerobic composting facilities are at least somewhat limited in how much organics other than green material they can take in relation to higher carbon containing materials like yard trimmings or wood waste. AD facilities typically create a digestate, which may be feedstock for aerobic composting.

Impacts

The following impact analysis is provided in order to compare the impacts of Increased Aerobic Composting Alternative to the impacts of the project. See also Table 13-1, the comparison of significant effects.

Aerobic composting takes more land than AD, but the digestate from AD is typically either land applied or composted, so the total area needed may be very similar. Because at least some of the composting infrastructure is already developed, the amount of “new” area required could be substantially less, assuming that existing facilities can take in organics other than green material, without expanding their permitted footprint.

As shown in Table 13-1, the Increased Aerobic Composting Alternative has impacts that are equal or greater than the impacts of the project (prior to mitigation) in areas of air quality and greenhouse gases and hydrology and noise. The Increased Aerobic Composting Alternative has impacts that are equal or less than the project (prior to mitigation) in areas of noise, public services and utilities, transportation, aesthetics, and hazards and hazardous materials. As with the project, it is likely that the potentially significant impacts of the Increased Aerobic Composting Alternative could be mitigated to a level that is less than significant.

The addition of organics other than green material to an existing composting facility would have equal to or greater noise impacts as those described in the project. Increase in the types or volume of additional organics may require adding processing equipment or increasing operating hours.

The Odor Impact Minimization Plan (OIMP) would also need to be updated for the addition of new organic materials.

The most common form of aerobic composting utilizes a turned windrow methodology. This approach requires relatively large amounts of land in undeveloped areas of the state. Because the facilities are sited in more remote areas, this alternative will increase the amount of vehicle miles compared to the project. However, in most cases with the project, even if the facility (the anaerobic digester itself) is located in an urban area, the digestate created by the project will also need to be hauled to sites that will process or use it.

Landfill In-Ground Digester Cell Alternative

Under the Landfill In-Ground “Digester Cell” Alternative, the AD Initiative would apply to the construction and operation of in-ground digesters at a landfill that are limited to organic materials and which would utilize liquid injection and recirculation.

The Digester Cell is a batch system. Materials are loaded into the prepared cell in layers with impermeable (usually synthetic) covers and biogas extraction systems. Water is added and recirculated into the mass. The process consists of four distinct steps: filling, anaerobic, aerobic, and curing. Figure 13-1 shows photos of digester cell stages and Figure 13-2 shows the basic anaerobic and aerobic stages of the digester cell process. After the aerobic stage, the material is removed and the cell is prepared for another batch of untreated material. As part of ongoing research at the Yolo County Central Landfill, CalRecycle funded the creation of a unique type of “Digester Cell” which used liner materials to create a digester for yard trimmings and aged manure (CalRecycle, 2010b).

Facilities wishing to replicate the “Digester Cell” described in the report “Landfill-Based Anaerobic Digester-Compost Pilot Project at Yolo County Central Landfill” are likely to be located at existing landfills, which have the required space, earth-moving equipment, and other infrastructure needed for this type of project and perhaps most importantly, access to a lined landfill cell. While the “Digester Cell” concept could be sited anywhere with sufficient space and equipment, this analysis assumes that the process would only be at a landfill with an approved liner system.

Impacts

The following impact analysis is provided in order to compare the impacts of the Landfill In-Ground “Digester Cell” Alternative to the impacts of the project. See also Table 13-1, the matrix of effects of the alternatives.

In-ground digester cells are still experimental and much is still unknown about viable feedstocks, environmental performance, and economic feasibility. Digester cells may be able to play a role in diverting a portion of the organics stream from landfill disposal, but given the lack of demonstration on food waste, it is unclear whether these cells will be able to achieve the same levels of efficiency and environmental performance as in-vessel digesters.

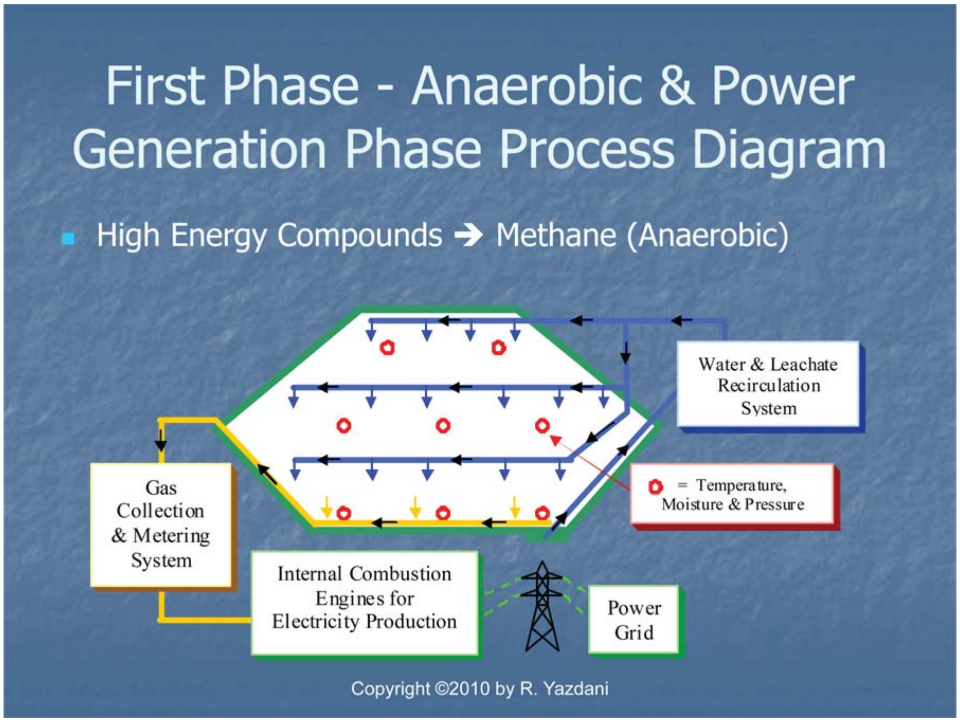
PHOTOGRAPH 1. Digester Cell project in Solon, OH.

PHOTOGRAPH 2. In-situ project material excavation (Yazdani, 2009).

PHOTOGRAPH 3. In-situ project material excavation (Yazdani, 2009).

SOURCE: ESA, 2010

Figure 13-1
Example Digester Cells



First Phase - Anaerobic & Power Generation Phase Process Diagram

- High Energy Compounds ➔ Methane (Anaerobic)

Water & Leachate Recirculation System

○ = Temperature, Moisture & Pressure

Gas Collection & Metering System

Internal Combustion Engines for Electricity Production

Power Grid

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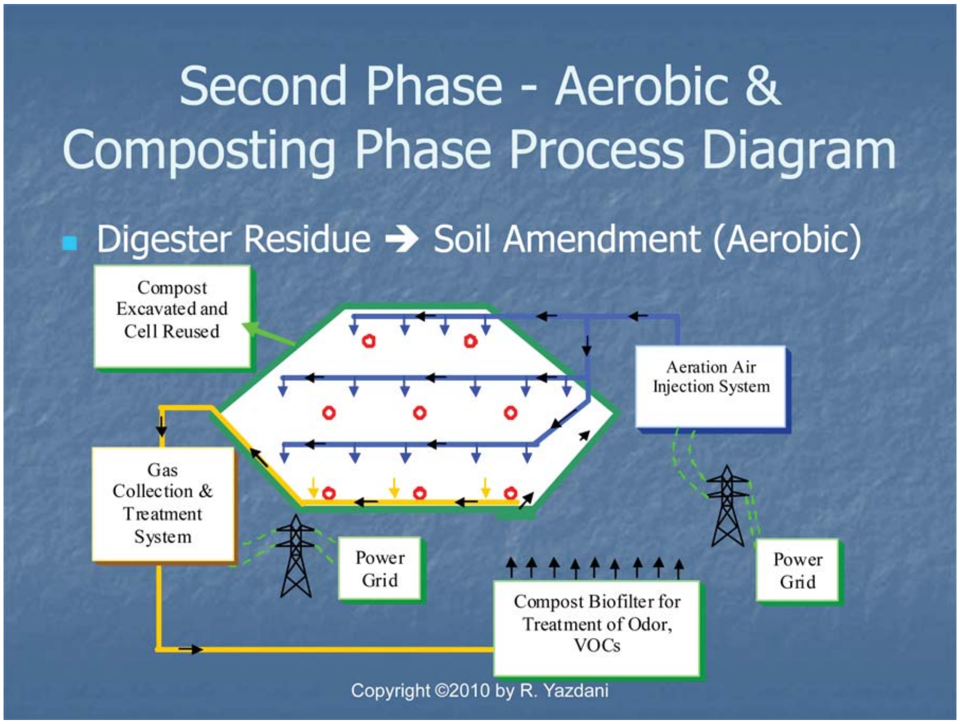
PHOTOGRAPH 1. Yazdani Digester-CalRecycle (Yolo County, 2006).



Second Phase - Aerobic & Composting Phase Process Diagram

- Digester Residue ➔ Soil Amendment (Aerobic)

Compost Excavated and Cell Reused

Aeration Air Injection System

Gas Collection & Treatment System

Power Grid

Compost Biofilter for Treatment of Odor, VOCs

Power Grid

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PHOTOGRAPH 2. Yazdani Digester-CalRecycle (Yolo County, 2006).

SOURCE: ESA, 2010

Figure 13-2
Digester Cell Process Diagrams

A review of Table 13-1 shows that the Landfill In-Ground “Digester Cell” Alternative has impacts that are equal or greater than the impacts of the project (prior to mitigation) in areas of air quality and greenhouse gases and hazards and hazardous materials. The Landfill In-Ground “Digester Cell” Alternative has impacts that are equal or less than the project (prior to mitigation) in areas of hydrology, noise, public services and utilities, transportation, aesthetics, and hazards and hazardous materials.

13.4 Comparison of Alternatives

The relative impacts of the various project alternatives identified for consideration in this document, including the project and No Project Alternative, are shown in Table 13-1. Only those project effects that are identified as significant before mitigation are listed in Table 13-1. In addition, the significance of each impact is described prior to implementation of feasible mitigation measures. This is done in order to identify which alternatives would avoid or substantially lessen one or more potentially significant impacts, as required by CEQA Guidelines §15126.6(a). For the level of significance of the proposed project after mitigation, refer to Table 1-1 and the impact analysis in Chapters 5-11. Many mitigation measures identified for the project (Table 1-1) would also be feasible under the various alternatives.

Ability to Achieve Project Objectives

Table 13-2 shows the ability of each alternative to achieve the project objectives. While the proposed project meets all the objectives, the evaluation in Table 13-2 shows that none of the alternatives meet all the project objectives.

Environmentally Superior Alternative

CEQA Guidelines §15126.6(d) requires that an EIR include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed project. CEQA Guidelines §15126(e) requires that the alternatives analysis must identify the “environmentally superior” alternative among those considered. If the “No Project” alternative is identified as the environmentally superior alternative, then the EIR must also identify an environmentally superior alternative among the other alternatives. The analysis in this chapter clearly shows that the No Project Alternative is not the environmentally superior alternative. While it has less impact than the project for several impacts because no AD construction impacts would occur, it completely fails to achieve any of the primary environmental benefits of the project. Tables 13-1 and 13-2 were reviewed in considering the environmental benefits of the other Alternatives. A review of Table 13-1 indicates that the most of the alternatives have several impacts that are less significant than the project and some impacts than are rated potentially greater (more adverse) than the impacts of the proposed project. Table 13-1 indicates that the Co-Digestion at Dairy Manure Digesters Alternative is not the environmentally superior alternative; as there are more impacts for this alternative that are rated potentially greater (more adverse) than the proposed project.

TABLE 13-1
PROJECT ALTERNATIVES: COMPARISON OF SIGNIFICANT EFFECTS[1]

	No Project Alternative	Co-Digestion at Wastewater Treatment Plants (WWTPs) Alternative	Co-Digestion at Dairy Manure Digesters Alternative	Increased Aerobic Composting Alternative	Landfill In-Ground Digester Cell Alternative
5. Air Quality and Greenhouse Gas					
Impact 5.1: Construction and operations of AD facilities within California would result in emissions of criteria air pollutants at levels that could substantially contribute to a potential violation of applicable air quality standards or to nonattainment conditions.	LS	LS	PG	E/PG	PG
Impact 5.2: Operation of AD facilities in California could create objectionable odors affecting a substantial number of people.	LS	LS	E	E/PG	E
Impact 5.3: Construction and operation of AD facilities in California could lead to increases in chronic exposure of sensitive receptors in the vicinity to certain toxic air contaminants from stationary and mobile sources.	LS	E	LS	E	E
Impact 5.5: Development of AD facilities in California, together with anticipated cumulative development in the area, would contribute to regional criteria pollutants.	E	E	PG	E	E
6. Hydrology					
Impact 6.2: The operation of AD facilities could adversely affect surface and groundwater quality.	LS	LS	PG	PG	PG
Impact 6.3: AD facilities could be exposed to flooding hazards.	LS	E	PG	PG	PG
Impact 6.4: Construction of AD facilities could change drainage and flooding patterns.	LS	LS	E	E	PG
Impact 6.6: Digesters and associated facilities could become inundated as a result of seiche, tsunami, or mudflow.	LS	LS	LS	E	E
Impact 6.7: AD facilities could contribute to cumulative impacts to water quality.	LS	E	PG	PG	LS
7. Noise					
Impact 7.1: Construction of AD facilities could temporarily increase noise levels at nearby sensitive receptor locations or result in noise levels in excess of standards in local general plans, noise ordinance, or other applicable standards.	LS	LS	PG	E	E
Impact 7.2: Noise from operation of AD facilities could substantially increase ambient noise levels at nearby land uses or result in noise levels in excess of standards in local general plans, local noise ordinances, or other applicable standards.	LS	LS	E	PG	LS
Impact 7.4: Development of AD facilities could result in a cumulative increase in noise levels.	E	E	E	E	LS
8. Public Services and Utilities					
Impact 8.2: The project could potentially exceed wastewater treatment requirements of the Regional Water Quality Control Board.	LS	LS/PG	PG	LS	LS
Impact 8.3: The project could result in significant environmental effects from the construction and operation of new water and wastewater treatment facilities or expansion of existing facilities.	LS	LS/PG	LS	LS	LS

PG Potentially Greater impact than project LS Less Significant impact than project E Equal impact to the project

TABLE 13-1
PROJECT ALTERNATIVES: COMPARISON OF SIGNIFICANT EFFECTS[1]

	No Project Alternative	Co-Digestion at Wastewater Treatment Plants (WWTPs) Alternative	Co-Digestion at Dairy Manure Digesters Alternative	Increased Aerobic Composting Alternative	Landfill In-Ground Digester Cell Alternative
Impact 8.6: The project could result in exceeding the capacity of a wastewater treatment provider.	LS	LS/PG	LS	LS	LS
Impact 8.7: The project could result in the construction of new energy supplies and could require additional energy infrastructure.	LS	E	PG	LS	LS
9. Transportation					
Impact 9.1: Construction of AD facilities would intermittently and temporarily increase traffic congestion due to vehicle trips generated by construction workers and construction vehicles on area roadways.	LS	LS	E	E	LS
Impact 9.2: AD facility operations would not substantially increase on-going (operational) traffic volumes on roadways serving the facilities.	E	LS/E	E	E	LS
Impact 9.3: AD facilities could potentially cause traffic safety hazards for vehicles, bicyclists, and pedestrians on public roadways, and could increase traffic hazards due to possible road wear or to accidental spills of digestate (liquids and solids).	LS	LS	E	E	E
Impact 9.4: AD facilities could intermittently and temporarily impede access to local streets or adjacent uses (including access for emergency vehicles), as well as disruption to bicycle/pedestrian access and circulation.	LS	LS	PG	E	LS
Impact 9.5: The project could contribute to cumulative impacts to traffic and transportation (traffic congestion, traffic safety, and emergency vehicle access).	E	LS	E	E	LS
10. Aesthetics					
Impact 10.1: AD facilities could have adverse effects on a scenic vista and/or scenic resources.	LS	LS	E	LS	LS
Impact 10.2: AD facilities could degrade the existing visual character/quality of the site and its surroundings.	LS	LS	LS	LS	LS
Impact 10.3: AD facilities could create a new source of light or glare with adverse affects to daytime and/or nighttime views.	LS	LS	PG	LS	LS
Impact 10.4: The project could result in cumulative impacts to visual resources.	E	E	E	LS	LS
11. Hazards and Hazardous Materials					
Impact 11.1: Construction of AD facilities could result in the potential exposure of construction workers, the public and the environment to preexisting soil and/or groundwater contamination.	LS	LS	LS	LS	E
Impact 11.4 Operation of AD facilities could increase the risk of fire hazards due to the potential release of biogas.	LS	E	E	LS	E
Impact 11.7: AD facilities could be located within five miles of a public airport or private airstrip and create an aviation hazard.	LS	E	E	E/PG	LS

---

1. The significance of each impact is described prior to implementation of feasible mitigation measures.

SOURCE: Environmental Science Associates, 2011

PG Potentially Greater impact than project LS Less Significant impact than project E Equal impact to the project

TABLE 13-2
PROJECT ALTERNATIVES: COMPARISON OF ABILITY TO ACHIEVE PROJECT OBJECTIVES

	Proposed Project	No Project Alternative	Co-Digestion at Existing Wastewater Treatment Plants (WWTPs) Alternative	Co-Digestion at Dairies Alternative	Increased Aerobic Composting Alternative	Landfill In-Ground Digester Cell Alternative
Objective 1 – Assist in meeting CalRecycle Strategic Directive 6.1: Reduce the amount of organics in the waste stream by 50 percent by 2020.	✓	0	✓	✓ - 0	✓	✓ - 0
Objective 2 – Support Assembly Bill 32 (AB 32), the California Global Warming Solutions Act of 2006, greenhouse gas reduction measures related to the use of anaerobic digestion: • Measures E-3. Achieve a 33 percent renewable energy mix by 2020. (AD facilities produce biogas which is a renewable energy source.) • RW-3. High Recycling/Zero Waste. (anaerobic digestion is one of five subcategories listed under this measure.)	✓	0	✓ - 0	✓ - 0	✓ - 0	✓ - 0
Objective 3 – Assist local governments and state agencies (both lead and responsible agencies) by providing program-level analyses that will identify potential environmental effects of AD facilities and discuss mitigation measures or best management practices that can reduce or eliminate the environmental effects.	✓	0	0	0	0	0

✓ Alternative substantially achieves objective
0 Alternative does not achieve objective
✓ - 0 Alternative meets the objective but only to a limited degree

SOURCE: Environmental Science Associates, 2011

The analysis (Table 13-2) indicates that only the Increased Aerobic Composting Alternative and the Co-Digestion at Existing WWTPs Alternative substantially meet Objective 1 in the short term (substantially assist in reducing the amount of organics in the waste stream by 50 percent by 2020). Other alternatives will assist in meeting this objective but not as substantially in the short-term. None of the alternatives substantially meet Objectives 2 and 3.

Given the comparison of alternatives, only the Increased Aerobic Composting Alternative and the Co-Digestion at Existing WWTPs Alternative are promising for being able to substantially assist in reducing the amount of organics in the waste stream by 2020 (Objective 1). Between the two alternatives that could substantially reduce organics, the Increased Aerobic Composting Alternative would appear to have more flexibility in expanding existing facilities or adding new facilities to handle the increased organic materials. While WWTPs could use any current excess capacity they have to digest the additional organics, once that capacity is maximized, it would be a major step for a WWTP to add a new AD facility to their facility for the purpose of digesting municipal organic solid wastes, which is not the primary role of WWTPs. Therefore, compared to the alternatives analyzed in this chapter, the Aerobic Composting Alternative is the environmentally superior alternative because it is most likely to result in substantial reductions in organics in the waste stream by 2020. However, it should be noted that the proposed project (the AD Initiative) could substantially achieve all the project objectives and could be implemented with mitigation measures that would reduce most of the project impacts to a level that would be less than significant.

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CHAPTER 14

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14.3 Organizations/Persons Consulted

The organizations and persons consulted, and other referenced reports and materials can be found in the reference sections at the end of each chapter of this Draft Program EIR.

14.4 List of NOP Comment Letters

Comments received in response to the NOP were considered during preparation of the Draft Program EIR. Listed below are the agencies and persons that responded to the NOP for the preparation of the CalRecycle Statewide Anaerobic Digester Facilities Draft Program EIR:

Comment Letters:

- Riverside County Waste Management Department
- Humboldt County Waste Management Authority
- County of San Diego, Department of Planning and Land Use
- Santa Barbara County Air Pollution Control District
- South Coast Air Quality Management District
- City of San Diego, Solid Waste Local Enforcement Agency
- California Department of Food and Agriculture Animal Health and Food Safety Services (Meat and Poultry Inspection Branch)
- County of Fresno, Department of Public Health, Environmental Health Division

CHAPTER 15
Acronyms and Glossary

15.1 Acronyms

AB	Assembly Bill
AD	Anaerobic Digestion or Digester. In this Program EIR, AD is used as the acronym in referring to the Anaerobic Digester Facilities (AD Facilities) and the Anaerobic Digestion Initiative (AD Initiative).
APCDs	Air Pollution Control Districts
AQMDs	Air Quality Management Districts
AQMPs	Air Quality Management Plans
BACT	Best Available Control Technology
BMPs	best management practices
CAA	Clean Air Act
CalEPA	California Environmental Protection Agency
CAL FIRE	California Department of Forestry and Fire Protection
Caltrans	California Department of Transportation
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CAT	Climate Action Team
CCAA	California Clear Air Act
CCR	California Code of Regulations
CDFA	California Department of Food and Agriculture
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CH_4	Methane

CHP	California Highway Patrol
CNEL	Community Noise Equivalent Level
CNG	Compressed Natural Gas
CO	Carbon monoxide
CO_2	carbon dioxide
CO_2e	CO_2 equivalents
CPUC	California Public Utilities Commission
CUPA	Certified Unified Program Agency
CVRWQCB	Central Valley Regional Water Quality Control Board
CWA	Clean Water Act
dB	decibels
dBA	A-weighted decibels
DOT	U.S. Department of Transportation
DPM	diesel particulate matter
DTSC	Department of Toxic Substances Control
EIR	Environmental Impact Report (California)
EPA	U.S. Environmental Protection Agency
ERT	Emergency Response Team
ESA	Environmental Site Assessment
FEMA	Federal Emergency Management Agency
FICON	Federal Interagency Committee on Noise
FIP	Federal Implementation Plan
FOG	Fats, oils and greases
GHG	Greenhouse Gas
GWP	Global Warming Potential
H_2S	Hydrogen Sulfide
HAPs	Hazardous Air Pollutants
HARP	Hot spots Analysis Reporting Program
HFC	Hydrofluorocarbons
Hz	hertz

IC	Internal Combustion
IPCC	International Panel on Climate Change
LEA	Local Enforcement Agency
LNG	Liquefied Natural Gas
LUST	Leaking Underground Storage Tanks
MCL	Maximum Contaminant Level
MMRP	Mitigation Monitoring and Reporting Program
MSW	Municipal Solid Waste
NAAQS	National Ambient Air Quality Standards
NESHAPs	National Emission Standards for Hazardous Air Pollutants
NFPA	National Fire Protection Association
N_2O	Nitrous Oxide
NOI	Notice of Intent
NO	Nitric Oxide
NOP	Notice of Preparation
NOx	Nitrogen oxides
NO_2	Nitrogen Dioxide
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
OEHHA	Office of Environmental Health Hazard Assessment
OES	California State Office of Emergency Services
OMP	Odor Management Plan
OPR	Governor’s Office of Planning and Research
OPS	Office of Pipeline Safety
OSHA	Occupational Safety and Health Administration
PAH	Polycyclic Aromatic Hydrocarbons
PFC	Perfluorocarbons
PHMSA	Pipeline and Hazardous Materials Safety Administration
PG&E	Pacific Gas and Electric Company
PM10	particulate matter of less than 10 microns in size

PM2.5	particulate matter of less than 2.5 microns
PNPL	Proposed National Priorities List
PRC	California Public Resources Code
RCRA	Resource Conservation and Recovery Act
REA	Registered Environmental Assessor
RELs	Reference Exposure Levels
RWQCB	Regional Water Quality Control Board
ROG	Reactive organic gases
RPS	Renewable Portfolio Standards
SB	Senate Bill
SF_6	Sulfur Hexafluoride
SIP	State Implementation Plan
SMUD	Sacramento Metropolitan Utilities District
SO_2	Sulfur Dioxide
SOx	Sulfur Oxides
SWRCB	State Water Resources Control Board
SWPPP	Stormwater pollution prevention plan
TAC	Toxic Air contaminant
TAG	Technical Advisory Group
TDS	total dissolved solids
TMDL	Total Maximum Daily Loads
UC	University of California
USC	United States Code
UST	Underground storage tanks
US EPA	U.S. Environmental Protection Agency
VOC	Volatile Organic Compounds

15.2 Glossary of Terms[1]

Alternative daily cover	Material other than soil used to cover the surface of active landfills at the end of each day to control diseases, fires, odors, etc.
Anaerobic digester	A dedicated unit process for controlling the anaerobic decomposition of organic material. Typically consists of one or more enclosed, temperature controlled tanks with material handling equipment designed to prevent the introduction of oxygen from the atmosphere.
Biomixer	A rotating drum often with a trommel screen used for size reduction and pretreatment of the organic fraction in mixed MSW for sorting. Can be aerated to encourage biological breakdown. Can be operated at retention times from several hours to several days.
Bioreactor-landfill	A landfill operated as a bioreactor using leachate recycling (or other management schemes) to increase the rate of organic decomposition and biogas production. Not to be confused with anaerobic digester.
Compost	Compost here refers to stabilized and screened organic material ready for horticultural or agricultural use. If anaerobically digested material is used as compost, it must be biologically stabilized, typically through aeration and maturation.
Continuously stirred tank reactor	A digester configuration in which the entire digester contents are mixed to create a homogeneous slurry.
Hydraulic retention time	The average length of time liquids and soluble compounds remain in a reactor. Increasing the HRT allows more contact time between substrate and bacteria but requires slower feeding and/or larger reactor volume.
Mechanically separated OFMSW	Organic material separated from the mixed waste stream by mechanical means (i.e., trommels, screens, shredders, magnets, density dependent mechanisms). Isolating the OFMSW from mixed waste is less effective using mechanical separation as compared with source separation.
Municipal solid waste	MSW includes all of the solid wastes that are generated from residential (homes and apartments) sources, commercial and business establishments, institutional facilities, construction and

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[1] Amended from: CIWMB, *Current Anaerobic Digestion Technologies Used for Treatment of Municipal Organic Solid Waste*. March 2008.

	demolition activities, municipal services, and treatment plant sites. Hazardous wastes are generally not considered MSW. Some regions or countries consider only residential solid waste as MSW.
Organic fraction of municipal solid waste	The biogenic fraction of MSW. OFMSW can be removed from the waste stream at the source (source-separation), or downstream by mechanical separation, picking lines a combination of the two. The wood and paper fraction is more recalcitrant to biological degradation and is therefore not desired for biochemical conversion feedstocks.
Plug flow digester	A digester in which materials enter at one end and push older materials toward the opposite end. Plug flow digesters do not usually have internal mixers, and the breakdown of organic matter naturally segregates itself along the length of the digester.
Pre-treatment	In reference to municipal solid waste, pre-treatment can refer to any process used to treat the raw MSW stream before disposal. This includes separation, drying, comminuting, hydrolysis, biological treatment, heating, pyrolysis, and others.
Solids retention time	The average length of time solid material remains in a reactor. SRT and HRT are equal for complete mix and plug flow reactors. Some two-stage reactor concepts and UASB reactors decouple HRT from the SRT allowing the solids to have longer contact time with microbes while maintaining smaller reactor volume and higher throughput.
Source-separated OFMSW	Organic solid waste separated at the source (i.e., not mixed in with the other solid wastes). Often comes from municipal curbside recycling programs in which yard waste and sometimes kitchen scraps are collected separately from the rest of the MSW stream. The precise composition of source-separated OFMSW can change significantly depending on the collection scheme used.
Total solids	The amount of solid material (or dry matter) remaining after removing moisture from a sample. Usually expressed as a percentage of the as-received or wet weight. Moisture content plus total solids (both expressed as percentage of wet weight) equals 100 percent.
Volatile solids	The amount of combustible material in a sample (the remainder is ash). The value is usually reported as a percentage of the total solids, but may occasionally be given as a fraction of the wet weight. Volatile solids is used as an indicator or proxy for the

biodegradability of a material, though recalcitrant biomass (i.e., lignin) which is part of the volatile solids is less digestible. Because of the simplicity of the measurement procedure, it is commonly reported in the AD literature.

Appendix A
Notice of Preparation

Natural Resources Agency Arnold Schwarzenegger, Governor

CalRecycle

DEPARTMENT OF RESOURCES RECYCLING AND RECOVERY

801 K STREET, MS 19-01, SACRAMENTO, CALIFORNIA 95814• (916) 322-4027 • WWW.CALRECYCLE.CA.GOV

NOTICE OF PREPARATION

To: Interested Agencies and Individuals and the Office of Planning and Research

Subject: **Notice of Preparation of a Draft Statewide Program Environmental Impact Report for Anaerobic Digester Facilities for the Treatment of Municipal Organic Solid Waste**

The California Department of Resources Recycling and Recovery (CalRecycle) will be the lead agency for preparation of a Statewide Program Environmental Impact Report (Program EIR) for anaerobic digester facilities for the treatment of the organic fraction of Municipal Solid Waste (AD facilities) in accordance with the California Environmental Quality Act (CEQA). This Notice of Preparation (NOP) provides responsible and trustee agencies and the public with information describing the project and its potential environmental effects. Pursuant to CEQA Section 21080.4(a) and Section 15082 of the State CEQA Guidelines, responsible and trustee agencies and members of the public are asked to provide written comments regarding the scope and content of the Program EIR.

Public and Agency Comment: Public agencies may use the Program EIR prepared by CalRecycle when considering approval of individual projects for AD facilities within their jurisdictions. If you are a Responsible Agency or Trustee Agency, CalRecycle needs to know the views of your agency as to the scope and content of the environmental information which is germane to your agency's statutory responsibilities in connection with the proposed project. CalRecycle is also interested in the views of members of the public as to the desired scope and content of the environmental information in the Program EIR.

The preliminary project description and a list of environmental issues to be addressed in the Program EIR are contained in the attached materials. The NOP and attached materials will also be available on the CalRecycle web site (www.CalRecycle.ca.gov/SWFacilities) after the documents are published by the State Clearinghouse.

Due to the time limits mandated by State law, the response of Responsible Agencies and Trustee Agencies must be sent to CalRecycle at the earliest possible date **but not later than 30 days after receipt of this notice**. Responses should include a contact name at your agency and be sent to:

CalRecycle
Attn: Ken Decio
P.O. Box 4025
1001 I Street
Sacramento, CA 95812-4025

If you have any questions regarding this matter, please contact Ken Decio at (916) 341-6313.

Ken Decio, Senior Integrated Waste Management Specialist April 30, 2010

STATEWIDE PROGRAM EIR FOR ANAEROBIC DIGESTER FACILITIES

FOR THE TREATMENT OF MUNICIPAL ORGANIC SOLID WASTE

Introduction

Compostable organic materials comprise approximately 25 percent of the solid waste stream disposed in California landfills.[1] CalRecycle Strategic Directive 6.1 calls for a 50 percent reduction in the amount of organics being disposed in landfills by 2020. An additional 10-15 million tons of organics will need to be composted or recycled annually to achieve this goal, requiring the siting of new and expansion of existing organic diversion facilities.

Currently there are no commercial-scale anaerobic digester (AD) facilities processing organics in California; however, interest in developing AD facilities for organic processing is growing, and CalRecycle anticipates that AD facilities will be developed across the state to meet the increasing need to divert organic waste from landfills. CalRecycle is preparing this Statewide Program Environmental Impact Report (EIR) to assess the potential environmental effects that may result from the development of AD facilities in California. The results of the Program EIR will inform future policy considerations related to AD facilities and provide background information on AD technologies, potential impacts and mitigation measures. This information will also assist state and local agencies in preparing site-specific environmental documentation that may be required for AD facility applications and/or permits submitted to CalRecycle, regulatory agencies and local jurisdictions. In the event CalRecycle or other public agencies adopt regulations or ordinances relating to regulating or permitting AD facilities, the EIR will also provide useful information and can serve as the basis for analyzing the environmental effects of those projects.

The project has several objectives including the following:

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[1] CalRecycle, 2009. Organics Policy Roadmap and Schedule. Available online at: <http://www.ciwmb.ca.gov/Organics/RoadMap08/default.htm>. Accessed 04/07/10.

- Assist in meeting CalRecycle Strategic Directive 6.1: Reduce the amount of organics in the waste stream by 50 percent by 2020.
- Support Assembly Bill 32 (AB 32), the Global Warming Solutions Act of 2006, greenhouse gas reduction measures related to anaerobic digestion:

    Measures E-3. Achieve a 33 percent renewable energy mix by 2020. (AD facilities produce biogas which is a renewable energy source.)

    RW-3. High Recycling/Zero Waste. (Anaerobic digestion is one of five subcategories listed under this measure.)

- Assist local governments and state agencies (both lead and responsible agencies) by providing program-level analyses that will identify potential environmental effects of AD facilities and discuss mitigation measures or best management practices that can reduce or eliminate the environmental effects.

Background

Anaerobic digestion is the biological decomposition of organic matter with little or no oxygen. The anaerobic digestion process occurs naturally in marshes and wetlands. There are a variety of controlled systems where anaerobic technology is currently utilized in the United States including wastewater treatment facilities and dairy manure digesters. In other countries (primarily Europe), anaerobic technology is utilized in municipal solid waste digesters to produce energy and to reduce the volume of solid waste that must be landfilled.

Anaerobic digester facilities that process solid waste produce biogas and digestate (liquids and solids). The biogas consists primarily of methane (CH_4), which can be used for energy, and carbon dioxide (CO_2), with small amounts of hydrogen sulfide (H_2S), and ammonia (NH_3). Typically, biogas is saturated with water vapor and may have trace amounts of hydrogen (H_2), nitrogen (N_2), oxygen (O_2), dust and siloxanes.[2] Residual products from anaerobic digestion are liquid and solid residuals (digestate).

Project Description

CalRecycle formed a Technical Advisory Group (TAG) to discuss the project description and environmental issues to be considered in the Program EIR. The TAG includes state and regional regulatory agencies, solid waste industry representatives, AD facility developer representatives, and local jurisdictions. The following project description incorporates input from the TAG regarding facilities and feedstocks which should be considered in the Program EIR.

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Facilities and Feedstocks to be Analyzed in the Program EIR

The scope of the project description has been focused on the objective of reducing the organic content of the solid wastes that are disposed in municipal solid waste landfills.

> **AD Facilities included:** In-vessel digester facilities which are located at permitted solid waste facilities and within industrial areas.
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> **AD Facilities not included:** Dairy digesters and wastewater treatment plant digesters and co-digesters. In-ground digester cell technology, though not included in the project, will be discussed and evaluated as an alternative to in-vessel digestion. An example of the in-ground digester cell is the landfill-based anaerobic digester-compost pilot project developed at the Yolo County Central Landfill.
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> **Feedstock materials included:** Food waste, green material, and mixed solid waste. The food and green material categories are intended to be inclusive and not limited by current regulatory definitions or collection methods – so “food” includes cannery waste, meat, poultry, fish, cheese waste, food processing waste, etc., and “green material” includes urban, agricultural, crop residues, contaminated green materials, etc. Use of manure will be considered as a seed material for the purpose of increasing digester efficiency, but not as a primary waste stream to be evaluated.
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> **Feedstock materials not included:** Biosolids, food waste co-digested at wastewater treatment plants or dairy digesters, and hazardous waste.

Technologies

There are several technology choices for commercial AD facilities. The EIR will allow for flexibility in technology choices at the local level. The project will analyze the environmental effects of different digestion technologies, including one-stage continuous, two-stage continuous and batch systems. The project will evaluate both wet (low solids) and dry (high solids) processes. Although there is no set standard, generally wet processes have less than 15% total solids concentration and dry processes have 15 to 40% total solids concentration. A good description of the range of these technologies that the Program EIR will evaluate is included in a March 2008 CIWMB report, *Current Anaerobic Digestion Technologies Used for Treatment of Municipal Organic Solid Waste*.

Processes

The technologies listed above share the following main processes which the Program EIR will evaluate: pre-processing, digestion and post-processing.

Pre-Processing. Pre-processing includes feedstock receiving, storage of feedstocks, all processing steps required to prepare the feedstock for the digester, and the process of feedstock delivery into the digester.

Digestion. Within the digester, decomposition occurs in four phases: hydroloysis, acidogenesis, acetogenesis, and methanogenesis.

Post Processing. The byproducts of the anaerobic digestion process are digestate and biogas. The digestate is a liquid which is further processed or dewatered resulting in separate liquid and solid byproducts. Options for handling the liquid byproduct depend on its quality and can include reuse in the digestion process, discharge to surface waters, percolation ponds, evaporation ponds, sanitary sewers, or beneficial use as irrigation water. The solid byproduct can be aerobically composted, used as feedstock for energy production facilities or disposed of in landfills. Biogas generated from the anaerobic digestion process can be used as a fuel for a cogeneration system, compressed or liquefied for use as a fuel commodity, or injected into a gas grid or combusted in a flare. For each gas use alternative, specific gas conditioning measures would be required.

Environmental Issues

This section discusses the environmental issue areas which will be evaluated at a program level within the Program EIR. The following lists incorporate input from the TAG which reviewed a preliminary summary of potential environmental impacts. The lists also incorporate a review of the analysis completed for the Notice of Preparation and Initial Study for the Central Valley Dairy Digester and Co-digester Facilities Program EIR, which was released March 2010 by the Central Valley Regional Water Quality Control Board.

The EIR will analyze the following environmental issues areas for which the project may have potentially significant impacts at the program level (specific areas of concern include, but are not limited to, the issues identified in parenthesis):

- Aesthetics (litter, light, glare)
- Air Quality (criteria pollutants, odors, fugitive emissions)
- Greenhouse Gas Emissions
- Hazards and Hazardous Materials (fuels, lubricants, spillage, contaminated feedstocks, equipment, explosions/fire, vector control, airport consistency)
- Hydrology and Water Quality (washwater, stormwater runoff, condensate, effluent disposal)
- Noise (traffic noise and equipment noise)
- Public Services and Utilities (water, wastewater, solid waste, energy use/creation, gas)
- Transportation and Traffic (level of service and roadway impacts from trucks)
- Cumulative Impacts

The following environmental issue areas will be discussed in much less detail as they are not anticipated to have potentially significant impacts at the program level, although they could require evaluation for individual projects due to the potential for local effects:

- Agricultural and Forest Resources
- Biological Resources
- Cultural Resources
- Geology, Soils and Seismicity
- Land Use and Land Use Planning
- Mineral Resources
- Population and Housing
- Recreation

Appendix B

Anaerobic Digester Facility Photographs

PHOTOGRAPH 1 – UC Davis Biogas Plant (CIWMB, 2008).

PHOTOGRAPH 2 – Wet AD Plant in Leubeck, Germany (Anaerobic-digestion.com, 2010).

- Commissioned 2002
- Design 25,000 tonnes per year SSO
- Current 40,000 + tonnes per year
- Area < 1 Ha
- Building < 2,200m²
- BTA technology
- City owned
- CCI-TBN Toronto Inc. operated

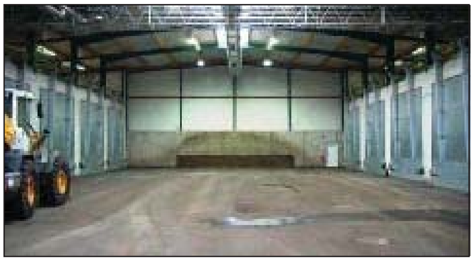
PHOTOGRAPH 3 – Dufferin Organics Processing Facility, Toronto, Canada (CCI-TBN Toronto Inc., 2009)

SOURCE: ESA, 2010

Figure B-1
Anaerobic Digester Facilities Photographs

PHOTOGRAPH 1. AD chambers, Munich, Germany.

PHOTOGRAPH 2. Fermenter Plant in Bennati, Italy.



PHOTOGRAPH 3. Indoor AD facility, Munich, Germany.

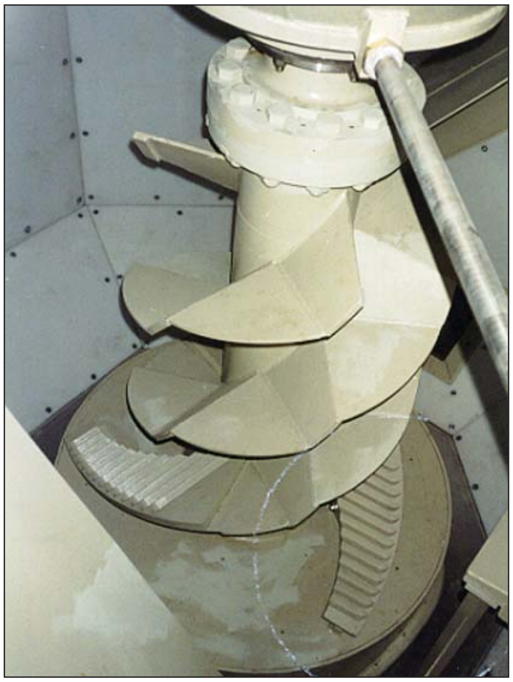
SOURCE: ESA, 2010

CalRecycle Statewide AD Facilities Program EIR . 209134

Figure B-2

Anaerobic Digester Facilities Photographs

PHOTOGRAPH 1 – Pulper at Dufferin facility (City of Toronto, 2009).



PHOTOGRAPH 2 – Inside the pulper (City of Toronto, 2009).

PHOTOGRAPH 3 – Mixed solid waste.

SOURCE: ESA, 2010

Figure B-3
Anaerobic Digester Facilities Photographs

Natural Resources Agency Arnold Schwarzenegger, Governor

CalRecycle

DEPARTMENT OF RESOURCES RECYCLING AND RECOVERY

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- Land Use and Land Use Planning
- Mineral Resources
- Population and Housing
- Recreation

- Compostable Materials Home
- Index
- Permitting
- Enforcement
- Statutes and Regulations
- Operational Challenges
- Responses to Challenges
- Community Outreach
- Resources
- Organic Materials Management
- LEA Central
- Solid Waste Facilities Home

Compostable Materials

Anaerobic Digestion

Current Initiatives | **Program Enivronmental Impact Report** | **Additional Guidance and Resources**

Anaerobic digestion (AD) is the biological decomposition of organic matter with little or no oxygen. The anaerobic digestion process occurs naturally in marshes and wetlands. There are a variety of controlled systems where anaerobic technology is currently utilized in the United States, including wastewater treatment facilities (also Public-Operated Treatment Works or POTWs), and dairy manure digesters. In other countries (primarily Europe), anaerobic technology is utilized in municipal solid waste digesters to produce energy and to reduce the volume of solid waste that must be landfilled.

CalRecycle is encouraging the development of technologies that divert organic waste from landfills and comply with the Global Warming Solutions Act (Assembly Bill [AB] 32, Núñez, Chapter 488, Statutes of 2006) and AB 341 (Chesbro, Chapter 476, Statutes of 2011). AB 32 calls for the reduction of greenhouse gases and the use of low carbon fuels, and solid waste landfills are a significant source of greenhouse gases due to decomposition of organic material in landfills into methane. AB 341 takes a statewide approach to decreasing California's reliance on landfills with an ambitious goal of 75 percent recycling, composting or source reduction of solid waste by 2020. Anaerobic digestion is being considered for many projects to divert organic materials from landfills and produce low carbon fuels.

Current Initiatives

- **Organics Regulatory Changes**: As part of CalRecycle's regulatory review process, feedback was solicited on 14 compostable material handling issues and potential approaches for addressing these issues from 2011-2014. The formal rulemaking for the revision of existing Title 14 and Title 27 regulations regarding in-vessel digestion regulations was initiated in October 2014 and the regulations will go into effect in January 2016.
- **Greenhouse Gas (GHG) Reduction Grants and Loans**: The Greenhouse Gas Reduction Fund (GGRF) was established in 2012 and receives Cap-and-Trade auction proceeds appropriated by the Legislature and Governor for projects that support the goals of AB 32. CalRecycle established the GHG Reduction Grant and Loan Program to fund capital investments in anaerobic digesters and other facilities that will reduce GHG emissions by diverting organics from the landfill. A priority is to realize environmental and economic benefits in disadvantaged communities.
- **75 Percent Initiative**: Current initiatives, activities and workshops related to anaerobic digestion and organics are described within the focus areas for the statewide strategy called for by AB 341.

Program Environmental Impact Report (EIR) for Anaerobic Digestion Facilities

To assist in the siting and permitting of AD facilities in California, CalRecycle sponsored the development of a Program EIR to assess the environmental effects of anaerobic digestion facilities in California. The Program EIR also provides background on technologies, potential impacts, and mitigation measures. If you require assistance in obtaining access to these documents, call the Public Affairs Office at (916) 341-6300 or Ken Decio at (916) 341-6313.

- Final Program EIR. The Final Program EIR was certified on June 22, 2011 after a June 21 public meeting. Documents related to certification of the Final Program EIR include:
    - Guidance Document for CEQA Review of Municipal Organic Waste Anaerobic Digester Facilities in California
    - Staff Recommendations on CEQA Findings
    - Mitigation Monitoring and Reporting Plan
    - Anaerobic Digestion Initiative
    - Request for Certification of the Anaerobic Digestion Final Program EIR and Approve Anaerobic Digestion Initiative
    - Notice of Determination
    - Department of Fish and Game CEQA Filing Fee No Effect Determination
- Draft Program EIR was available for public comment through April 4, 2011. Comments were also accepted at the CalRecycle Monthly Public Meeting on March 15, 2011 in Sacramento and at a special public meeting for Southern California jurisdictions on March 30, 2011 in Lakewood.
- Notice of Preparation, April 30, 2010.

Additional Guidance and Resources

- How Anaerobic Digestion Fits Current Board Regulatory Structure. This guidance document provides a detailed review of the way anaerobic digestion activities are to be regulated under the Integrated Waste Management Act. (October 2009)
- List of Anaerobic Digestion Projects in California. Location, feedstocks, status and websites for various projects.
- Anaerobic Digestion: What is it and Who is Doing it? Overview of some technical and financing factors that local officials and staff should consider in determining whether anaerobic digestion is an appropriate approach to meet their goals. Includes case examples from Sacramento, Monterey Region, and city of Perris. (Institute for Local Government contract, 2015).
- 2012 Bioenergy Action Plan. Statistics on bioenergy production as well as barriers and recommendations to meet clean energy, waste reduction and climate protection goals. (California Energy Commission).
- Dairy Manure Digester And Co-Digester Facilities Final Program Environmental Impact Report, November 2010.
    - Draft Program Environmental Impact Report
- Permit Guidance for Anaerobic Digesters and Co-Digester Manual (CalEPA).
- Anaerobic Digester Projects (CalEPA). Resources, mapping and grants for biogas recovery also known as biodigesters.
- Current Anaerobic Digestion Technologies Used for Treatment of Municipal Organic Solid Waste.
- New and Emerging Conversion Technologies: Report to the Legislature (2007). Impacts of conversion technologies on recycling and diversion per AB 2770 (Matthews, Chapter 740, Statutes of 2002).
- Increasing Siting and Capacity of Organic Diversion Facilities. Process for developing Organics Policy Roadmap in beginning in 2007-2008.
- Safely Disposing of Waste Meat, Poultry, and Fish Material: Guidance and FAQs
- LEA Advisory 58: Methodology for Determining Compliance. (2003) Advisory provides guidance to LEAs in implementing the three-part test.

Martin Perez: Martin.Perez@calrecycle.ca.gov (916) 323-0834

Response to Comments Document

DAIRY MANURE DIGESTER AND CO-DIGESTER FACILITIES

Final Program Environmental Impact Report
SCH No. 2010031085

Prepared for
California Regional Water Quality
Control Board, Central Valley Region

November 2010

ESA

Response to Comments Document

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Final Program Environmental Impact Report
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CHAPTER 1
Executive Summary

This chapter contains the final mitigation measures for the Program EIR, summarizes key issues raised in the comments on the draft Program EIR, and discusses implementation of the Mitigation Monitoring and Reporting Programs (MMRPs) under the waste discharge regulatory program. For additional details regarding specific issues, please consult the appropriate chapters of the draft Program EIR, as well as any modifications to those chapters as identified in the Text Changes to the draft Program EIR (Chapter 5 of this document). All of the final mitigation measures, as modified in this Response to Comments document, are presented in the revised **Table 1-1**, Environmental Impacts and Mitigation Measures, presented at the end of this chapter. Please see Chapter 5 (Text Changes to the draft Program EIR) to see the detailed deletions and insertions to any changes in the mitigation measures in **Table 1-1**.

1.1 Key Issues in the Response to Comments Document

This Response to Comments document has modified the draft Program EIR as identified in the specific insertions and deletions contained in Chapters 3 and 4 that are organized sequentially in Chapter 5. The most substantial comments are in Comment Letters H (Dairy Cares), I (Sustainable Conservation) and J (Western United Dairymen). These three comment letters have questions regarding the mitigation measures that would be implemented for various types of dairy manure digester projects. These comment letters resulted in modification to some of the mitigation measures in the EIR and were helpful in preparing the mitigation monitoring and reporting plan contained in Appendix A for the overall waste discharge regulatory program.

The three commenters also expressed concern about the need for several of the mitigation measures. The need for more mitigation measures than might be required for a site specific EIR stems from the fact that this EIR is for a broad-based program meant to cover a variety of potential dairy digester configurations that could be proposed in the Central Valley (Region 5) and thus there is a lack of site specific information. The commenters are reminded of this in response to Comment I-12, which states that, “the primary goal of the Program EIR is to provide certainty to the CEQA environmental review process for dairy digester projects by identifying potentially significant environmental level impacts absent knowledge of site specific conditions, and identify feasible mitigation measures to address the potential impacts.”

1.2 Mitigation Monitoring and Reporting Programs

Mitigation monitoring is the follow-up effort by the Lead Agency to ensure that mitigation measures are implemented. The Final Program EIR identifies mitigation measures that reduce most potentially significant effects of the program to a less than significant level. A Mitigation Monitoring and Reporting Program (MMRP) is required by CEQA Guidelines Section 15097, and will be incorporated into each waste discharge requirement (WDR) order or other action taken pursuant to the waste discharge regulatory program. The mitigation monitoring reporting plan (Appendix A of this document) provides a framework for the MMRPs to be considered during the adoption of each WDR order (e.g., General Order, and Individual WDRs) under the waste discharge regulatory program.

TABLE 1-1
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance Before Mitigation	Impact Significance After Mitigation
5. Hydrology and Water Quality			
Impact 5.1: Construction associated with installation of dairy digesters and co-digester facilities could generate loose, erodible soils that may impair water quality.	None required.	LS	LS
Impact 5.2: Digester and co-digester development could adversely affect surface waters.	**Measure 5.2:** WDRs for digester and co-digester facilities shall include design and operational requirements to manage all wastes and discharges to protect surface waters. Requirements shall include the following: • Prohibitions against any surface water discharges (unless exempt from NPDES permitting requirements or covered by separate NPDES permit), • Prohibitions against any discharges that would cause exceedance of surface water quality objectives, • Setbacks from surface water bodies • Drainage requirements for co-digestion substrates/waste storage/receiving/handling areas to drain to on-site wastewater retention ponds, • Lining requirements for retention ponds in new facilities and operational dairies, • Monitoring requirements that include sampling data of soils, retention water, and waste streams to reconcile annually with Nutrient Management Plan (NMP), • Requirements for tailwater return systems or other effective methods to minimize offsite discharges; • Prohibitions against any unreasonable effects on beneficial uses of nearby surface waters.	S	LSM
Impact 5.3: Digester and co-digester development could adversely affect groundwater quality.	**Measure 5.3:** WDRs for the discharge to land from dairy digester and co-digester facilities shall include the following BPTC requirements or equivalent: • Prepare and implement site-specific Salt Minimization Plan (SMP) as approved by the Central Valley Water Board. The SMP shall consider the elimination, decommissioning, or the reduction in use of regenerative water softeners on process water distribution networks or, alternatively, evaluate and install alternate technology that reduces or eliminates on-site brine disposal; • Prepare and implement a site-specific NMP that incorporates analytical data for soils, wastewater, manure, digester solids, groundwater and/or surface water supply. The required analytical data is to be generated by a site-specific monitoring and reporting program. In the case of groundwater, data from an approved representative groundwater monitoring program may be substituted for some or all site-specific groundwater monitoring, if appropriate. The NMP will be reconciled annually based on results of the monitoring and reporting program and site-specific measurements of agronomic rates; • Require all drainage be directed to a retention wastewater pond that has been designed to meet antidegradation provisions of Resolution 68-16 by an appropriately licensed professional;	S	LSM

LS – Less than Significant LSM – Less than Significant with Mitigation NI – No Impact S – Significant SU – Significant and Unavoidable

TABLE 1-1
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance: Before Mitigation	Impact Significance: After Mitigation
	• To the extent practicable, use crops that maximize salt uptake; • Apply liquid digestate consistently with crop water uptake rates; • Prohibit hazardous substances in co-digestion substrates processed by each facility as verified by laboratory analytical testing; • Apply digestate at an approved rate commensurate with agronomic rate; • Properly time application of digestate in accordance with crop requirements; • Avoid excess irrigation; • Maintain cover crops and vegetative buffer zones; • Develop co-substrate acceptance criteria; • Perform vector control and reduction; • Monitor groundwater for pathogen indicator organisms; • Require that solid wastes be stored on surfaces designed in accordance with a site-specific Waste Management Plan prepared for the facility by an appropriate California registered professional in accordance with WDR requirements; • Maintain a neutral or alkaline pH for dairy digestate waste water applied to cropland unless conditions warrant otherwise as detailed in the NMP; • Prohibit hazardous waste, mammalian tissues (with the exception of mammalian tissue as contained in compostable material from the food service industry, grocery stores, or residential food scrap collection), dead animals, and human waste from all discharges; and • Incorporate lined digester and co-digestion substrate storage facilities that meet the antidegradation provisions of Resolution 68-16, as relevant, into project design in order to prevent groundwater contamination with salts, nutrients, and other constituents. Each facility shall prepare a site-specific Waste Management Plan in accordance with the WDR requirements for review and approval to the Central Valley Water Board prior to commencement of operations. Annual monitoring reports shall be reviewed by the Central Valley Water Board and any revisions deemed necessary to the handling, storage, or land application of wastes shall be incorporated into facility operations.		
Impact 5.4: Development of dairy digester and co-digester facilities could be exposed to flooding hazards.	**Measure 5.4:** WDRs for digester and co-digester facilities shall include design requirements for individual or centralized anaerobic digester or co-digester facilities and associated facilities to protect them from FEMA 100-year flood events. Design measures may include, but are not limited to: facility sitting, access placement, grading foundation soils above projected water elevation, and site protection.	S	LSM
Impact 5.5: Development of dairy digester and co-digester facilities could require additional water supplies resulting in depletion of groundwater.	None required.	LS	LS
Impact 5.6: Development of dairy digester and co-digester facilities could contribute to cumulative impacts to water quality.	**Measure 5.6:** Implement Mitigation Measures 5.2, 5.3 and 5.4.	S	SU

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TABLE 1-1
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

		Impact Significance	
Impact	**Mitigation Measure**	Before Mitigation	After Mitigation
6. Air Quality and Greenhouse Gas Emissions			
Impact 6.1: Construction of dairy digester and co-digester facilities within Region 5 would generate short-term emissions of criteria air pollutants: ROG, NOx, CO, SO_2, PM10, and PM2.5 that could contribute to existing nonattainment conditions and further degrade air quality.	**Measure 6.1a:** Applicants shall prepare and submit an Air Quality Technical Report as part of the environmental assessments for the development of future dairy digester or co-digester facilities on a specific project-by-project basis. The technical report shall include an analysis of potential air quality impacts (including a screening level analysis to determine if construction and operation related criteria air pollutant emissions would exceed applicable air district thresholds, as well as any health risk associated with TACs from all dairy digester or co-digester facility sources) and reduction measures as necessary associated with digester developments through the environmental review process. Preparation of the technical report should be coordinated with the appropriate air district and shall identify compliance with all applicable New Source Review and Best Available Control Technology (BACT) requirements. The technical report shall identify all project emissions from permitted (stationary) and non-permitted (mobile and area) sources and mitigation measures (as appropriate) designed to reduce significant emissions to below the applicable air district thresholds of significance, and if these thresholds cannot be met with mitigation, then the individual digester project could require additional CEQA review or additional mitigation measures. **Measure 6.1b:** Applicants shall require construction contractors and system operators to implement the following Best Management Practices (BMPs) as applicable during construction and operations: • Facilities shall be required to comply with the rules and regulations from the applicable AQMD or APCD. For example, development of dairy digester and co-digester facilities in the SJVAPCD jurisdiction shall comply with the applicable requirements of Regulation VIII (Fugitive PM10 Prohibitions) and Rule 9510 (Indirect Source Review). • Use equipment meeting, at a minimum, Tier II emission standards, as set forth in §2423 of Title 13 of the California Code of Regulations, and Part 89 of Title 40 Code of Federal Regulations. • Minimize idling time either by shutting equipment off when not in use or reducing the time of idling to 5 minutes (as required by the state airborne toxics control measure [Title 13, §2485 of the California Code of Regulations]). Provide clear signage that posts this requirement for workers at the entrances to the site. • Comply with state regulations to minimize truck idling. • Maintain all equipment in proper working condition according to manufacturer's specifications. • Use electric equipment when possible. • Payment into an AQMD or APCD operated Voluntary Emission Reduction Agreement (VERA). • Incorporate fuel cells where feasible as an alternative to internal combustion engines, which generate NOx emissions, to generate energy from the biogas produced at dairy digester and co-digester facilities. • Where feasible as an alternative to internal combustion engines, which generate NOx emissions, use biogas from dairy manure digester and co-digester projects as a transportation fuel (compressed biomethane) or inject biomethane into the utility gas pipeline system.	S	LSM

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TABLE 1-1
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance	
		Before Mitigation	After Mitigation
Impact 6.2: Pre-processing, digestion, and post-processing operational activities of dairy digester and co-digester facilities in Region 5 would result in emissions of criteria air pollutants at levels that could substantially contribute to a potential violation of applicable air quality standards or to nonattainment conditions.	**Measure 6.2:** Implement Mitigation Measures 6.1a and 6.1b.	S	LSM
Impact 6.3: Operation of dairy digester and co-digester facilities in Region 5 could create objectionable odors affecting a substantial number of people.	**Measure 6.3a:** Applicants for the development of digester facilities shall comply with appropriate local land use plans, policies, and regulations, including applicable setbacks and buffer areas from sensitive land uses for potentially odoriferous processes. **Measure 6.3b:** AD facilities that handle compostable material and are classified as a compost facility must develop an Odor Impact Minimization Plan (OIMP) pursuant to 14 CCR 17863.4. Otherwise, applicants shall implement a site-specific Odor Management Plan (OMP) as part of each application submitted to establish digester and co-digester facilities under the waste discharge regulatory program. The OMP will specifically address odor control associated with digester operations and will include: • A list of potential odor sources. • Identification and description of the most likely sources of odor. • Identification of potential, intensity, and frequency of odor from likely sources. • A list of odor control technologies and management practices that could be implemented to minimize odor releases. These management practices shall include the establishment of the following criteria as appropriate: - Establish time limit for on-site retention of undigested odiferous co-substrates (i.e., organic co-substrates must be put into the digester within 48 hours of receipt). - Provide negative pressure buildings for indoor unloading of odiferous co-digestion substrates. Treat collected foul air in a biofilter or air scrubbing system. - Establish contingency plans for operating downtime (e.g., equipment malfunction, power outage). - Manage delivery schedule to facilitate prompt handling of odorous co-substrates. - Modification options for land application practices if land application of digestate results in unacceptable odor levels. - Protocol for monitoring and recording odor events. - Protocol for reporting and responding to odor events.	S	LSM
Impact 6.4: Construction and operation of dairy digester and co-digester facilities in Region 5 could lead to increases in chronic exposure of sensitive receptors in the vicinity to certain toxic air contaminants from stationary and mobile sources.	**Measure 6.4a:** Implement Mitigation Measures 6.1a and 6.1b. **Measure 6.4b:** Based on the Air Quality Technical Report (specified in Measure 6.1a), if the health risk is determined to be significant on a project-by-project basis with DPM as a major contributor, then the applicants shall either use new diesel engines that are designed to minimize DPM emissions (usually through the use of catalyzed particulate filters in the exhaust) or retrofit older engines with catalyzed particulate filters, which will reduce DPM emissions by 85%. **Measure 6.4c:** H_2S contained in the biogas shall be controlled before emission to air can occur.	S	LSM

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TABLE 1-1
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance	
		Before Mitigation	After Mitigation
Impact 6.5: Construction and operation of dairy digester and co-digester facilities in Region 5 would reduce GHG emissions.	None required.	NI	NI
Impact 6.6: Development of dairy digester and co-digester facilities in Region 5, together with anticipated cumulative development in the area, would contribute to regional criteria pollutants.	**Measure 6.6:** Implement Mitigation Measures 6.1a and 6.1b.	S	SU
7. Land Use and Agricultural Resources			
Impact 7.1: The project would not physically divide an established community.	None required.	LS	LS
Impact 7.2: The project would not result in dairy digester and co-digester facilities that could conflict with an applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect.	None required.	LS	LS
Impact 7.3: Implementation of the project would not conflict with an applicable habitat conservation plan or natural community conservation plan.	None required.	LS	LS
Impact 7.4: Implementation of the project could result in the permanent conversion of land designated by the Department of Conservation FMMP as Prime Farmland, Farmland of Statewide Importance or Unique Farmland.	**Measure 7.4:** Whenever feasible, project related facilities off-site of a dairy should not be sited on Important Farmland as defined by the California Department of Conservation's Farmland Mapping and Monitoring Program.	LS	LS
Impact 7.5: The project would not result in conflicts with existing zoning for agricultural use or a Williamson Act contract.	None required.	LS	LS
Impact 7.6: Implementation of the project would not result in the conversion of farmland to non-agricultural uses.	None required.	LS	LS
Impact 7.7: Development of dairy digester and co-digester facilities would not result in cumulative land use impacts or cumulative impacts to agricultural resources.	None required.	LS	LS
8. Transportation and Traffic			
Impact 8.1: Construction of dairy digester and co-digester facilities would intermittently and temporarily increase traffic levels and traffic delays due to vehicle trips generated by construction workers and construction vehicles on area roadways.	**Measure 8.1:** The contractor(s) will obtain any necessary road encroachment permits prior to installation of pipelines within the existing roadway right-of-way. As part of the road encroachment permit process, the contractor(s) will submit a traffic safety / traffic management plan (for work in the public right-of-way) to the agencies having jurisdiction over the affected roads. Elements of the plan will likely include, but are not necessarily limited to, the following:	S	LSM

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TABLE 1-1
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance Before Mitigation	Impact Significance After Mitigation
	• Develop circulation and detour plans to minimize impacts to local street circulation. Use haul routes minimizing truck traffic on local roadways to the extent possible. Use flaggers and/or signage to guide vehicles through and/or around the construction zone. • To the extent feasible, and as needed to avoid adverse impacts on traffic flow, schedule truck trips outside of peak morning and evening commute hours. • Limit lane closures during peak traffic hours to the extent possible. Restore roads and streets to normal operation by covering trenches with steel plates outside of allowed working hours or when work is not in progress. • Limit, where possible, the pipeline construction work zone to a width that, at a minimum, maintains alternate one-way traffic flow past the construction zone. • Install traffic control devices as specified in Caltrans' Manual of Traffic Controls for Construction and Maintenance Work Zones where needed to maintain safe driving conditions. Use flaggers and/or signage to safely direct traffic through construction work zones. • Coordinate with facility owners or administrators of sensitive land uses such as police and fire stations, hospitals, and schools. Provide advance notification to the facility owner or operator of the timing, location, and duration of construction activities. • To the maximum extent feasible, maintain access to private driveways located within construction zones. • Coordinate with the local public transit providers so that bus routes or bus stops in work zones can be temporarily relocated as the service provider deems necessary.		
Impact 8.2: Operations of dairy digester and co-digester facilities would increase traffic volumes on roadways serving the facility sites.	None required.	LS	LS
Impact 8.3: Construction and operation of dairy digester and co-digester facilities could potentially cause traffic safety hazards for vehicles, bicyclists, and pedestrians on public roadways, and could increase traffic hazards due to possible road wear or to accident spills of manure, or co-digestion feedstocks or digestate.	**Measure 8.3a:** Implement Measure 8.1, which stipulates actions required of the contractor(s) to reduce potential traffic safety impacts to a less-than-significant level. **Measure 8.3b:** Prior to construction, the contractor(s), in cooperation with the agencies having jurisdiction over the affected roadways, will survey and describe the pre-construction roadway conditions on rural roadways and residential streets. Within 30 days after construction is completed, the affected agencies will survey these same roadways and residential streets in order to identify any damage that has occurred. Roads damaged by construction will be repaired to a structural condition equal to the condition that existed prior to construction activity.	S	LSM
Impact 8.4: Construction of dairy digester and co-digester facilities could intermittently and temporarily impede access to local streets or adjacent uses (including access for emergency vehicles), as well as disruption to bicycle/pedestrian access and circulation.	**Measure 8.4:** Implement Measure 8.1, which stipulates actions required of the contractor(s) to reduce potential access impacts to a less-than-significant level.	S	LSM

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TABLE 1-1
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance	
		Before Mitigation	After Mitigation
Impact 8.5: Construction and operation of dairy digester and co-digester facilities could contribute to cumulative impacts to traffic and transportation (traffic congestion, traffic safety, and emergency vehicle access).	**Measure 8.5a:** Prior to construction, for installation of pipelines in existing roadways, the project sponsor will coordinate with the appropriate local government departments, Caltrans, and utility districts and agencies regarding the timing of construction projects that would occur near project sites. Specific measures to mitigate potential significant impacts will be determined as part of the interagency coordination, and could include measures such as employing flaggers during key construction periods, designating alternate haul routes, and providing more outreach and community noticing. **Measure 8.5b:** Implement Mitigation Measures 8.1 and 8.3b.	S	LSM
9. Biological Resources			
Impact 9.1: The project could impact special-status plant or wildlife species or their habitats.	**Measure 9.1a:** The project applicant or agency(s) responsible shall document that a site assessment report for dairy digester and co-digester facilities to be constructed (including the location of digestate application) has been submitted to CDFG for its review. This report shall be prepared by a qualified biologist. It shall evaluate the project site's potential to support special-status plant and wildlife species (including critical habitat) and whether special-status species could be affected by dairy digester and co-digester development, including construction and operations. If there are no special-status species or critical habitat present, no additional mitigation would be required. **Measure 9.1b:** If the site assessment determines that special-status species could be affected by facilities development, the project would not be eligible as part of the project (for the Central Valley Water Board discharge permit) unless the applicant submits a plan, prepared by a qualified biologist, to mitigate or avoid any significant impacts on special-status species. This plan must be forwarded to the appropriate regional office of the CDFG, the Endangered Species Unit of the USFWS in Sacramento, and/or NMFS for review and approval of the mitigation strategy, when appropriate. If the site assessment determines that a State or federally listed species would be affected by facilities development, the project applicant shall consult with CDFG, the Endangered Species Unit of the USFWS in Sacramento, and/or NMFS, as appropriate.	S	LSM
Impact 9.2: The project could result in impacts on biologically unique or sensitive natural communities.	**Measure 9.2a:** The project applicant or agency(s) responsible shall submit a site assessment report prepared by a qualified biologist that determines if the project is likely to affect biologically unique or sensitive natural communities. This information could be included in the report prepared under Mitigation Measure 9.1a. If there are no biologically unique or sensitive natural communities present, no further mitigation is required. **Measure 9.2b:** If biologically unique or sensitive natural communities are present and would be disturbed, the project would not be authorized under the project unless the applicant or agency(s) responsible submits a plan to avoid or mitigate for any significant impacts on biologically unique or sensitive natural communities and agrees to implement the mitigation. This report must be forwarded to the appropriate regional office of the CDFG and/or the Endangered Species Unit of the USFWS in Sacramento (as appropriate) for review and approval of the mitigation strategy. As described above, this portion of the report could be incorporated into the report prepared under Mitigation Measure 9.1a.	S	LSM
Impact 9.3: The project could result in impacts on waters of the State and/or the U.S., including wetlands.	**Measure 9.3a:** The project applicant or agency(s) responsible shall submit a site assessment report prepared by a qualified biologist that evaluates if the project is likely to affect waters of the State and/or U.S., including wetlands. This information could be included in the report prepared under Mitigation Measure 9.1a. If there are no waters present, no further mitigation would be required.	S	LSM

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TABLE 1-1
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance	
		Before Mitigation	After Mitigation
	Measure 9.3b: If waters of the State and/or U.S. are present in the project area, the project applicant or agency(s) responsible shall either re-design the project to avoid affecting the waters, or obtain the appropriate permits to allow for the impact. For waters that cannot be avoided, the permit process shall start with the preparation of a jurisdictional wetland delineation, prepared by a qualified biologist that will be submitted to the Corps for verification. Following verification, if jurisdictional waters occur within the project site, the project applicant or agency(s) responsible shall obtain and comply with federal and State permit requirements. This could include obtaining a Clean Water Act Section 404 permit, Section 401 Water Quality Certification or Waiver, a Section 1602 Streambed Alteration Agreement, and any other applicable permits.		
Impact 9.4: The project would not result in impacts on migratory corridors or native wildlife nursery sites.	None required	LS	LS
Impact 9.5: Dairy digester and co-digester facilities would not conflict with local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.	None required.	LS	LS
Impact 9.6: Development of dairy digester and co-digester facilities could contribute to cumulative impacts to biological resources.	**Measure 9.6:** Implement Measures 9.1a, 9.1b, 9.2a, 9.2b, 9.3a, and 9.3b.	S	LSM
10. Hazards and Hazardous Materials			
Impact 10.1: Construction of dairy digester and co-digester facilities could result in the potential exposure of construction workers, the public and the environment to preexisting soil and/or groundwater contamination.	**Measure 10.1:** Prior to final project design and any earth disturbing activities, the applicant or agency(s) responsible shall conduct a standard “Phase I Type” electronic record search. If no incidents are identified within a quarter mile of the construction area, standard construction practices can be implemented. If the record search identifies soil or water quality contamination open cases within a quarter mile of the construction area, a Phase I Environmental Site Assessment (ESA) shall be prepared by a Registered Environmental Assessor (REA) or other qualified professional to assess the potential for contaminated soil or groundwater conditions at the project site; specifically in the area proposed for construction of dairy digester or co-digester facilities. The Phase I ESA shall include a review of appropriate federal and State hazardous materials databases, as well as relevant local hazardous material site databases for hazardous waste on-site and off-site locations within a one quarter mile radius of the project site. This Phase I ESA shall also include a review of existing or past land uses and areal photographs, summary of results of reconnaissance site visit(s), and review of other relevant existing information that could identify the potential existence of contaminated soil or groundwater. If no contaminated soil or groundwater is identified or if the Phase I ESA does not recommend any further investigation then the project applicant or agency(s) responsible shall proceed with final project design and construction. OR If existing soil or groundwater contamination is identified and if the Phase 1 ESA recommends further review, the applicant or agency(s) responsible shall retain a REA to conduct follow-up sampling to characterize the contamination and to identify any required remediation that shall be conducted	S	LSM

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TABLE 1-1
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance	
		Before Mitigation	After Mitigation
	consistent with applicable regulations prior to any earth disturbing activities. The environmental professional shall prepare a report that includes, but is not limited to, activities performed for the assessment, summary of anticipated contaminants and contaminant concentrations at the proposed construction site, and recommendations for appropriate handling of any contaminated materials during construction.		
Impact 10.2: Transportation, use, disposal or accidental spill of hazardous materials during construction of dairy digester and co-digester facilities would not result in the potential exposure of construction workers, the public and the environment to hazardous materials.	None required.	LS	LS
Impact 10.3: Transportation, use, disposal or accidental spill of hazardous materials during the operation and maintenance of dairy digester and co-digester facilities would not result in the potential exposure of the public or the environment to hazardous materials.	None required.	LS	LS
Impact 10.4 Operation of dairy digester and co-digester facilities would not result in the release of biogas which could increase the risk of fire hazards.	None required.	LS	LS
Impact 10.5 Dairy digester and co-digester facilities could be located within a one quarter mile of a school resulting in potential hazards associated with accidental release of hazardous materials, including biogas.	**Measure 10.5:** Dairy digester and co-digester facilities shall be sited at least one quarter mile from existing or proposed schools, daycare facilities, hospitals and other sensitive land uses.	LS	LS
Impact 10.6: Installation of biogas pipelines in public rights-of-way could impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.	**Measure 10.6:** Implement Mitigation Measure 8.1.	S	LSM
Impact 10.7: Development of dairy digester and co-digester facilities could contribute to cumulative impacts related to hazardous materials.	**Measure 10.7:** Implement Mitigation Measures 10.1 and 10.5.	LS	LS
11. Aesthetic Resources			
Impact 11.1: Implementation of the project, including operation of dairy digester and co-digestion facilities, could result in impacts to scenic highways and/or scenic vistas.	**Measure 11.1a:** Centralized biogas processing facilities shall be sited in locations that do not conflict with local polices for preservation of vistas or scenic views. **Measure 11.1b:** When feasible considering the scale of the facilities and the site specific topography, site specific landscape design, including berms and/or tree rows, shall be constructed in order to minimize potentially sensitive views of both digester facilities at dairies or off dairies at centralized facilities. **Measure 11.1c:** Centralized biogas processing facilities shall be designed similarly in massing and scale to other nearby agricultural buildings in agricultural areas, in order to retain the character of the surrounding visual landscape.	S	LSM

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TABLE 1-1
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance	
		Before Mitigation	After Mitigation
Impact 11.2: Construction of the project could result in impacts to scenic highways and/or scenic vistas.	**Measure 11.2:** The project shall incorporate into all construction contracts for the proposed project and ensure implementation of the following measures: • Main construction staging areas and the storage of large equipment shall be situated on individual sites in such a manner to minimize visibility to nearby receptors. As feasible, staging areas and storage shall occur away from heavily traveled designated scenic roadways, in areas where it will be least visible from the surrounding roads. • Construction staging areas shall be onsite and remain clear of all trash, weeds and debris, etc. Construction staging areas shall be located in areas that limit visibility from scenic roadways and sensitive receptors to the extent feasible.	S	LSM
Impact 11.3: Implementation of the project could result in substantial creation of or change in light or glare.	**Measure 11.3:** Whenever possible, flares shall be situated on individual sites in such a manner to minimize visibility to nearby receptors. Site specific design shall discourage placement of flares at higher elevations, or within the line of site of nearby residential buildings or scenic highways. In the event that site design does not provide adequate coverage, an enclosed flare design shall be used or landscaping, such as berms or tree rows, shall be constructed to minimize light impacts.	S	LSM
Impact 11.4: Development of dairy digester and co-digester facilities could contribute to cumulative impacts to aesthetics.	**Measure 11.4:** Implement Mitigation Measures 11.1a, 11.1b, 11.1c, 11.2, and 11.3.	S	LSM
12. Cultural Resources			
Impact 12.1: Construction of dairy digester and co-digester facilities could result in the adverse change in the significance of a historical or archaeological resource, pursuant to §15064.5.	**Measure 12.1a:** In order to determine whether a project may cause a significant impact to cultural resources, and therefore, have an adverse effect on the environment, the Central Valley Water Board shall require each application submitted for a discharge permit for a digester or co-digester facility to identify the project's potential impacts to cultural resources. Prior to ground-disturbing activities, the project applicant shall retain a qualified archaeologist to (1) conduct a record search at the appropriate information center of the California Historical Resources Information System (CHRIS) to determine whether the project area has been previously surveyed and whether cultural resources were identified; and (2) request a sacred lands search from the NAHC. The results of the record search and sacred lands search shall be included in the Cultural Resources Inventory Report provided to the Central Valley Water Board. In the event the CHRIS records search indicates that no previous survey has been conducted, the qualified archaeologist shall recommend whether a survey is warranted to satisfy the requirements of CEQA based on the sensitivity of the project area for cultural resources. If, for example, the existing dairy or agricultural land proposed for establishment of a digester or co-digester facility was constructed entirely on fill, as shown by original and final contour drawings, a surface survey for archaeological resources would not be warranted. Similarly, a surface survey may not be warranted if the project area has been extensively disturbed by dairy or agricultural use. For projects that constitute federal undertakings, as described in the Federal Agencies section of the Introduction (Chapter 2), the cultural resources study shall be prepared in accordance with Section 106 of the NHPA. The cultural resources study and inclusive mitigation measures shall form the basis for the cultural resources component of the project-level environmental documentation prepared for	S	LSM

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ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance Before Mitigation	Impact Significance After Mitigation
	the project under Section 106. If the survey, CHRIS record search, or NAHC search indicate cultural resources are located within a project area, the Cultural Resources Inventory Report shall include an assessment of the significance of the resources according to applicable federal, state, and local significance criteria. If the cultural resources are determined significant historical resources, the Lead Agency (usually the Central Valley Water Board) must review and approve the applicant’s proposed treatment measures to ameliorate any “substantial adverse change” in the significance of each historical resource, in consultation with a qualified archaeologist or architectural historian, and other concerned parties. Treatment measures may include preservation through avoidance or project redesign, incorporation within open space or conservation easements, data recovery excavation of archaeological resources, formal documentation of built environment resources, public interpretation of the resource, or other appropriate treatment, and may be described in a project-level Cultural Resources Mitigation Plan included in the Cultural Resources Inventory Report to be approved by the Lead Agency. Should the project area contain standing, built environment resources now 50 years of age, a qualified architectural historian shall be retained to evaluate the integrity and significance of the resource(s) unless the building(s) or structure(s) were covered in the existing survey report and determined not significant according to applicable federal, state, and local criteria. The results of that evaluation shall be included in the Cultural Resources Inventory Report. If cultural resources identified within a project area are neither a historical resource nor unique archaeological resource, there would be no significant effect to the environment and no further treatment of those known resources would be required. **Measure 12.1b:** Inadvertent discovery measures for cultural resources shall be implemented during all construction activities within the project area. Measures shall include procedures for discovery and protection of cultural resources, including human remains, during construction or earth-disturbing activities. Within project areas of identified archaeological sensitivity, discovery measures would include: (1) a worker education course for all construction personnel; (2) monitoring of all earth-disturbing activities by a qualified archeologist; and (3) procedures for discovery of cultural resources, including human remains, during construction or ground-disturbing activities if an archaeological monitor is not present. Monitoring by a Native American with knowledge in cultural resources may also be required, as appropriate. Monitoring within recent fill deposits or non-native soil would not be required. All construction or ground-disturbing activities shall be halted within 100 feet of a cultural resources discovery, including human remains, whether or not a monitor is present, until a qualified professional archaeologist can evaluate the find. If the find is determined to be a significant historical resource and cannot be avoided, then impacts on that resource will require mitigation. During evaluation or mitigative treatment, ground disturbance and construction work could continue on other parts of the project area. If known or suspected human remains are discovered, in addition to halting all construction or ground-disturbing activities within 100 feet, the following steps must be taken before construction activities may be resumed within the stop-work area:		

LS – Less than Significant LSM – Less than Significant with Mitigation NI – No Impact S – Significant SU – Significant and Unavoidable

TABLE 1-1
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

		Impact Significance	
Impact	**Mitigation Measure**	Before Mitigation	After Mitigation
	• The County Coroner has been immediately notified and has determined that no investigation of the cause of death is required; and • If the remains are of Native American origin, the following steps have been taken: o The applicant has 24 hours to notify the NAHC, who should, in turn, notify the person identified as the proper descendant of any human remains. Under existing law, the descendant then has 24 hours to make recommendations regarding the disposition of the remains following notification from the NAHC of the discovery. o If the NAHC is unable to identify a descendant or if the descendant does not make recommendations within 24 hours, the applicant shall, with appropriate dignity, reinter the remains in an area of the property secure from further disturbance. o Should the applicant not accept the descendant's recommendations, the applicant or the descendant may, under existing law, request mediation by the NAHC.		
Impact 12.2: Construction of dairy digester and co-digester facilities could result in the disruption of human remains, including those interred outside formal cemeteries.	**Measure 12.2:** Implement inadvertent discovery measures for the protection of cultural resources, including human remains (Measure 12.1b).	S	LSM
Impact 12.3: Construction of dairy digester and co-digester facilities could result in direct or indirect disturbance or destruction of a unique paleontological resource or site or unique geologic feature.	**Measure 12.3:** If paleontological resources, such as fossilized bone, teeth, shell, tracks, trails, casts, molds, or impressions are discovered during ground-disturbing activities, all ground disturbing activities within 50 feet of the find shall be halted until a qualified paleontologist can assess the significance of the find and, if necessary, develop appropriate salvage measures in consultation with the lead agency and in conformance with Society of Vertebrate Paleontology Guidelines (SVP, 1995; SVP, 1996). Additional guidance may be found in *Standard Guidelines for the Assessment and Mitigation of Adverse Impacts to Nonrenewable Paleontologic Resources* (SVP 2010).	S	LSM
Impact 12.4: Development of dairy digester and co-digester facilities could contribute to cumulative impacts related to archaeological, historical, and/or paleontological resources.	**Measure 12.4:** Implement Measures 12.1a, 12.1b, 12.2, and 12.3.	S	LSM
13. Geology			
Impact 13.1: The project could expose people to injury and structures to damage resulting from seismic activity.	**Measure 13.1:** Prior to construction, project applicants or agency(s) responsible shall ensure that dairy digester facilities are designed and construction techniques are used that comply with relevant local, State and federal regulations and building code requirements. Requirements could include, but might not be limited to: • Preparation of site-specific soil and geotechnical engineering studies performed by a licensed professional including, but not limited to, a geologist, engineering geologist, certified soil scientist, certified agronomist, registered agricultural engineer, registered civil or structural engineer, and/or certified professional erosion and sediment control specialist with expertise in geotechnical engineering issues who is registered and/or certified in the State of California, to determine site specific impacts and to recommend site specific mitigations. The site specific soil and geotechnical engineering studies shall be submitted to the all appropriate State and local regulatory agencies including, but not limited to, the CVRWQCB and the city or county engineering department for review and approval. The project applicant or agency(s)	S	LSM

LS – Less than Significant LSM – Less than Significant with Mitigation NI – No Impact S – Significant SU – Significant and Unavoidable

TABLE 1-1
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance Before Mitigation	Impact Significance After Mitigation
	responsible shall implement all feasible recommendations addressing potential seismic hazards and soil constraints; and • Implementation of CBC design requirements		
Impact 13.2: The project could expose people to injury and structures to damage resulting from unstable soil conditions.	**Measure 13.2:** Implement Mitigation Measure 13.1.	S	LSM
Impact 13.3: Construction of project facilities would not result in an increase in the erosion of soils which could result in a loss of top soil.	None required	LS	LS
Impact 13.4: Development of dairy digester and co-digester facilities would not contribute to cumulative impacts related to geology, soils and seismicity.	None required	LS	LS
14. Noise			
Impact 14.1: Construction of dairy digester and co-digester facilities could temporarily increase noise levels at nearby sensitive receptor locations or result in noise levels in excess of standards in local general plans, noise ordinance, or other applicable standards.	**Measure 14.1a:** Construction activities shall be limited to daytime hours, between 7 a.m. and 6 p.m., Monday through Saturday, or an alternative schedule established by the local jurisdiction. **Measure 14.1b:** Construction equipment noise shall be minimized by muffling and shielding intakes and exhaust on construction equipment to a level no less effective than the manufacture's specifications, and by shrouding or shielding impact tools. **Measure 14.1c:** Construction contractors within 750 feet of sensitive receptors shall locate fixed construction equipment, such as compressors and generators, and construction staging areas as far as possible from nearby sensitive receptors. **Measure 14.1d**: Construction contractors shall comply with all local noise ordinances and regulations.	S	LSM
Impact 14.2: Noise from operation of dairy digester and co-digester facilities or centralized facilities could substantially increase ambient noise levels at nearby land uses or result in noise levels in excess of standards in local general plans, local noise ordinances, or other applicable standards.	**Measure 14.2:** Any continuous equipment operating at night within 1,000 feet of a sensitive receptor must be enclosed. Furthermore, an acoustic study and follow-up measurements must be performed (after construction) to prove that the noise from any continuous equipment operating at night would comply with all local noise regulations. If no local regulations are available, noise levels must be below 45 dBA at the nearest sensitive receptor. If the sound level exceeds local regulations, or 45 dBA if applicable, additional sound-proofing shall be installed to meet the required sound level.	S	LSM
Impact 14.3: Project operational activities associated with transportation would not increase ambient noise levels at nearby land uses.	None required.	LS	LS
Impact 14.4: Development of dairy digester and co-digester facilities could result in a cumulative increase in noise levels.	**Measure 14.4a:** Implement Mitigation Measures 14.1a through Measure 14.1d and Measure 14.2, above.	S	LSM
15. Public Services			
Impact 15.1: The project would not substantially increase demands on fire protection services.	None required.	LS	LS
Impact 15.2: The project would not conflict with wastewater treatment requirements of the Central Valley Water Board.	None required.	LS	LS

LS – Less than Significant LSM – Less than Significant with Mitigation NI – No Impact S – Significant SU – Significant and Unavoidable

TABLE 1-1
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance Before Mitigation	 After Mitigation
Impact 15.3: The project could result in significant environmental effects from the construction and operation of new water and wastewater treatment facilities or expansion of existing facilities.	**Measure 15.3a:** If the project proposes to obtain water from a water supplier (irrigation district, municipal system or other public water entity), the developer would enter into an agreement for service with the supplier. **Measure 15.3b**: If the project proposes to obtain wastewater service from a wastewater treatment provider (municipal or other public entity), the developer would enter into an agreement for service with the provider.	S	LSM
Impact 15.4: The project would not result in significant environmental effects from the construction of new stormwater treatment facilities or expansion of existing facilities.	None required.	LS	LS
Impact 15.5: The project would not require significant levels of new or expanded water supply resources or entitlements.	None required.	LS	LS
Impact 15.6: The project could result in exceeding the capacity of a wastewater treatment provider.	**Measure 15.6:** If the project proposes to obtain wastewater service from a wastewater treatment provider (municipal or other public entity), implement Mitigation Measure 15.3b.	S	LSM
Impact 15.7: The project could result in the construction new energy supplies and could require additional energy infrastructure.	**Measure 15.7:** Implement Mitigation Measures for construction of energy infrastructure including Mitigation Measures 6.1b, 9.1a, 9.1b, 9.2a, 9.2b, 9.3b, 12.1b, 12.2, 12.3, and 14.1a-c.	S	LSM
Impact 15.8: The project would not conflict with existing energy policies or standards.	None required.	NI	NI
Impact 15.9: Development of dairy digester and co-digester facilities would not contribute to cumulative impacts to public services and utilities.	None required.	LS	LS

LS – Less than Significant LSM – Less than Significant with Mitigation NI – No Impact S – Significant SU – Significant and Unavoidable

CHAPTER 2
Introduction

The Program Environmental Impact Report (Program EIR) for the Waste Discharge Regulatory Program for Dairy Manure Digester and Dairy Manure Co-Digester Facilities within Central Valley Region (Region 5) (SCH #2010031085) was prepared by ESA, pursuant to the requirements of the California Environmental Quality Act (CEQA), to inform the Central Valley Regional Water Quality Control Board (Central Valley Water Board) of the potential environmental impacts related to the proposed waste discharge regulatory program for dairy digester and co-digester (i.e., that use manure plus other organic feedstocks) facilities in Region 5. The Program EIR provides a programmatic analysis of the environmental impacts of the development of dairy manure digester and co-digester facilities and is intended to provide (CEQA) compliance for the Central Valley Water Board's waste discharge regulatory program for these facilities.

Throughout this Response to Comments document, the development of the waste discharge regulatory program for the adoption of Waste Discharge Requirements (WDRs) General Orders and Individual WDRs to regulate the discharge to land of liquid and solid digestate generated from dairy manure digesters and diary manure co-digesters will be referred to as the "project". The Central Valley Water Board is the lead agency for the environmental review of the project and has the principal responsibility for project approval. Written and oral comments received during the 45-day public review and comment period (8 July 2010 until 23 August 2010) for draft Program EIR are addressed in this Final Program EIR Response to Comments document. The Response to Comments document and the draft Program EIR together comprise the Final Program EIR for the project.

The Central Valley Water Board circulated a draft Program EIR regarding this project for public review and comment in accordance with CEQA Guidelines. The draft Program EIR is intended to inform the Central Valley Water Board and the public of the possible environmental impacts of the project, to determine whether these impacts could be significant, to identify methods whereby significant impacts could be reduced to less-than-significant levels, and to discuss possible alternatives. CEQA Guidelines specify that the Final EIR shall consist of the following:

- The draft EIR or a revision of that draft.
- Comments and recommendations received on the draft EIR either verbatim or in summary.
- A list of persons, organizations, and public agencies commenting on the draft EIR.
- The response of the lead agency to significant environmental points raised in the review and consultation process.
- Any other information added by the Lead Agency.

This Final Program EIR Response to Comments document responds to all significant environmental points raised during the public review period for the draft Program EIR. It also lists the text changes to the draft Program EIR as a result of the CEQA review process. This Final Program EIR Response to Comments document, together with the draft Program EIR, constitutes the Final Program EIR. To that end, the draft Program EIR is hereby incorporated by reference into this report. The draft Program EIR is available for review at the following Central Valley Regional Water Quality Control Board locations:

Fresno Office
1685 E Street, Suite 100
Fresno, CA 93706

Sacramento Office
11020 Sun Center Drive, Suite 200
Rancho Cordova, CA 95670

Redding Office
415 Knollcrest Drive, Suite 100
Redding, CA 96002

The draft Program EIR can also be found online at:

http://www.swrcb.ca.gov/centralvalley/press_room/announcements/index.shtml

2.1 Recommendations regarding the use of this Final Program EIR Response to Comments document

The inputs received on the draft Program EIR are written comments on the draft Program EIR and oral comments from speakers at the two public meetings held during the 45-day public comment and review period. Chapter 3 contains copies of the comment emails and letters on the draft Program EIR received by the deadline for responses (or shortly thereafter) and responses to the significant environmental points made by the commenters. Each comment email or letter is immediately followed by the responses to the email or comment letter. Each comment has been labeled with an identification number for reference to its response. The list of written commenters and identification numbers are depicted in **Table 2-1**.

The oral comments are responded to in Chapter 4. For ease of reading the list of commenters for both public meetings and the responses to the oral comments are at the beginning of Chapter 4. The comment responses are followed by the transcripts (with the comments identified) by the Fresno transcript and finally the Rancho Cordova transcript. The Fresno public meeting was held on Tuesday August 3, 2010 in the evening (6:30 to 8:00 p.m.), the list of each oral commenter and comment identification numbers are depicted in **Table 2-2**.

TABLE 2-1
LIST OF WRITTEN COMMENTERS ON DRAFT PROGRAM EIR

Letter ID	Agency	Commenter
A	State of California, Governor's Office of Planning and Research, State Clearinghouse and Planning Unit	Scott Morgan, Director
B	United Stated Environmental Protection Agency, Communities and Ecosystems Division	Katherine Taylor, Associate Director
C	U.S. Army Corps of Engineers, Regulatory Division, Sacramento District	Zac Fancher
D	Department of Resources Recycling and Recovery (CalRecycle)	Mark de Bie, Division Chief
E	California Department of Fish and Game	Lisa Gymer, Environmental Scientist
F	Stanislaus County Environmental Review Committee	Christine Almen ,Senior Management Consultant
G	County of Tulare, Resource Management Agency	Cynthia Echavarria, Environmental Coordinator
H	Dairy Cares	J.P. Cativiela, Dairy Cares Program Coordinator
I	Sustainable Conservation	Allen J. Dusault, Program Director
J	Western United Dairymen	Michael L. H. Marsh, CPA, Chief Executive Officer
K	United Auburn Indian Community of the Auburn Rancheria	Greg Baker, Tribal Administrator

TABLE 2-2
LIST OF ORAL COMMENTERS ON THE DRAFT PROGRAM EIR (FRESNO)

Comment Number	Commenter
1-1	Craig Hartman, Four Creeks
2-1	Nettie Drake
2-2	Nettie Drake
3-1	Marvin Mears
3-2	Marvin Mears
3-3	Marvin Mears
3-4	Marvin Mears

The Rancho Cordova public meeting was held on Wednesday August 4, 2010 in the evening (6:30 to 8:00 p.m.), the list of each oral commenter and identification numbers are depicted in **Table 2-3**.

TABLE 2-3
LIST OF ORAL COMMENTERS ON THE DRAFT PROGRAM EIR (RANCHO CORDOVA)

Comment Number	Commenter
4-1	Dan Weller, California Air Resources Board
4-2	Dan Weller, California Air Resources Board
4-3	Dan Weller, California Air Resources Board
4-4	Dan Weller, California Air Resources Board
4-5	Dan Weller, California Air Resources Board
4-6	Dan Weller, California Air Resources Board
4-7	Dan Weller, California Air Resources Board
4-8	Dan Weller, California Air Resources Board
5-1	Justin Ellerby, California Center for Cooperative Development
5-2	Justin Ellerby, California Center for Cooperative Development
5-3	Justin Ellerby, California Center for Cooperative Development
5-4	Justin Ellerby, California Center for Cooperative Development
6-1	Bill Van Dam, Alliance of Western Milk Producers
6-2	Bill Van Dam, Alliance of Western Milk Producers

Some comments and responses in this document resulted in text that should be changed in the draft Program EIR. Text with a line through it (~~strikethrough~~) is removed from the draft Program EIR; underlined text is added to the draft Program EIR. Chapter 5 contains all the changes in this Response to Comments document that result in changes to the draft Program EIR. The changes are organized sequentially according to the page in the draft Program EIR on which the change was made.

CHAPTER 3

Written Comments and Responses

TABLE 3-1
LIST OF WRITTEN COMMENTERS ON DRAFT PROGRAM EIR

Letter ID	Agency	Commenter	Page
A	State of California, Governor's Office of Planning and Research, State Clearinghouse and Planning Unit	Scott Morgan, Director	3.A-1
B	United Stated Environmental Protection Agency, Communities and Ecosystems Division	Katherine Taylor, Associate Director	3.B-2
C	U.S. Army Corps of Engineers, Regulatory Division, Sacramento District	Zac Fancher	3.C-1
D	Department of Resources Recycling and Recovery (CalRecycle)	Mark de Bie, Division Chief	3.D-1
E	California Department of Fish and Game	Lisa Gymer, Environmental Scientist	3.E-1
F	Stanislaus County Environmental Review Committee	Christine Almen ,Senior Management Consultant	3.F-1
G	County of Tulare, Resource Management Agency	Cynthia Echavarria, Environmental Coordinator	3.G-1
H	Dairy Cares	J.P. Cativiela, Dairy Cares Program Coordinator	3.H-1
I	Sustainable Conservation	Allen J. Dusault, Program Director	3.I-1
J	Western United Dairymen	Michael L. H. Marsh, CPA, Chief Executive Officer	3.J-1
K	United Auburn Indian Community of the Auburn Rancheria	Greg Baker, Tribal Administrator	3.K-1

A

STATE OF CALIFORNIA
Governor's Office of Planning and Research
State Clearinghouse and Planning Unit

Arnold Schwarzenegger
Governor

Cathleen Cox
Acting Director

August 24, 2010

AUG 30 2010

Stephen Klein
Regional Water Quality Control Board, Region 5 (Central Valley)
1685 E Street
Fresno, CA 93706

Subject: Central Valley Dairy Digester and Co-digester Facilities Program
SCH#: 2010031085

A-1

Dear Stephen Klein:

The State Clearinghouse submitted the above named Draft EIR to selected state agencies for review. On the enclosed Document Details Report please note that the Clearinghouse has listed the state agencies that reviewed your document. The review period closed on August 23, 2010, and the comments from the responding agency (ies) is (are) enclosed. If this comment package is not in order, please notify the State Clearinghouse immediately. Please refer to the project's ten-digit State Clearinghouse number in future correspondence so that we may respond promptly.

Please note that Section 21104(c) of the California Public Resources Code states that:

> "A responsible or other public agency shall only make substantive comments regarding those activities involved in a project which are within an area of expertise of the agency or which are required to be carried out or approved by the agency. Those comments shall be supported by specific documentation."

These comments are forwarded for use in preparing your final environmental document. Should you need more information or clarification of the enclosed comments, we recommend that you contact the commenting agency directly.

This letter acknowledges that you have complied with the State Clearinghouse review requirements for draft environmental documents, pursuant to the California Environmental Quality Act. Please contact the State Clearinghouse at (916) 445-0613 if you have any questions regarding the environmental review process.

Sincerely,

Scott Morgan

Scott Morgan
Director, State Clearinghouse

Enclosures
cc: Resources Agency

1400 TENTH STREET P.O. BOX 3044 SACRAMENTO, CALIFORNIA 95812-3044

Response A1

Comment noted that the Central Valley Water Board (Region 5) has complied with the State Clearinghouse review requirements for the draft Program EIR pursuant to the California Environmental Quality Act.

B

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

COMMUNITIES AND ECOSYSTEMS
DIVISION

California Regional Water Quality Control Board, Central Valley Region
Attn: Stephen Klein, P.E., M.S., project manager
1685 E Street
Fresno, CA 93706-2007

Via e-mail: sklein@waterboards.ca.gov

Subject: Comment Letter -- Dairy digester and co-digester draft Program EIR

Dear Mr. Klein,

We at U.S. EPA Region 9 appreciate the Central Valley Water Board's proactive preparation of this Program EIR to help support future development of dairy manure digester and co-digester projects in Region 5. We share your interests in supporting these projects that can provide benefits to the State by generating renewable energy and by reducing greenhouse gas (GHG) emissions. EPA is pleased to provide comments on the draft program EIR. Our comments address the environmental context of the PEIR, the proposed "environmentally superior alternative," and the biogas production scenarios analyzed.

In general, we note that a large subsection of the Central Valley Water Board's jurisdiction is the San Joaquin Valley, where dairies and dairy cows are highly concentrated. In the San Joaquin Valley, topography, climate, and emissions sources combine to make air quality the least healthful in the nation, and the contamination of groundwater with nitrates is widespread. As a result of these geographic and environmental conditions, generation of renewable energy from digesters must meet all applicable water and air regulatory requirements and, specifically, emit as little nitrous oxide (NOx) as feasible. We suggest that the PEIR acknowledge these conditions as constraints on the program in the introduction to the document. (To this end, we note that U.S. EPA is investing $400,000 in San Joaquin Valley's Clean Air Technology Initiative, some of which will advance low-NOx alternatives for electricity generation from digester biogas.) B-1

In addition, we are concerned about the cumulative effects on both air and groundwater quality that the PEIR indicates will occur under "the project" as specified. In this context, we question the designation of the project as the environmentally superior alternative, as opposed to a project that contains both the co-digestion substrate restriction and the reduced NOx emissions alternatives. The PEIR (p. 17-13) justifies this designation by defining the purpose of the project as to "promote the increase of renewable energy sources" and thereby obtain greenhouse gas emission reduction benefits, and by stating that the more stringent alternatives would impede this purpose. However, this seems to ignore the larger context and the need to consider the larger B-2 goal of balancing and reducing, to the extent feasible, all environmental impacts. We suggest revising the description of the purpose of the PEIR to address this issue and then re-evaluating the designation of the environmentally superior alternative. B-2 cont

Our specific comments address the scenarios analyzed in the PEIR. The PEIR analysis addresses individual on-farm anaerobic digesters, centralized digester facilities that process manure trucked or piped in from several nearby dairies, and centralized biogas upgrade facilities that process biogas piped in from distributed digesters. We suggest that the analysis also include a scenario in which a centralized facility generates electricity using biogas piped in from distributed digesters. The size of the resulting facility could make use of cleaner electricity generation technology financially feasible in locations not convenient to gas transmission infrastructure. B-3

In passing, we noted an apparent logical inconsistency and minor typographical errors. On page 5-18, the descriptions of the relationship between pH, NH3, and NH4- in the first and second paragraphs seem contradictory. On page 6-5, “system-troposphere system” should be “surface-troposphere system” and, on page 6-6, “nitric acid production” appears twice in the list of anthropogenic sources of NO2. B-4

Again, we appreciate the Central Valley Water Board’s work and the opportunity to comment on this important study.

Sincerely,

Katherine Taylor, Associate Director
Communities and Ecosystems Division
Agriculture Advisor to the Regional Administrator

Response B-1

The Central Valley Water Board appreciates the $400,000 investment in the San Joaquin Valley's Clean Air Technology Initiative, some of which will advance low-NOx alternatives for electricity generation from digester biogas.

We acknowledge that the program is constrained by the potential for NOx emission and that the San Joaquin Valley has the least healthful air quality in the nation. Please see Section 1.4 (third bullet top of page 1-7 in the draft Program EIR), where the San Joaquin Valley is described as "one of the most polluted air basins in the country".

Also on page 1-7 is a summary of "The Reduced NOx Emissions Alternative, which specifically addresses the concern for minimal NOx emissions.

Table 6-3 on page 6-9 of the draft Program EIR shows that many of the Air Basins in Region 5 are nonattainment with regard to state and federal air quality standards for ozone and particulate matter (PM10 and PM2.5).

Tables 5-1, 5-2 and 5-3 (draft program EIR pages 5-21, 5-22, and 5-23 respectively) show that nitrates are a common contaminant in groundwater wells in the Sacramento River Hydrologic Region (HR), San Joaquin River HR, and Tulare Lake HR. As noted in the second full paragraph of the draft Program EIR, the dairy digesters would also result in the conversion of more of the nitrogen into its mineralized form, which is more readily available to plants than organic nitrogen compounds, which release nitrogen slowly and not always at times and rates useful to plants. Reducing the time organic nitrogen remains in the surface soil reduces the potential that slowly mineralized nitrogen will be available to leach to groundwater.

Response B-2

Comment noted. The draft Program EIR did consider the larger context in making the determinations on the Environmentally Superior Alternatives given cumulative effects on both air and groundwater quality. Especially the context that the alternatives would actually have to be implemented to provide environmental benefits and if they are not implemented the opportunities for environmental improvements, especially in the areas of developing renewable energy resources and the reduction of greenhouse gas emissions, would not be realized. Extensive thought was given to balancing all the environmental impacts and these thoughts are summarized on page 1-8 (end of the last paragraph) and page 17-14 (end of the last paragraph) of the draft Program EIR as follows:

> "Regardless of their potential benefits, both the Additional Co-digestion Substrate Restrictions Alternative, and the Reduced NOx Emissions Alternative place restrictions on the development of dairy manure digester and co-digester projects that could further restrict future growth of digesters in Region 5. Dairy digester development would be restricted by the high costs and/or additional regulatory hurdles of the technologies associated with the Reduced NOx Emissions Alternative (i.e., fuel cells, transportation fuel, and utility pipeline

> injection). Dairy digester development would also be restricted by additional limitations contained in the Additional Co-digestion Substrate Restrictions Alternative. By likely restricting the development of dairy digesters in Region 5, both the Additional Co-digestion Substrate Restrictions Alternative, and the Reduced NOx Emissions Alternative would have a negative influence on two of the primary objectives of the project, which are the development of a renewable energy resource (biogas) and the reduction of GHG emissions from dairy operations. Accordingly, some environmental benefits would as a practical matter be lost under these alternatives. Given the existing technological and economic constraints, therefore, these alternatives cannot be said to be clearly environmentally superior to the proposed project."

Response B-3

The Program EIR analysis is intended to include electrical generation as an option at centralized facility. We agree with the EPA. The description of the centralized facilities in the draft Program EIR should more clearly indicate that the centralized facilities would have the same flexibility as individual dairies with regard to the use of biogas. As shown in the draft Program EIR on Figure 1-2 (page 1-4) and Figure 3-3 (page 3-8), biogas production can be used for a variety of purposes (i.e, transportation fuel, utility pipeline injection, engine/turbine, boiler and fuel cells). The air quality analyses and mitigation measures would be the same whether electricity is generated from biogas at an individual dairy or at a centralized facility (see Impact 6.2 beginning on page 6-24 of the draft Program EIR). Also, as noted by the EPA, the size of the centralized facility could make electrical generation feasible in locations where injection into the utility pipeline system is not possible.

To clarify the lack of any restriction on centralized facilities to generate electricity, the text describing these scenarios on pages 1-5 and 3-11 shall be revised as follows:

> "Centralized Locations
>
> There are two categories of centralized location facilities for dairies that will be assessed in this Program EIR: (1) Central AD Facility, whereby individual dairies would collect manure and transport the manure by pipeline or truck to a central facility; and (2) a Central Biogas Clean-Up Facility, whereby raw biogas from individual dairies (including dairies linked via underground gas pipelines) is piped to a central facility. These types of centralized facilities may be sited on or off-site of dairies. For both location options, the central facility would have the potential to receive manure, manure plus co-digestion substrate, and/or raw biogas. <u>Biogas at centralized facilities could be used to generate electricity using internal combustion engines/turbines or fuel cells or used for boilers, transportation fuel, or for utility pipeline injection.</u>"

Response B-4

The second sentence in the second paragraph on page 5-18 of the Program EIR is revised to read:

> "Toxicity ~~increases~~ decreases as pH decreases and as temperature decreases."

The fourth sentence of the first paragraph of the Greenhouse Gas Emissions discussion on page 6-5 of the draft Program EIR has been revised as shown below:

> "The term "natural greenhouse effect" refers to how greenhouse gases trap heat with the ~~system~~ surface-troposphere system; the term "enhanced greenhouse effect" refers to an increased concentration of greenhouse gases, which results in an increase in temperature of the surface-troposphere system."

The third sentence on page 6-7 of the draft Program EIR has been revised as shown below.

> "Anthropogenic sources of nitrous oxide include fertilizer application, production of nitrogen fixing crops~~, nitric acid production~~, animal manure management, sewage treatment, combustion of fossil fuels, and nitric acid production (CAT, 2006; CAPCOA, 2009)."

C

Paul Miller

From: Stephen Klein [sklein@waterboards.ca.gov]
Sent: Thursday, July 22, 2010 9:34 AM
To: Paul Miller
Cc: Clay Rodgers; Doug Patteson; David Sholes
Subject: Fwd: USACE Comments on Waste Discharge Regulatory Program SCH #2010031085

Paul,

This is the first comment I have received on the draft PEIR.

Stephen

>>> "Fancher, Zachary J SPK" <Zachary.J.Fancher@usace.army.mil>
>>> 7/21/2010 2:36 PM >>>
Dear Mr. Klein,

We are responding to your July 8, 2010 request for comments on the Draft Program EIR for a Waste Discharge Regulatory Program for Dairy Manure Digester and Co-Digester Facilities within the Central Valley Region. We understand that study locations are undetermined as of yet, but correspondence with the Corps should be maintained as they are confirmed.

The Corps of Engineers' jurisdiction within the study areas may be under the authority of Section 404 of the Clean Water Act for the discharge of dredged or fill material into waters of the United States. Waters of the United States include, but are not limited to, rivers, perennial or intermittent streams, lakes, ponds, wetlands, vernal pools, marshes, wet meadows, and seeps. Project features that result in the discharge of dredged or fill material into waters of the United States will require Department of the Army authorization prior to starting work.

To ascertain the extent of waters on the project site(s), the applicant should prepare a wetland delineation, in accordance with the "Minimum Standards for Acceptance of Preliminary Wetland Delineations", under "Jurisdiction" on our website at the address below, and submit it to this office for verification. A list of consultants that prepare wetland delineations and permit application documents is available on our website at the same location. C-1

The range of alternatives considered for the project(s) should include alternatives that avoid impacts to wetlands or other waters of the United States. Every effort should be made to avoid project features which require the discharge of dredged or fill material into waters of the United States. C-2
In the event it can be clearly demonstrated there are no practicable alternatives to filling waters of the United States, mitigation plans should be developed to compensate for the unavoidable losses resulting from project implementation. C-3

If you have any questions, please contact Zachary Fancher at 1325 J Street, Room 1480, Sacramento, California 95814-2922, email Zachary.J.Fancher@usace.army.mil, or telephone 916-557-6643. For more information regarding our program, please visit our website at www.spk.usace.army.mil/regulatory.html.

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Let us know how we're doing.
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Information on the Regulatory Program.

Response C-1

Comment noted. Because the dairy digesters are likely to be constructed on lands that have been previously altered by agricultural activities, they are unlikely to impact any waters of the U.S. However, Mitigation Measure 9.3a requires a wetland assessment, prepared by a qualified biologist that will determine if waters of the U.S. and/or waters of the State are present in the project area. If potential wetlands are present, and cannot be avoided, under Mitigation Measure 9.3b, the project applicant or agency(s) responsible will be required to prepare a wetland delineation for review by the Corps.

Response C-2

Comment noted. As stated in Mitigation Measure 9.3b, if waters of the U.S. are present in the project area, the project would either be re-designed to avoid impacts or the project applicant or agency(s) responsible would obtain the appropriate permits. If waters of the U.S. are present, and cannot be avoided, the project applicant will comply with state and federal law, including the Clean Water Act, which could require the preparation of an alternatives analysis.

Response C-3

Comment noted. Mitigation Measure 9.3b requires that if waters of the U.S. are present, and cannot be avoided, then the project applicant or agency(s) responsible shall obtain all appropriate permits. Mitigation plans are required as part of the Clean Water Act, Section 404 permit.

Natural Resources Agency Arnold Schwarzenegger, Governor

CalRecycle

DEPARTMENT OF RESOURCES RECYCLING AND RECOVERY

801 K STREET, MS 19-01, SACRAMENTO, CALIFORNIA 95814• (916) 322-4027 • WWW.CALRECYCLE.CA.GOV

D

August 23, 2010

Mr. Stephen Klein, Project Manager
Central Valley Regional Water Quality Control Board
1685 E Street
Fresno, California 93706

Subject: **State Clearinghouse (SCH) No. 2010031085 –** Draft Program Environmental Impact Report (EIR) for a *Waste Discharge Regulatory Program for Dairy Manure Digester and Dairy Manure Co-Digester Facilities* (project) within the Central Valley Regional Water Quality Control Board (CVRWQCB) Region.

Dear Mr. Klein:

CalRecycle staff (staff) have reviewed the draft Program EIR cited above and offer the following comments intended to assist the lead agency.

D-1 Staff have outlined CalRecycle's regulatory requirements relative to anaerobic digestion (AD) projects in a publication entitled *How Anaerobic Digestion Fits Current Board Regulatory Structure*. The publication is included as Attachment 1 to this comment letter, and it may also be accessed online at the following URL: http://www.calrecycle.ca.gov/Publications/Organics/2009021.pdf. This document provides an overview of how the Title 14 requirements for permit/authorization apply to anaerobic digestion with consideration of the feedstock, source of the feedstock, location and quantity involved. The determination of the appropriate level of authorization or permit for an activity involving anaerobic digestion is made by the [Local] Enforcement Agency.

Staff have reviewed all aspects of the draft Program EIR and have the following observations and questions:

D-2 Regarding air quality, mitigation measure 6.3b requires applicants to "…implement an Odor Management Plan (OMP) as part of each application submitted to establish digester and co-digester facilities." If an AD facility handles compostable material and is classified as a compost facility, odor issues are shared responsibility of the Enforcement Agency and local air pollution control or air quality management district pursuant to Public Resources Code Section 43209.1 The facility must develop an Odor Impact Minimization Plan (OIMP) pursuant to14 CCR §17863.4. If an OIMP is required for an AD facility, staff recommend that odor mitigations include reference to the need to comply with 14 CCR §17863.4.

The draft Program EIR on page 3-16 states that "…the solids [digestate] could be used for land application, compost, fertilizer, or potentially landfill alternative daily cover and the liquid portion of the effluent could be recycled for flush water, used for land application, or at a centralized facility it could potentially be sent to a sanitary sewer." The solid digestate is not a material that has been evaluated for use as Alternative Daily Cover (ADC) at landfills. If a landfill operator proposes to use the solid digestate as ADC, a site-specific demonstration project would be required in compliance with Section of Title 27 Section 20690(b). D-3

As noted in the draft Program EIR on page 2-2, CalRecycle is preparing a Program EIR for AD facilities that would use food waste, green material, and mixed solid waste (MSW) as feedstocks. CalRecycle will be analyzing the development and operation of AD facilities that would be sited at solid waste facilities and in industrial areas. The Program EIR will not cover AD facilities sited at dairies and other agricultural areas. D-4

Please note that correspondence for staff of CalRecycle's Waste Compliance and Mitigation Program should continue to be sent to 1001 I Street, P.O. Box 4025, Sacramento, CA 95812. Correspondence specifically for the attention of the Director of CalRecycle should be sent to the address in the letterhead at the top of this letter.

If you have any questions regarding these comments, please contact Ken Decio of my staff at (916) 341-6313, facsimile at (916) 319-7244, or e-mail Mr. Decio at Ken.Decio@CalRecycle.ca.gov.

Sincerely,

Mark de Bie, Division Chief
Permitting and LEA support Division
Waste Compliance and Mitigation Program
CALIFORNIA DEPARTMENT OF RESOURCES RECYCLING AND RECOVERY

cc: State Clearinghouse
Office of Planning and Research
P.O. Box 3044
Sacramento, CA 95812-3044

California Integrated Waste
Management Board

September 2009

How Anaerobic Digestion Fits Current Board Regulatory Structure

California Environmental Protection Agency

STATE OF CALIFORNIA

Arnold Schwarzenegger
Governor

Linda S. Adams
Secretary, California Environmental Protection Agency

•

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Mark Leary
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California Integrated Waste Management Board

Executive Summary

The Board adopted Strategic Directives, specifically SD-2, SD-3 and SD-9, to establish goals to increase the diversion of waste from landfills, encourage use the technology to effectively manage and reuse waste consistent with the waste management hierarchy and The Global Warming Solutions Act of 2006 (AB 32), and to encourage the development of alternative fuels. AB 32 calls for the reduction of greenhouse gases through reductions from sources and the use of low carbon fuels. Solid waste landfills are a significant source of greenhouse gases due to decomposition of organic material in landfills into methane. Anaerobic digestion is being considered for many projects to meet the goals in the Board Strategic Directives and AB 32.

The use of anaerobic digestion to digest organic waste will contribute to meeting the goals identified in the Strategic Objectives and AB 32 by eliminating the land disposal of organic waste, generating a methane rich gas that can be used as fuel for generating electricity, heat, or vehicles. The methane rich gas is a low carbon fuel that is environmentally superior to petroleum based fuel such as gasoline or diesel. Lastly, this fuel source is sustainable, reducing the dependence on the importation of crude oil.

California, as well as the rest of the United States, is behind in using anaerobic digestion to manage solid waste. Many European countries are using anaerobic digestion to reduce their dependence on land disposal while creating a source of low carbon fuel. Possible reasons for this may be that available land for landfills in Europe is scarcer, and fuel and energy costs are much higher in Europe.

The guidance focuses on the applicability for a solid waste facilities permit, compostable materials handling facility permit, enforcement agency notification and exclusions. It is not a comprehensive discussion of all Board requirements that may apply. Likewise, it does not include a discussion of any approvals that may be required by other state agencies or local jurisdictions, such as the Regional Water Quality Control Board and local air pollution control agency. The determination of what level of authorization or permit is required for an activity involving anaerobic digestion is made by the Local Enforcement Agency.

Guidance Document On How Anaerobic Digestion Fits Current Board Regulatory Structure

Purpose of this Document

The use of anaerobic digestion to treat solid waste to produce compost and biogas will continue to increase in California as municipalities and industry take on the challenge to reduce the disposal of organic waste into landfills and reduce our reliance on non-renewable energy.

Anaerobic digestion is one technology that is part of a system that includes the digester, feedstock handling process, equipment for the control and collection of off-gases from the digester, and management of digestate (liquid and/or solids) from the digester. This guidance document is intended to provide a basic outline of how the statutory and regulatory requirements of the California Integrated Waste Management Board apply to the permitting/authorization of anaerobic digestion projects. The application of the Board requirements must be applied on a case-by-case basis. This document provides an overview of how the Title 14 requirements for permit/authorization apply to anaerobic digestion with consideration of the feedstock, source of the feedstock, location and quantity involved. The determination what level of authorization or permit for an activity involving anaerobic digestion is made by the LEA.

The guidance focuses on the applicability for a solid waste facilities permit, compostable materials handling facility permit, enforcement agency notification and exclusions. It is not a comprehensive discussion of all Board requirements that may apply. Likewise, it does not include a discussion of any approvals that may be required by other state agencies or local jurisdictions, such as the Regional Water Quality Control Board and local air pollution control districts.

The following discussion provides guidance on how anaerobic digestion is regulated under the current regulatory structure, as charted in Attachment 1, Decision Diagram for Anaerobic Digestion, Attachment 2, Tier Regulatory Placement for Anaerobic Digestion by Feedstock, and in Attachment 3, Excluded Activities for Anaerobic Digestion Handling Compostable Materials.

Brief Description of Anaerobic Digestion

Anaerobic digestion is a biological process that decomposes organic matter in an environment with little or no oxygen resulting in a biogas and liquid/solid stream called digestate. This process occurs in nature in anaerobic environments, as well in landfills. Engineered anaerobic digestion systems have been used in Europe, Canada, Japan, Australia and the U.S. to reduce the biodegradable content of organic solid waste and to produce energy. The decomposition occurs in a four-step process: hydrolysis, acidogenesis, acetogenesis, and methanogenesis to break down organic matter into methane, carbon dioxide, water, and digestate/residuals.

The biogas contains mostly methane and carbon dioxide but frequently carrying impurities such as moisture, hydrogen sulfide (H_2S), ammonia, siloxane, and particulate matter. Anaerobic digestion can be conducted in lagoons (covered or not), controlled reactors, digesters and landfills. Biogas, primarily methane and carbon dioxide, is the principal energy product from anaerobic digestion processes. Biogas can be burned directly for heat or steam or converted to electricity in reciprocating or gas turbine engines, steam turbines, or fuel cells. Biogas can be upgraded to biomethane and used as a vehicle fuel, injected to the natural gas transmission system, or reformed into hydrogen fuel.

Anaerobic digestion systems are employed in many wastewater treatment facilities for sludge degradation and stabilization, and used in engineered anaerobic digesters to treat high-strength industrial and food processing wastewaters prior to disposal. In Europe, the systems are used to treat the biodegradable fraction of solid waste prior to landfilling in order to reduce future methane and leachate emissions and recover some energy. As a consequence of the European Commission Landfill Directive, installed anaerobic digestion capacity in Europe has increased sharply and now stands at more than 4 million tons of annual capacity.

A facility using anaerobic digestion to handle solid waste will have a system comprised of the following units: feedstock handling/storage, preprocessing, digester, collection and storage of the biogas, dewatering of the digestate, and handling/storage of the dewatered digestate. There are several designs for digesters, single-stage (wet or dry), two-stage, and batch systems. The dewatered digestate still contains organic matter and may need to be further treated to stabilize it, usually through aerated composting or disposal in a landfill. A digestate that meets the definition of compostable material, but fails the standards set for metals or pathogens set in Title 14 California Code of Regulations Sections 17868.2 and 17868.3, should continue to be considered to be a waste material. The storage and use of biogas generated from anaerobic digestion is not viewed as a part of the solid waste handling activities discussed in this guidance.
Information on anaerobic digestion systems and their use is contained in the March 2008 Board report, "Current Anaerobic Digestion Technologies Used for Treatment of Municipal Organic Solid Waste," can be viewed or downloaded at http://www.ciwmb.ca.gov/publications/default.asp?pubid=1275.

Anaerobic Digestion Handling Compostable Material Is Regulated As a Compostable Material Handling Facility

In general, looking first to the nature of the material being handled helps determine the regulatory scheme which applies to anaerobic digestion activities. If the feedstock handled at the facility is a compostable material, the facility will typically be regulated as a compostable material handling facility. If the material is not compostable, then the activity will typically be treated as a transfer and processing facility, subject to the Three-Part Test and volumes involved.

Anaerobic digestion fits within the statutory definition of composting. ("Composting" is defined broadly as "the controlled or uncontrolled biological decomposition of organic wastes." PRC section 40116.1.) Thus, sites using anaerobic digestion would most properly be regulated under the Board’s compostable material handling regulations if their feedstock is compostable (14 CCR 17850 et seq.).

In making this determination, some key definitions include:

> PRC 40116. “Compost” means the product resulting from the controlled biological decomposition of organic wastes that are source separated from the municipal solid waste stream, or which are separated at a centralized facility. “Compost” includes vegetable, yard, and wood wastes which are not hazardous.
>
> PRC 40200 (a) “Transfer or processing station” or “station” includes those facilities utilized to receive solid wastes, temporarily store, separate, convert, or otherwise process the materials in the solid wastes, or to transfer the solid wastes directly from smaller to larger vehicles for transport, and those facilities utilized for transformation.
>
> PRC 40200 (b) “Transfer or processing station” or “station” does not include any of the following:
>
> > (1) A facility, whose principal function is to receive, store, separate, convert, or otherwise process in accordance with state minimum standards, manure.
> >
> > (2) A facility, whose principal function is to receive, store, convert, or otherwise process wastes which have already been separated for reuse and are not intended for disposal.
> >
> > (3) The operations premises of a duly licensed solid waste handling operator who receives, stores, transfers, or otherwise processes wastes as an activity incidental to the conduct of a refuse collection and disposal business in accordance with regulations adopted pursuant to Section 43309.

Anaerobic digestion of compostable material is typically regulated under the Board’s Compostable Materials Handling Operations and Facilities Regulatory Requirements, Title14, CCR 17850 et seq. The regulations take into the consideration the type of feedstock, location of the activity, the volumes involved, and purpose. If the feedstock is not compostable material, the required permit or authorization will be dependent on the feedstock, size and location as illustrated in the Decision Diagram for anaerobic digestion. Mixtures of feedstock will require a case-by-case determination.

Title 14, section 17852(a)(8) “Anaerobic Decomposition” means the biological decomposition of organic substances in the absence of oxygen.

Title 14, section 17852(a)(17) “Enclosed Composting Process” means a composting process where the area that is used for the processing, composting, stabilizing, and curing of organic materials, is covered on all exposed sides and rests on a stable surface with environmental controls for moisture and airborne emissions present.

Title 14, section 17852(a)(12) "Compostable Material Handling Operation" or "Facility" means an operation or facility that processes, transfers, or stores compostable material. Handling of compostable materials results in controlled biological decomposition. Handling includes composting, screening, chipping and grinding, and storage activities related to the production of compost, compost feedstocks, and chipped and ground materials. "Compostable Materials Handling Operation or Facility" does not include activities excluded from regulation in section 17855. "Compostable Materials Handling Operation or Facility" also includes:

(A) agricultural material composting operations;
(B) green material composting operations and facilities;
(C) research composting operations; and
(D) chipping and grinding operations and facilities.

A Tiered Regulatory Structure

The Board has implemented regulations which exclude some activities from permitting requirements, allow others to operate after making a notification to the Local Enforcement Agency (LEA). The tiers that are applicable for anaerobic digestion are the Full Permit, Enforcement Agency Notification, and Excluded Solid Waste Handling tiers. The determination of how anaerobic digestion fits into the tiers is made by the LEA. The type of feedstock, location, and size of the activity will determine which tier is applicable for a specific anaerobic digestion project. If the feedstock is not compostable material, the activity is subject to the requirements for a transfer station and solid waste handling. As mentioned above, the regulations have specific provisions and requirements for compostable materials. The regulations for compostable materials provide the criteria for activities that are excluded, subject to requirements for notification or a permit.

How do I Determine if the Feedstock is Compostable?

Anaerobic digestion may use compostable or non-compostable material. If an activity is handling compostable material,[*] the activity is usually subject to the compostable material handling requirements of Title 14, Chapter 3.1, Compostable Materials Handling Operations and Facilities Regulatory Requirements. A compostable material is any organic material that when accumulated will become active compost,[†] that is, is unstable and will rapidly decompose, generating temperatures of at least 50 degrees Celsius (122 degrees Fahrenheit) during decomposition, or is releasing carbon dioxide at a rate of at least 15 milligrams per gram of compost per day, or the equivalent of oxygen uptake (Title 14, section 17852(a)(11), (a)(1)). Compostable materials include, but are not limited to, vegetable, yard, food, agricultural, and biosolids.

The compost regulations make an exception for an operator who is handling compostable material in a way that precludes it from becoming active compost. In that case, the activity is excluded from the compost regulation, even though it handles compostable material (Title 14, section 17855(a)(5)(J)). This circumstance is rare. Of course, the activity may still be subject to regulation as a transfer/processing station, as noted below.

Anaerobic Digestion Handling Feedstock That Is Not Compostable Material

Anaerobic digestion that is handling a solid waste that does not meet the definition of a compostable material may be subject to the requirements for a transfer/processing station. See Attachment 4 for more details on transfer station.

When is an Anaerobic Digestion Activity that is Handling Compostable Material and Creating Active Compost Excluded From Any Requirements Under the Solid Waste Regulations?

The use of anaerobic digestion under specific conditions will be considered an excluded activity and not be subject to permitting or notification requirements under the compost regulations. There are provisions addressing agricultural material, small quantity of green material (if no more than 500 cubic yards is on-site at any one time), location, non-commercial composting, and

---

[*] Title 14, section 17852 (a) (11) – “Compostable Material” means any organic material that when accumulated will become active compost as defined in section 17852(a) (1).

[†] Title 14, section 17852 (a) (1) – “Active Compost” means compost feedstock that is in the process of being rapidly decomposed and is unstable. Active compost is generating temperatures of at least 50 degrees Celsius (122 degrees Fahrenheit) during decomposition; or is releasing carbon dioxide at a rate of at least 15 milligrams per gram of compost per day, or the equivalent of oxygen uptake.

within-vessel composting. The activities listed below are excluded activities and do not constitute compostable material handling operations or facilities, and are not subject to the Compostable Materials Handling requirements. Nothing in this section precludes the Enforcement Agency or the Board from inspecting an excluded activity to verify that the activity is being conducted in a manner that qualifies as an excluded activity or from taking any appropriate enforcement action.

Agricultural Material

Title 14, section 17855(a)(1) An activity is excluded if it handles agricultural material derived from an agricultural site, and returns a similar amount of the material produced to that same agricultural site, or an agricultural site owned or leased by the owner, parent, or subsidiary of the composting activity. No more than an incidental amount of up to 1,000 cubic yards of compost product may be given away or sold annually.

Title 14, section 1785 (a)(5) “Agricultural Material” means material of plant or animal origin, which result from the production and processing of farm, ranch, agricultural, horticultural, aquacultural, silvicultural, floricultural, vermicultural, or viticultural products, including manures, orchard and vineyard prunings, and crop residues.

Small Quantity of Green Material

Title 14, section 17855(a)(4) Handling of green material, feedstock, additives, amendments, compost, or chipped and ground material is an excluded activity if 500 cubic yards or less is on-site at any one time, the compostable materials are generated on-site, and if no more than 1,000 cubic yards of materials are either sold or given away annually. The compostable material may also include up to 10 percent food material by volume.

Location at Existing Solid Waste Facilities

Title 14, section 17855(a)(5) The handling of compostable materials is an excluded from having to comply with the Compostable Materials Handling requirements if:

(A) the activity is located at a facility (i.e., landfill or transfer/processing facility) that has a tiered or full permit as defined in section 18101,

1. has a Report of Facility Information which is completed and submitted to the EA that identifies and describes the activity and meets the requirements of Titles 14 or 27; and,
2. will only use the material on the facility site, or

(B) the activity is solely for the temporary storage of biosolids sludge at a Publicly Operated Treatment Works (POTW), (see section on POTW), or

(H) the activity is part of an animal food manufacturing or rendering operation.

Non-commercial

(6) Non-commercial composting with less than one cubic yard of food material is excluded provided that all compostable material is generated and used on-site.
Within-vessel Small Quantity
(8) Within-vessel composting process activities with less than 50 cubic yard capacity are excluded.

When is Anaerobic Digestion Required to Comply with the Enforcement Agency Notification?

If an activity meets the requirements for a compost material handling activity, the next step is to determine what type of compostable material handling activity it fits under.

Agricultural Material Composting Operation

When anaerobic digestion is used to process only agricultural material in a manner that does not meet the provisions for the exclusion in Title 14, section 17855(a)(1); pursuant to Title 14, section 17856, the operations must comply with the notification requirement.

Title 14, section 17852(a)(5) “Agricultural Material” means material of plant or animal origin, which result from the production and processing of farm, ranch, agricultural, horticultural, aquacultural, silvicultural, floricultural, vermicultural, or viticultural products, including manures, orchard and vineyard prunings, and crop residues.

Title 14, section 17852(a)(6) “Agricultural Material Composting Operation” means an operation that produces compost from green or agricultural additives, and/or amendments.

Title 14, section 17852(a)(25) “Manure” is an agricultural material and means accumulated herbivore or avian excrement. This definition shall include feces and urine, and any bedding material, spilled feed, or soil that is mixed with feces or urine.

Green Material

A green material composting operation that has up to 12,500 cubic yards of feedstock, compost or chipped and ground material onsite at any one time needs to comply with the requirement for Enforcement Agency Notification (Title 14, section 17857.1). Green material with any quantity of food material will be subject to a full permit.

Title 14, section 17852(a)(21) “Green Material” means any plant material that is separated at the point of generation, contains no greater than 1.0 percent of physical contaminants by weight, and meets the requirements of section 17868.5. Green material includes, but is not limited to, yard trimmings, untreated wood wastes, natural fiber products, and construction and demolition wood waste. Green material does not include

> food material, biosolids, mixed solid waste, material processed from commingled collection, wood containing lead-based paint or wood preservative, mixed construction or mixed demolition debris.
>
> Title 14, section 17852(a)(32) “Physical Contamination” or “Contaminants” means human-made inert products contained within feedstocks, including, but not limited to, glass, metal, and plastic.
>
> Title 14, section 17852(a)(22) “Green Material Composting Operation” or “Facility” is an operation or facility that composts green material, additives, and/or amendments. A green material composting operation or facility may also handle manure and paper products. An operation or facility that handles a feedstock that is not green material, manure, or paper products, shall not be considered a green material composting operation or facility. “Green Material Composting Operation” or “Facility” does not include activities excluded from regulation in section 17855.

Publicly Operated Treatment Works (POTWs)

If a Publicly Operated Treatment Works (POTW) is using anaerobic digestion for biosolids on-site as a part of the process to treat biosolids, they would be excluded under Title 14, section 17855(a)(5)(B). If compostable wastes (material that would typically be received at the site through the sewer system) are added to biosolids undergoing anaerobic digestion at a POTW, the activity shall comply with the EA notification under Title 14, section 17859.1 For example, food waste received by truck and processed on-site before being added to the biosolids anaerobic digestion process would require a Notification level tier under Title 14, section 17859.1.

For activities where anaerobic digestion of other wastes, not including biosolids, is proposed to be conducted at a POTW, these activities may be subject to the requirements for a compostable materials handling activity or transfer station depending on the specifics of the activity as determined by the LEA.

Research Operations

Research operations for anaerobic digestion with no more than 5,000 cubic yards of feedstock, additives, amendments, chipped and ground materials, and composted on-site at any one time, shall comply with the EA notification. A research operation using within-vessel with more than 5,000 cubic yards may be allowed only if the LEA determines that the increased volume will not pose additional risk to public health and the environment.

> Title 14, section 17862. Research Composting Operations**.**
> (a) An operator conducting research composting operations shall not have more than 5,000 cubic yards of feedstock, additives, amendments, chipped and ground material, and compost on-site at any one time, and shall comply with the EA Notification requirements

set forth in Title 14, California Code of Regulations, Division 7, Chapter 5.0, Article 3.0 (commencing with section 18100), except as otherwise provided by this Chapter.

(b) An operator conducting research composting operations utilizing within-vessel processing, may exceed 5,000 cubic-yards of feedstock, additives, amendments, chipped and ground material and compost, if the EA determines that such increased volume will not pose additional risk to the public health, safety and the environment.

(c) In addition to the EA Notification requirements set forth in Title 14, California Code of Regulations, Division 7, Chapter 5.0, Article 3.0, section 18103.1 (a)(3), the operator shall provide a description of the research to be performed, research objectives, methodology/protocol to be employed, data to be gathered, analysis to be performed, how the requirements of this subchapter will be met, and the projected timeframe for completion of the research operation.

(d) The EA Notification for a research composting operation shall be reviewed after each two-year period of operation. Review criteria shall include the results and conclusions drawn from the research.

(e) Research composting operations that will be using unprocessed mammalian tissue as a feedstock for the purpose of obtaining data on pathogen reduction or other public health, animal health, safety, or environmental protection concern, shall satisfy the following additional requirements:

> (1) Unprocessed mammalian tissue used as feedstock shall be generated from on-site agricultural operations, and all products derived from unprocessed mammalian tissue shall be beneficially used on-site.
> (2) The operator shall prepare, implement and maintain a site-specific, research composting operation site security plan. The research composting site security plan shall include a description of the methods and facilities to be employed for the purpose of limiting site access and preventing the movement of unauthorized material on to or off of the site.
> (3) The EA Notification for the research composting operation using unprocessed mammalian tissue as feedstock and documentation of additional requirements of this section shall be reviewed after each six month period of operation.

Large Volume of Green Material

An anaerobic digestion of green material at a volume that is more than 12,500 cubic yards of green materials on-site at any time, is required to obtain a Compostable Materials Handling Facility Permit pursuant to the requirements for a full solid waste facility permit, pursuant to Title 14, sections 17854 and 17857.1(b).

All Other Material as a Feedstock

Anaerobic digestion of all other material considered compostable material requires a full permit.

Design and Operational Requirements

As a compostable material handling operation or facility, anaerobic digestion facilities are required to comply with all of the applicable regulatory standards found in Chapter 3.1, Title 14 of the California Code of Regulations. These requirements include the development and approval of a Report of Compost Site Information and an Odor Impact Minimization Plan as part of the permit application package. Many of the design and operational standards have prescriptive requirements focused on aerobic composting methods, but some of the requirements have a process outlined for requesting and receiving approval for alternative compliance methods. Each anaerobic digestion site will be required to maintain records as indicate in Article 8 and will be required to provide for site restoration as outline in Article 9.

Compost Sampling Requirements

Composting facilities and operations in California are required to meet maximum metals concentrations, and pathogen reduction requirements to protect public health and safety. These requirements are based on U.S. Environmental Protection Agency regulations (Title 40 CFR 503) which were based on scientific research and technology. Compost that does not meet the maximum allowable concentrations for metals and pathogens must be designated for disposal or further processing. The LEA may approve alternative methods for sampling or ensuring pathogen reduction if the methods will ensure that allowable thresholds are not exceeded.
Any material resulting from the anaerobic digestion process, such as digestate, that is sold or given away (as product) must be sampled and tested for pathogen and metals prior to leaving the site, consistent with the Compostable Materials Handling Requirements. If a material does not meet the standards for pathogens or metals, the material must continue to be managed as solid waste. A summary of California requirements for sampling, maximum metals concentrations and pathogen reduction at composting operations are listed below:

Section 17868.1 Sampling Requirements
Composting operations that sell or give away greater than 1,000 cubic yards of compost annually must verify that compost meets the maximum acceptable metal concentration limits. Verification of pathogen reduction requirements occurs at the point where compost is sold and removed from the site, bagged for sale, given away for beneficial use and removed from the site, or otherwise beneficially used. An operator who composts green material, food material, or mixed solid waste is required to take and analyze one composite sample for every 5,000 cubic yards of compost produced. The sampling schedule for operators composting biosolids is based on the amount of compost feedstock produced. The LEA may approve alternative methods of sampling for a green material composting operation or facility that ensures the maximum metal concentration requirements and pathogen reduction requirements are met.

Section 17868.2 Maximum Metal Concentrations

Compost cannot exceed the maximum acceptable metal concentrations for arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, and zinc. The LEA may approve alternative methods of sampling for green and food materials composting if the LEA determines that the alternative methods will ensure that the maximum metal concentrations are met.

Section 17868.3 Pathogen Reduction

Compost producers must follow specific procedures to demonstrate adequate pathogen reduction or an alternative method approved by the LEA that will provide equivalent pathogen reduction:

- Enclosed or within-vessel composting. Active compost shall be maintained at a temperature of 55 degrees Celsius (131 degrees Fahrenheit) or higher for a pathogen reduction period of three days.

- Windrow composting process. Active compost shall be maintained under aerobic conditions at a temperature of 55 degrees Celsius (131 degrees Fahrenheit) or higher for a pathogen reduction period of 15 days or longer. During the period when the compost is maintained at 55 degrees Celsius or higher, there shall be a minimum of five turnings of the windrow.

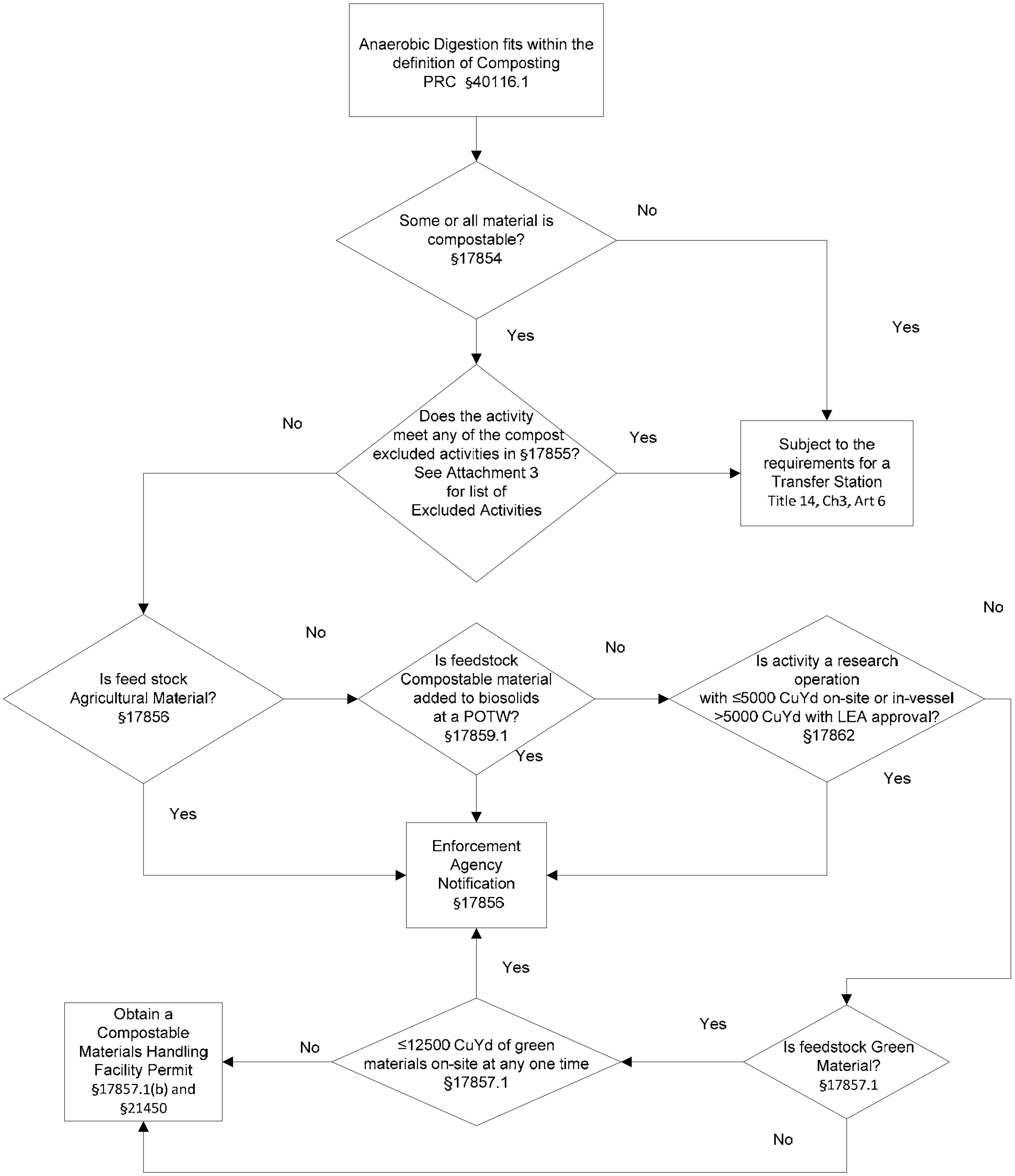
- Aerated static pile composting process. Active compost shall be covered with 6 to 12 inches of insulating material, and the active compost shall be maintained at a temperature of 55 degrees Celsius (131 degrees Fahrenheit) or higher for a pathogen reduction period of three days.

- Alternative methods of compliance may be approved by the EA if the EA determines that the alternative method will provide equivalent pathogen reduction.

- Finished compost must meet acceptable levels for fecal coliform (includes *E. coli*) and Salmonella.

Attachment 1

Decision Diagram for Anaerobic Digestion



Attachment 2
Tier Regulatory Placement for Anaerobic Digestion By Feedstock

TYPE OF FEEDSTOCK	EXCLUDED	EA NOTIFICATION	FULL PERMIT
BIOSOLIDS	STORAGE ON SITE AT A POTW	BIOSOLIDS ONLY SEPARATE FROM NORMAL TREATMENT AT A POTW	
GREEN MATERIAL	≤500 CU YDS ONSITE ≤1000 CU YDS GIVEN AWAY OR SOLD ANNUALLY	≤12, 500 CU YDS	>12,500 CU YDS, OR GREEN MATERIAL WITH OTHER WASTE INCLUDING FOOD
AGRICULTURAL MATERIAL (INCLUDES MANURE)	≤1000 CU YDS GIVEN AWAY OR SOLD ANNUALLY	ONLY AG MATERIAL	WHEN MIXED WITH OTHER WASTE INCLUDING FOOD
RESEARCH	<50 CU YDS	≤5000 CU YDS ON-SITE OR IN-VESSEL (>5000 CU YDS WITH LEA APPROVAL)	
FOOD WASTE	≤10 % FOOD WASTE, ONLY WITH GREEN MATERIAL ≤500 CU YDS, ON-SITE AND ≤1000 CU YARDS GIVEN AWAY OR SOLD ANNUALLY	ONLY WHEN ADDED TO THE TREATMENT OF BIOSOLIDS AT A POTW	ALL OTHER SITUATIONS

Attachment 3

Excluded Activities For Anaerobic Digestion Handling Compostable Materials

Title 14, Section 17855(a) The activities listed below do not constitute compostable material handling operations or facilities and are considered excluded activities. Nothing in this section precludes the EA or the Board from inspecting an excluded activity to verify that the activity is being conducted in a manner that qualifies as an excluded activity or from taking any appropriate enforcement action.

(1) An activity is excluded if it handles agricultural material derived from an agricultural site, and returns a similar amount of the material produced to that same agricultural site, or an agricultural site owned or leased by the owner, parent, or subsidiary of the composting activity. No more than an incidental amount of up to 1,000 cubic yards of compost product may be given away or sold annually.

(4) Handling of green material, feedstock, additives, amendments, compost, or chipped and ground material is an excluded activity if 500 cubic yards or less is on-site at any one time, the compostable materials are generated on-site and if no more than 1,000 cubic yards of materials are either sold or given away annually. The compostable material may also include up to 10% food material by volume.

(5) The handling of compostable materials is an excluded activity if:

(A) the activity is located at a facility (i.e., landfill or transfer/processing facility) that has a tiered or full permit as defined in section 18101,

1. has a Report of Facility Information which is completed and submitted to the EA that identifies and describes the activity and meets the requirements of Titles 14 or 27; and,

2. will only use the material on the facility site, or

(B) the activity is solely for the temporary storage of biosolids sludge at a Publicly Operated Treatment Works (POTW), or

(C) the activity is located at the site of biomass conversion and is for use in biomass conversion as defined in Public Resources Code section 40106; or

(D) the activity is part of a silvicultural operation or a wood, paper, or wood product manufacturing operation; or

(E) the activity is part of an agricultural operation and is used to temporarily store or process agricultural material not used in the production of compost or mulch; or

(F) the activity is part of an operation used to chip and grind materials derived from and applied to lands owned or leased by the owner, parent, or subsidiary of the operation; or

(G) the activity is part of an agricultural operation used to chip and grind agricultural material produced on lands owned or leased by the owner, parent, or subsidiary of the agricultural operation, for use in biomass conversion; or

(H) the activity is part of an animal food manufacturing or rendering operation.

(I) the activity is the storage of yard trimmings at a publicly designated site for the collection of lot clearing necessary for fire protection provided that the public agency designating the site has notified the fire protection agency; or

(J) the materials are handled in such a way to preclude their reaching temperatures at or above 122 degrees Fahrenheit as determined by the EA.

(6) Non-commercial composting with less than one cubic yard of food material is excluded provided that all compostable material is generated and used on-site.

(7) Storage of bagged products from compostable material is an excluded activity provided that such bags are no greater than 5 cubic yards.

(8) Within-vessel composting process activities with less than 50 cubic yard capacity are excluded.

(9) Beneficial use of compostable materials is an excluded activity. Beneficial use includes, but is not limited to slope stabilization, weed suppression, alternative daily cover, and similar uses, as determined by the EA; land application in accordance with California Department of Food and Agriculture requirements for a beneficial use as authorized by Food and Agricultural Code section 14501 et seq.; and reclamation projects in accordance with the requirements of the Office of Mine Reclamation of the Department of Conservation as authorized by Public Resources Code section 2770 et seq.

Attachment 4
Anaerobic Digestion and Transfer/Processing Facility Requirements

If a site is not handling compostable materials as defined in Title 14, section 17852 but is utilizing anaerobic digestion, the site may be subject to transfer/ processing facility requirements.

Activities that only handle non-compostable material that has been separated for reuse and satisfy the 3 Part Test found in Title 14, section 17402.5(d) would be considered a recycling center and would not be subject to regulation. All others could be considered a transfer station and should be examined using Title 14, section 17400 et seq.

There are anaerobic digestion systems that are designed to operate at low temperatures. Several manufacturers that have designed operating temperatures at 95 degrees Fahrenheit are listed in Table 1 of the March 2008 Board report, "Current Anaerobic Digestion Technologies Used for Treatment of Municipal Organic Solid Waste." If the materials on-site are prevented to reach a temperature of 122 degrees Fahrenheit while stored on site or in the digestion process, then the activity is not handling compostable material (Title 14, section 17852(a)(11)). In this situation, the anaerobic digestion systems will not be considered a compostable material handling activity and may be subject to the requirements for a transfer station.

The "Three-Part Test"

An activity is not subject to regulatory requirements if, (1) the site is receiving material that has been source separated (by the generator) or separated for reuse (at a centralized facility – such as a MRF) prior to receipt at the site; (2) less than 1 percent of the material is putrescible and the material is not causing a nuisance as determined by the LEA; and, (3) the residual amount of solid waste in the separated for reuse material is less than 10 percent of the material received at the site (calculated by weight on a monthly basis). Section 17402.5(d) of Title 14, CCR, sets out the regulations which describe the three-part test:

> 14 CCR 17402.5… (d) A "Recycling Center" means a person or business entity that meets the requirements of this subdivision. A recycling center shall not be subject to the requirements of Articles 6.0, 6.1, 6.2, 6.3 and 6.35 of this Chapter.
> (1) A recycling center shall only receive material that has been separated for reuse prior to receipt.
> (2) The residual amount of solid waste in the separated for reuse material shall be less than 10 percent of the amount of separated for reuse material received by weight.
>> (A) The residual amount is calculated by measuring the outgoing tonnage after separated for reuse materials have been removed.
>> (B) The residual amount is calculated on a monthly basis based on the number of operating days.
>
> (3) The amount of putrescible wastes in the separated for reuse material shall be less than 1 percent of the amount of separated for reuse material received by weight, and the

putrescible wastes in the separated for reuse material shall not cause a nuisance, as determined by the EA.

(A) The amount of putrescible wastes is calculated in percent as the weight of putrescible wastes divided by the total incoming weight of separated for reuse material.

(B) The amount of putrescible wastes is calculated on a monthly basis based on the number of operating days.

(4) The only separation that may occur at the recycling center is the sorting of materials that have been separated for reuse prior to receipt.

Title 14, section 17402.5(b)(1) “Residual” means the solid waste destined for disposal, further transfer/processing as defined in section 17402(a)(30) or (31) of this Article, or transformation which remains after processing has taken place and is calculated in percent as the weight of residual divided by the total incoming weight of materials.

If the activities fail the Three-Part Test, then the activity is subject to the requirements for a transfer and processing facility set out at Title 14, Chapter 3, Article 6. The type of authorization or permit that is required is dependent on the quantity of waste received as stated below.

1) Enforcement Agency Notification, if the volume received is less than 60 cubic yards per day or 15 tons per day;
2) Registration Permit, if the volume is equal to or greater than 60 cubic yards per day or 15 tons per day, but less than 100 tons per day; or
3) Full Solid Waste Facilities Permit, if equal to or greater than 100 tons per day.

Response D-1

The publication provided is helpful in understanding how the CalRecycle regulation could affect dairy co-digestion facilities and that the determination of the appropriate level of authorization or permit for an activity involving anaerobic digest is made by the Local Enforcement Agency. An LEA contact list can be found at www.calrecycle.ca.gov/LEA/Contacts.htm.

The potential need for a Composting Permit or Transfer Processing Permit is identified in Section 3.7 on page 3-18 of the draft Program EIR.

Response D-2

In response to the comment D-2, and also comment H-13, Mitigation Measure 6.3b has been revised. Please see response to comment H-13.

Response D-3

In response to the comment the last paragraph on page 3-16 of the draft Program EIR is modified to read as follows:

> "…The separated solids and liquids would then be applied pursuant to the applicable nutrient management plan. As an example, the solids could be used for land application, compost, fertilizer, or potentially landfill alternative daily cover and the liquid portion of the effluent could be recycled for flush water, used for land application, or at a centralized facility it could potentially be sent to a sanitary sewer. <u>If a landfill operator proposes to use the solid digestate as Alternative Daily Cover (ADC), a site-specific demonstration project would be required in compliance with Title 27 Section 20690(b).</u>"

Response D-4

In response to the comment the third paragraph on page 2-2 of the draft Program EIR is modified to read as follows:

> "…The order affects projects such as the one proposed in this Program EIR and the anticipated Program EIR being prepared by the Department of Resources Recycling and Recovery (CalRecycle) for anaerobic digester facilities that would use food waste, green material, and mixed solid waste as feedstocks; thus diverting these materials from landfills. <u>CalRecycle will be analyzing the development and operation of AD facilities that would be sited at solid waste facilities and in industrial areas. The CalRecycle Program EIR will not cover AD facilities sited at dairies and other agricultural areas.</u>"

E

Paul Miller

From: Lisa Gymer [LGYMER@dfg.ca.gov]
Sent: Monday, August 23, 2010 3:39 PM
To: sklein@waterboards.ca.gov
Cc: Annee Ferranti
Subject: Comment Letter - Dairy Digester and Co-Digester draft Program EIR

Stephen,

The Department of Fish and Game has reviewed the information submitted by the Regional Water Quality Control Board, Central Valley Region regarding the subject Project.

The Department has the following comments regarding Section 9 - Biological Resources of the draft Program EIR.

E-1

Measure 9.1a: The Department agrees that a biological site assessment should be conducted and a report should be submitted as part of the NOI process. The Department disagrees that the biological assessment should be limited to those lands that are undisturbed or have been fallowed for 1 year or greater. There are no such limitations on Measure 9.2a, nor should there be here. The Department recommends that biological site assessments be required to be submitted with the NOI for all proposed dairy digester and co-digester facilities. Special status species can use the fringes of agricultural fields and developed areas. Depending on the type of crop, it can be a foraging sources for special status species. A qualified biologist should be the one to determine the potential impacts on special status species and habitat for all digester and co-digester facilities. The Department would also request that a copy of the biological assessment report be included for CEQA review purposes so that we can provide comments as appropriate on individual projects.

E-2

Impact 9.4: The draft Program EIR states there are no mitigation measures required because there will be no impacts on migratory corridors or native wildlife nursery sites. This should be evaluated during the biological site assessment conducted by a qualified biologist and as such should have similar mitigation measures as Impacts 9.1 (see comments above) and 9.2.

Thank you for allowing us the opportunity to provide comments on this Project. If you have questions, please contact me at the numbers below.

Respectfully,

Lisa Gymer
Environmental Scientist
California Department of Fish and Game
1234 East Shaw Avenue
Fresno, California 93710
(559) 243-4014 x238
lgymer@dfg.ca.gov

Response E-1

The comment is correct in that special status species could use habitat on the fringe of agricultural fields. Therefore, Mitigation Measure 9.1a on pages 1-15 and 9-13 of the draft Program EIR has been revised to read as follows:

> "**Measure 9.1a:** The project applicant or agency(s) responsible shall document that ~~submit , as part of the NOI,~~ a site assessment report for dairy digester and co-digester facilities to be constructed (including the location of digestate application) has been submitter to CDFG for its review. ~~in areas that contain undisturbed land and/or any agricultural fields that have been fallow for more than 1 year~~. This report shall be prepared by a qualified biologist. It shall evaluate the project site's potential to support special-status plant and wildlife species (including critical habitat) and whether special-status species could be affected by dairy digester and co-digester development, including construction and operations. If there are no special-status species or critical habitat present, no additional mitigation would be required."

Response E-2

Comment noted. As stated on page 9-15 of the draft Program EIR, the project would have a less-than-significant impact on wildlife corridors and nursery sites. Facilities constructed for the project would be small in size and would not affect wildlife corridors or nursery sites. Because this impact is less than significant, no mitigation is required.

F

Stanislaus County
Striving to be the Best

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AUG 26 2010
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FRESNO, CALIF.

STANISLAUS COUNTY ENVIRONMENTAL REVIEW COMMITTEE

August 23, 2010

Stephen Klein, Project Manager
California Valley Water Board
1685 E Street
Fresno, CA 93706-2007

SUBJECT: **ENVIRONMENTAL REFERRAL – CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD – WASTE DISCHARGE REGULATORY PROGRAM FOR DAIRY MANURE DIGESTER AND CO-DIGESTER FACILITIES WITHIN THE CENTRAL VALLEY REGION**

Mr. Klein:

F-1

The Stanislaus County Environmental Review Committee (ERC) has reviewed the subject project and has no comments at this time.

The ERC appreciates the opportunity to comment on this project.

Sincerely,

Christine Almen

Christine Almen, Senior Management Consultant
Environmental Review Committee

cc: ERC Members

Response F-1

Comment noted. The Stanislaus County Environmental Review Committee (ERC) has reviewed the project and has no comments at this time.

G

COUNTY OF TULARE CALIFORNIA

RESOURCE MANAGEMENT AGENCY

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Britt L. Fussel
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Planning
Public Works
Administration/Community Development

JAKE RAPER JR., AICP, DIRECTOR

August 24, 2010

Stephen Klein
CVWB Project Manager
CVWQCB
1685 E Street
Fresno, CA 93706

Re: **Draft Program Environmental Impact Report (DPEIR) for the Central Valley Dairy Digester and Co-Digester Facilities Program EIR SCH#** 2010031085

Dear Mr. Klein:

Thank you for the opportunity to provide comments related to the above project. To assist the Central Valley Region Water Quality Control Board in preparing a Draft Program EIR that provides an adequate and complete document, in accordance with the California Environmental Quality Act (CEQA) the County submits the following comments and concerns:

The County appreciates the effort the Central Valley Regional Water Quality Control Board (CVRWQCB) has put forth to streamline the permitting process for dairy manure digesters and co-digester projects. The County recognized the need for collaboration between the responsible agencies to make the permitting process straightforward and less time consuming without jeopardizing the integrity of the CEQA process. G-1

The County recognizes the Program EIR as a tool that local agencies can use to satisfy the requirements of CEQA. The County is looking at ways to make the land use permitting process faster and more efficient. The County would like to develop an efficient approach to permitting these types of facilities, possibly a two-tiered permitting process. Onsite digesters that meet all regulations, policies, mitigation requirements, and standards set for by the County could be a ministerial process. "Centralized location facilities" going through the Special Use Permit process could utilize the Program EIR to expedite the permitting process. G-2

The County is concerned that the trade off for reduction of Greenhouse could be the increase in other pollutants that could have adverse impacts to the County's resources. The County would prefer a flexible Mitigation Monitoring Plan, making available options to mitigate an impact. All measures should be discussed and reasoning for each measure should be identified. Mitigation measures should not be deferred until some future time. However, measures may specify performance standards which would mitigate the significant effect of the project and which may be accomplished in more than one specified way. G-3

Thank you for the opportunity to discuss our concerns. If you have any questions that require further information, please call Cynthia Echavarria at (559) 624-7000.

Cynthia Echavarria
Environmental Coordinator
County of Tulare

C:file

Response G-1

Comment noted. Tulare County appreciates the effort of the Central Valley Water Board to make the permitting process straightforward and less time consuming without jeopardizing the integrity of the CEQA process.

Response G-2

Comment noted. Tulare County discusses how they could utilize the Program EIR. It should be noted that the process could be different in other counties.

Response G-3

The Mitigation Monitoring and Reporting Plan (MMRP) will have flexibility because of the variety of projects that it covers and the various jurisdictions in Region 5 that potentially could permit dairy digesters. Some of the mitigation measures have performance standards that can be accomplished by a variety of approaches. The MMRP will identify the timing of mitigation measures so they will not be deferred past their appropriate implementation time.

H

VIA EMAIL-REVISED

August 23, 2010

Central Valley Water Board
Attn: Stephen Klein, Project Manager
1685 E Street
Fresno, CA 93706-2007

SUBJECT: Comment letter, Dairy Digester and Co-Digester Draft Program EIR

Dear Stephen:

I have reviewed the above-referenced Draft Program Environmental Impact Report (hereafter "Draft PEIR"), and am providing the following comments to you and the staff of ESA, on behalf of the Dairy Cares coalition. Dairy Cares is a coalition of California's dairy producer and processor associations, including the state's largest producer trade associations (***Western United Dairymen, California Dairy Campaign*** and ***Milk Producers Council***) and the largest milk processing companies and cooperatives (***California Dairies, Inc., Dairy Farmers of America-Western Area Council, Hilmar Cheese Company, Joseph Gallo Farms, Producers Bar 20 Dairy*** and ***Land O' Lakes***). Formed in 2001, Dairy Cares promotes the long-term sustainability of California dairies by working to improve the industry's performance on environmental, animal care and quality-of-life issues.

We appreciate the hard work and expertise that was invested in the effort to create this excellent draft. We look forward, through these comments and the continuing stakeholder process, to assisting you in producing a PEIR that will meet the stated project objectives.

Summary

We agree with the project objectives as stated, support the major findings in the analysis of project alternatives, and concur with overall discussion and findings related to significance levels for the various impacts analyzed <u>prior to mitigation measures</u>. H-1

However, we have concerns and are requesting addition of clarifying language or revisions, primarily in the discussion of proposed mitigation measures related to air quality/greenhouse gases and water quality. Specifically, we are concerned that some mitigation measures have not been thoroughly supported in the record or may not be appropriate in some or all situations. In those cases, additional clarity as to the decision framework that will be applied to variable project configurations is needed. We understand that this will likely occur as the referenced draft general orders are developed, and so we have offered some suggestions to consider during that process to ensure that requirements are appropriately matched to project types. H-1 cont

Finally, we have offered a few technical comments intended to improve the factual basis for the report.

Project goals. We support the six overarching project goals as outlined in Section 1.1 of the Executive Summary and appreciate this clear and concise summary. In particular, we appreciate the specific goal of reducing water quality permitting time by 75 percent and inclusion of several pathways to permitting, including general orders, individual orders and conditional waivers. H-2

Electrical capacity of co-digestion. Section 1.2 includes a statement that "co-digestion substrates can increase the electrical capacity of a proposed system by a magnitude five times or greater than that of dairy manure alone." Information reviewed by Dairy Cares to date shows that addition of non-manure substrates can increase, dramatically, biogas production, but more in the range of 100 to 400 percent increases (e.g. two to five times more gas produced than manure alone). The current language suggests that gas production is always at least five times higher. Also, we suggest a citation be added specific to this information. H-3

Lining requirements for retention ponds. Table 1.1, Measure 5.2 suggests that "requirements ***shall*** include [emphasis added]: "Lining requirements for retention ponds in new facilities and operational dairies." Similar language is included in Table 3-1 and on pages 5-35 and 5-42. H-4

Dairy Cares agrees that all newly constructed ponds on new dairies, or newly constructed ponds on expanding, existing dairies where digesters are not being considered, should meet lining requirements approved by the Regional Water Quality Control Board. However, the Draft PEIR does not discuss the process that will be used for developing lining requirements or applying the requirements to various project configurations.

Specifically, it may be appropriate to include different tiers of requirements for dairies, reserving the most stringent review (as CEQA intends) for new facilities installed in areas where a dairy has not previously operated. Less stringent measures are appropriate on existing dairies that are modifying (triggering CEQA review) but almost entirely in a way that benefits the environment. The greatest opportunity to build digesters exists on dairies that already are operating. By holding existing dairies to the most stringent standards reserved for entirely new projects, the proposed orders/permitting requirements could have the opposite of its intended effect by discouraging interim improvements.

In the case of already operational dairies, utilization/conversion of an existing retention pond to an anaerobic digester (AD) tank or covered lagoon, or as a repository for (manure-only) digestate, presents little risk over the California Environmental Quality Act (CEQA) baseline. Indeed, the Draft PEIR correctly points out that for such a project based on an operational dairy, H-4 cont

the dairy would not be required to seek additional water board permits if the dairy is already covered under General Order R5-2007-0035.[1]

As such, certainly no lining requirements are needed for "operational dairies" [ref. Table 1,1, Measure 5.2] unless such a dairy is utilizing co-digestion or is not covered by the General Order. However, to truly meet the goals stated in Section 1.1, the Regional Board should identify additional opportunities for streamlining permitting at operational dairies. For example:

- Dairies not covered under the General Order R5-2007-0035, but who wish to build a digester utilizing an existing pond, should not be required to reconstruct the pond if it can adequately operate as a digester in its present condition.
- On operational dairies, if an existing pond is reconstructed, expanded or otherwise improved within the same facility footprint, lining requirements that otherwise meet General Order R5-2007-0035 Tier II standards (California Natural Resources Conservation Service Practice Standard 313 or equivalent) should be deemed adequate without the additional submission of "technical reports that the alternative design is protective of groundwater quality…"[2] This would allow the dairies to install a technology that generates renewable energy, reduces greenhouse gas emissions *and* represents an improvement over the previous pond – without causing projects to experience excessive project costs or permitting delays due to Tier II groundwater modeling exercises.

H-5

Similarly, Measure 5.3 includes a requirement that "all drainage be directed to a retention wastewater pond that has been designed to meet antidegradation provisions of Resolution 68-16 by an appropriately licensed professional." While Dairy Cares supports a requirement for proper drainage to the retention pond, there is a lack of clarity and certainty at this point in time as to who will determine, and how it will be determined, that a pond meets "Antidegradation provisions of Resolution 68-16." If the determination is made that the pond must meet Tier I or Tier II standards in all cases, this will cause a significant disincentive to development of dairy digesters.

H-6

Salt minimization plan and "reasonable salt loading." Table 1.1, Measure 5.3 includes a requirement that dairy digesters and co-digesters "prepare and implement site-specific Salt Minimization Plan (SMP) as approved by the Central Valley Water Board." Similar language is included on page 5-42. Similar to above, this requirement would not apply to a manure-only digester added to an operating dairy covered under General Order R5-2007-0035.

This section would appear to require a salt minimization plan for all other dairies installing a digester, whether or not they were utilizing co-digestion. While Dairy Cares supports a process to limit co-digestion substrates to salinity levels that can be managed as digestates are applied to crops, the requirement for an SMP would not appear to be necessary for any manure-only digester. Dairy Cares supports the use of a Nutrient Management Plan on all dairies and this will help ensure proper application levels of crop nutrients.

---

[1] Section 2.2.1, p. 2-4

[2] Page 13, B.7-b, Waste Discharge Requirements General Order No. R5-2007-0035.

However, language on page 5-36 asserts that "Based on a study conducted by J.L. Meyer in 1973, "reasonable" salt loading rates under normal situations were determined to help prevent the vertical migration of salts within the soil profile (Meyer, 1973 as cited in RWQCB, 2008). Unless environmental conditions show differently, 'reasonable' is **accepted to be** [emphasis added] a maximum annual non-nitrate salt loading rate of 2,000 pounds per acre for single-cropped land and 3,000 pounds per acre for double-cropped land." H-6 cont

To the knowledge of Dairy Cares, numerical limitations on salt application by crop are not required on dairies that do not contain digesters, nor are these required on other farms. Also to the knowledge of Dairy Cares, no basis has been provided for the numerical limitations suggested above. This language stating these specific numerical limitations should be removed from the Draft EIR or alternatively, this section should include more information and citations clarifying exactly how these numbers were "accepted to be" as "reasonable." If the source of this is the Regional Water Quality Control Board, we suggest including a citation of the Board action or Executive Officer decision or other appropriate citation that led to this determination.

Also, to the degree that SMP contains numerical limits on salt loading to agricultural fields, such limits would pose a restriction on dairy digester operators not imposed on non-digester dairy operators and as such, would discourage digester development. One alternative that may be less of a disincentive would be to restrict the digester operator from utilizing certain types or volumes of substrates that are deemed to contain unacceptably high salt levels. H-7

Crop selection based on salt uptake. Measure 5.3 suggests a requirement that dairy digester operators should "to the extent practicable, use crops that maximize salt uptake." This proposed requirement is unclear in its definition of "salt" and to what constitutes "practicable," although elsewhere in the Draft PEIR, the authors reference "non-nitrate salts" as one potential definition. Dairy Cares supports requiring an NMP, which properly implemented, has the effect of ensuring that digestate is not applied at non-agronomic rates. Beyond that, crop selection must remain at the discretion of the farmer. Imposing requirements that could affect the farmer's needs to meet market or feed demands is likely to impose a significant disincentive for digester development. H-8

Hazardous substance testing. Measure 5.3 prohibits "hazardous substances in co-digestion substrates processed by each facility as verified by laboratory analytical testing." Dairy Cares supports testing of substrate to ensure that hazardous materials are not present nor applied to crops. However, steps should be taken to focus the testing scope and frequency so that protection is provided without excessive laboratory costs. Daily testing of substrate for all possible hazardous substances will pose a significant cost that will serve as a disincentive to co-digestion development. The testing regime should be scaled to match the variability and risk actually associated with the substrates used. For example, many food wastes are unlikely to contain hazardous substances simply, because they are a by-product of production of food, which does not contain hazardous substances. H-9

Monitoring groundwater and digestate for pathogens. Measure 5.3 proposes a requirement to "monitor digestate, and groundwater for pathogen indicator organisms." Absent evidence to the contrary, which does not appear to be included in the Draft PEIR, this appears to be an excessive requirement. Evidence in the Draft PEIR suggests that one of the benefits of digestion and co- H-10 digestion is reduction in pathogens. Requiring dairy digester operators to test digestate and groundwater for pathogens imposes a requirement that is not imposed on dairy operators who do not operate digesters and therefore poses a significant disincentive to dairy digester development. H-10 cont

Monitoring groundwater and soil. Measure 5.3 on page 5-42 suggests that dairy digester or co-digester operators must "prepare and implement a site-specific NMP that includes a soils and groundwater monitoring and reporting program that include a variety of waste constituents, as well as yearly reconciliation based on sampling results that measure agronomic rates." Dairy Cares supports use of an NMP on all dairies. However a site-specific groundwater monitoring program should not be the sole path to compliance for dairies installing digesters. All dairies, particularly dairies covered under General Order R5-2007-0035, should be allowed the option to participate in a Representative Groundwater Monitoring program that has been accepted and approved by the Regional Board. Failure to allow such an option will serve as a significant disincentive to development of digesters and co-digesters on dairies. H-11

Solid wastes on impermeable surfaces. Measure 5.3 proposes to require that all "solid wastes" (it is not clear if this applies to substrate, separated solids post-digestion, or both) be stored on an impermeable surface. A clear definition of impermeable is needed. All such materials should be stored on concrete or surfaces that drain to the retention pond. However, it may not be necessary to store, for example, separated solids on concrete. These may be safely stored in corrals or other appropriate, properly drained areas until such time as they may be used as bedding, soil amendment or other productive use. The same may be true for certain substrates. Requiring a concrete pad in situations where no significant protection is necessary may pose a disincentive to dairy digester and co-digester development. H-12

Odor Management Plan (OMP). Measure 6.3 suggests that dairy digesters and co-digesters could cause objectionable odors and as such, an OMP should be required. Dairy Cares does not agree that an odor management plan is necessary in all cases, particularly for manure-only digesters. OMPs should only be required if the dairy digester is part of a new dairy facility (in which case an OMP is typically required), or co-digestion is involved. H-13

In cases where an OMP is required, the requirements must not be excessive. Measure 6.3 says the OMP must include "management practices that could be implemented to minimize odor releases," and that those "management practices shall include the establishment of the following criteria:

- Establish time limit for on-site retention of undigested co-substrates (i.e., organic co-substrates must be put into the digester within 48 hours of receipt).
- Provide negative pressure buildings for indoor unloading. Treat collected foul air in a biofilter or air scrubbing system."

Great care should be exercised in considering any such measures. A time limit for on-site retention of co-substrates could impose significant operational constraints. Dairy Cares supports ensuring that adequate and appropriate storage space (such as tanks or other holding areas) are in place at any dairy receiving deliveries of co-substrate for digester use.

Negative pressure buildings for indoor unloading, combined with a biofilter, adds a significant level of operational cost. Such a measure should be considered only in the case that the odor impacts of the delivered substrate are determined to have a site-specific significant impact that must be mitigated. In most cases, it is likely that such measures would not provide any helpful benefit. H-13 cont

Environmental benefits discussion. Section 3.4, p. 3-10, suggests that the environmental benefits of digesters and co-digesters include "reduction in mass of solid wastes" and "generation of clean liquid effluent for irrigation or recycled water." Generally, reduction in mass attributable to AD is minimal and the (non-water) mass of digestate is not much smaller than the amount fed to the digester. However, diversion of waste streams from sewer systems and landfills to more appropriate use (to generate biogas and a soil amendment or compost) is a benefit of the process. Similarly, AD does not generally produce what can be described as "clean liquid effluent." However, liquid effluent can be blended with irrigation water and put to a beneficial use (irrigating and fertilizing crops). H-14

Section 3.4 also cites "concentration of nutrients in condensed solid for export or storage" as a benefit. Again, this is not a benefit of AD. Digesting and <u>subsequent drying</u> of scraped manure in a plug flow or complete mix digester may act to concentrate nutrients in the solid fraction. However, retention pond digesters tend to move nutrients into the liquid fraction. In summary, the process of AD itself tends to preserve nutrients in the digestate.

Facility size. Section 3.4.2 contains the statement that a "flush system for manure transport, which affects the dilution of waste, would require larger AD facilities than if the manure were collected using a scrape or vacuum system." In fact, a flush system does require a large retention pond to store and recycle flush water and nutrients. If the pond is used as a digester, it is also larger than a complete-mix tank or plug flow digester processing a comparable amount of manure/substrate. However, a pond may still be needed on a dairy with another type of digester tank. Thus, a non-flush system may result in a larger "digester facility" than a flush system when all the digester elements are considered. H-15

Codigestion vs. manure only economics. Page 3-11 contains the statement that "co-digestion is considered to be essential for dairy digester project viability" (ECOregon, 2010). Dairy Cares does not agree with this as a blanket statement. Co-digestion can improve gas output which can improve a project's economic viability. However, co-digestion also brings with it certain requirements that will increase costs and may impact viability negatively. As such, co-digestion or lack of it should not be considered as a sole criterion for viability. H-16

Covered lagoons. Section 3.4.5 includes a description of the gas capture system as a "floating impermeable cover." In fact, these covers do not generally "float" on the lagoon surface but rather are held up by a layer of pressurized gases between the liquid surface of the lagoon and the cover. H-17

Scrubbing of gas in internal combustion situations. The schematic for internal combustion engines on page 3-16 does not include removal of hydrogen sulfide or other pollutants from raw biogas, or cleanup of exhaust via catalytic treatment, even though gas cleanup and pollutant H-18 removal is included in the schematics for comparable energy capture technologies on the same page. This suggests incorrectly that such technologies are not used nor required in the Central Valley when the opposite is true. The schematic should be revised to include this information. H-18 cont

Internal combustion engines not appropriately included as an option for energy generation. The Draft PEIR recognizes as unresolved the issue on appropriate standards for NOx controls on internal combustion biogas engines for electricity generation. These engines are an important and central component of nearly all operating dairy digesters and co-digesters. As such, Dairy Cares supports an appropriate resolution to the issue that protects air quality but also provides a feasible option for dairy digester operators. Fuels cells are generally not yet considered feasible on dairies and pipeline injection projects are extremely capital intensive. In the near-term, internal combustion engines must be maintained as an option for electricity generation if dairy digesters and co-digesters are to develop. H-19

Not all digesters will require all upgrades. Section 3.5.3 suggests that all digesters “will” require the listed improvements. In some cases, some of the improvements will likely not be needed. As such, we suggest changing “will” to “may.” H-20

Incentives to build 20 digesters per year. Page 4-7 lists “several factors would need to be necessary to develop up to 20 dairy digesters per year in Region 5. Dairy Cares strongly disagrees with the inclusion of “Regulations that require the development of energy-producing dairy digester facilities for specified dairies” as an included factor. Regulations requiring digesters will be considered not only a disincentive for digester development but also a disincentive for dairy development. Dairy Cares strongly believes that maintaining installation of digesters as a voluntary option for new, expanding or existing dairies will be a far more effective strategy for enhancing their development in California. Regulations requiring digesters would not only eliminate some of the economic incentives for digesters, such as developing and banking greenhouse gas reduction credits, but would also likely drive dairy investment capital out of the Central Valley entirely. H-21

Electricity and renewable gas prices more critical than demand. Page 4-7 also suggests that “demand” for locally generated renewable energy and “demand” for new energy sources is a key factor for driving development of dairy digesters and co-digesters. In fact, demand is important but the critical issue of price is even more important. Even if demand for renewable energy continues to rise, dairy digester development may stagnate is the prices paid for dairy-generated electricity and renewable natural gas/biomethane fuels are not comparable to prices paid for other sources of renewable energy such as wind and solar. Demand coupled with electricity and renewable natural gas/biomethane prices will draw investment capital to dairy digester and co-digester development. H-22

Potential electricity for dairy cattle. The footnote on page 4-7 suggests that the estimate that dairies in Region 5 could produce 140 MW of electricity is based on 1.7 million cows; page 3-3 contains the same estimate but says the Central Valley contains 1.6 million cows. H-23

Evaluation of alternatives. We have reviewed the Draft PEIR’s discussion of project alternatives including the “no project” alternative, “co-digestion substrate restrictions” H-24 alternative, "thermal conversion" alternative and "reduced NOx" alternative. Dairy Cares agrees with the draft PEIR's findings that these project alternatives were appropriately selected for review. Dairy Cares also concurs with the finding that none of these projects is "clearly environmentally superior to the proposed project." H-24 cont

Thanks for the opportunity to comment and we look forward to continuing to work with you on the Technical Advisory Group as the process moves forward.

Sincerely,

J.P. Cativiela
Dairy Cares Program Coordinator

Response H-1

Summary comments noted. Dairy Cares indicates support of the significance levels (prior to mitigation measures) for the various impacts analyzed in the draft Program EIR. They express interest in adding clarifying language or revisions in mitigation measures to air quality, greenhouse gases (GHGs), and water quality. These issues are further described in their additional comments.

Response H-2

Comment noted. Dairy Cares indicates support for the project goals as outlined in Section 1.1 of the draft Program EIR.

Response H-3

The fourth sentence of the third paragraph on page 1-5 and the last paragraph on page 3-11 of the draft Program EIR will be revised as shown below:

> "Co-digestion substrates can increase the electrical capacity of a proposed system by ~~a magnitude~~ two to five times or greater than that of dairy manure alone (ECOregon, 2010)."

Response H-4

Comments noted. The commenter states that operational dairies that add manure only digesters "would not be required to seek additional water board permits if the dairy is already covered under General Order R5-2007-0035." That statement is not correct. As stated in Section 4.3 of the draft Program EIR, such dairies will remain under the Dairy General Order, but may be required to submit a Report of Waste Discharge seeking coverage under a dairy digester GO or Individual WDRs. Thus, the draft Program EIR clarifies that the Central Valley Water Board has the ability to require an operational dairy covered under General Order R5-2007-0035 to seek additional permits.

The commenter also states that the draft Program EIR does not discuss the process that will be used for developing lining requirements. The process is not discussed in detail because the draft Program EIR is for a waste discharge regulatory program and thus does not specifically address what liner requirements will be at the project level (i.e., water quality permits including GOs or Individual WDRs). The reasonableness of lining requirements for a water quality permit covered under the Program EIR can be commented on during the public review period of the draft permit. However, for a water quality permit to come under the proposed waste discharge regulatory program covered by the Program EIR it must comply with Mitigation Measure 5.2 which requires that WDRs include "lining requirements" (i.e., design and operation requirements) to protect water quality.

Response H-5

Comment noted. Comment requests clarification as to who will determine and how the determination will be made that a pond meets the antidegradation provisions of Resolution 68-16. Similar to the discussion in Response H-4, the reasonableness of pond requirements for a water quality permit covered under the Program EIR can be commented on during the public review period of the draft permit. However, for a water quality permit to come under the proposed waste discharge regulatory program covered by the Program EIR it must be consistent with the antidegradation provisions of Resolution 68-16 as detailed in Mitigation Measure 5.3.

Response H-6

The comment suggests that the requirement of a Salt Minimization Plan (SMP) within Mitigation Measure 5.3 should not apply to manure only digestion facilities. This waste discharge regulatory program and mitigation measures required by this Program EIR do not pertain to dairies that maintain coverage under the General Order for Existing Milk Cow Dairies including those with manure only digesters. The Program EIR is for a waste discharge regulatory program that will require an SMP as a permit requirement. This requirement will help to protect groundwater from salts regardless if the facility is a manure only digester or co-digester because both types of facilities have the potential to significantly impact groundwater for salts (Impact 5.3) and to have a significant unavoidable cumulative to groundwater (Impact 5.6). The comment also suggests that page 5-36 of the draft Program EIR presents unreasonable numerical limitations and requests they be removed or further clarification be provided. It should also be noted that the numerical figures that are presented on page 5-36 were never intended to represent numerical limitations required by Mitigation Measure 5.3, as the figures are not within Mitigation Measure 5.3 itself. The discussion on page 5-36 has been revised to clarify that the figures are not numeric limitations, as shown below:

> "Based on a study conducted by J.L. Meyer in 1973, ~~"reasonable"~~ salt loading rates ~~under normal situations~~ of no more than 2,000 pounds per acre for single-cropped land and 3,000 pounds per acre for double-cropped land may help ~~were determined to help~~ prevent the vertical migration of salts within the soil profile (Meyer, 1973 as cited in RWQCB, 2008). ~~Unless environmental conditions show differently, "reasonable" is accepted to be a maximum annual non-nitrate salt loading rate of 2,000 pounds per acre for single-cropped land and 3,000 pounds per acre for double-cropped land.~~"

Response H-7

The comment states that numerical limits for the SMP would result in hardship for some operators. See Response to H-6.

Response H-8

The comment requests further clarification on definition of “salt” and “practicable” in regards to Mitigation Measure 5.3’s requirement to select crops that maximize salt uptake to the extent practicable. As referenced in the comment, the discussion of salt does refer to non-nutrient based salts otherwise referred to as non-nitrate salts. The choice of crop and its capacity for salt uptake would be one of the elements covered within the SMP, which would be required by Mitigation Measure 5.3. The purpose of the SMP would be to identify sources of salinity in the discharge and measures available to minimize the concentration and mass loading of salinity. See also Response J-4.

Response H-9

Comment noted. The comment expresses support for testing of co-digestion substrates provided that testing frequency of hazardous substances is scaled to match the variability and risk associated with the substrate used to avoid excessive laboratory costs. The monitoring frequency will be established for the waste discharge regulatory program (i.e., one or more GOs etc.) during permit development. Comments on proposed monitoring frequencies will be accepted during the public review period of each permit.

Response H-10

Comment noted. Digestion and co-digestion reduce but do not completely eliminate pathogens. Monitoring of groundwater where wastes with pathogenic concerns are being discharged to land is appropriate to protect public health. This is true even if the numbers of pathogens are less than would have otherwise occurred without digestion or co-digestion. The monitoring type, frequency, and location for groundwater monitoring of pathogens will be established for the waste discharge regulatory program (i.e., one or more GOs etc.) during permit development. Comments on the type (e.g., total and fecal coliform), frequency (e.g., monthly, yearly etc.), and location (e.g., monitoring wells, irrigation wells, domestic water supply wells) of groundwater monitoring for pathogens will be accepted during the public review period of each permit.

Response H-11

Dairy Cares indicates its support for use of an NMP on all dairies. The comment suggests that the second bullet of Mitigation Measure 5.3 on pages 5-42 and 1-9 of the draft Program EIR allow a Representative Groundwater Monitoring Program as an option to a site-specific groundwater monitoring program.

The second bullet has been revised as shown below:

- “Prepare and implement a site-specific NMP that incorporates analytical data for soils, wastewater, manure, digester solids, groundwater and/or surface water

> supply. The required analytical data is to be generated by a site-specific monitoring and reporting program. In the case of groundwater, data from an approved representative groundwater monitoring program may be substituted for some or all site-specific groundwater monitoring, if appropriate. The NMP will be reconciled annually based on results of the monitoring and reporting program and site-specific measurements of agronomic rates; ~~includes a soils and groundwater monitoring and reporting program that include a variety of waste constituents, as well as yearly reconciliation based on sampling results that measure agronomic rates;~~"

Response H-12

The comment requests a definition of "impermeable" as it relates to the requirement in Mitigation Measure 5.3 on pages 1-10 and 5-42 (4th bullet from the bottom) of the draft Program EIR:

- "Require that solid wastes be stored on impermeable surfaces;"

It should be noted that "impermeable" does not necessarily refer to a concrete surface and that a surface to store solid wastes that protects groundwater quality can be met in other ways. This text will be revised as follows:

- "Require that solid wastes be stored on ~~impermeable~~ surfaces designed in accordance with a site-specific Waste Management Plan prepared for the facility by an appropriate California registered professional in accordance with WDR requirements;"

In general, solid waste storage areas will be required to divert all runoff to the wastewater retention pond and minimize infiltration into the underlying groundwater. The ultimate performance of the storage areas will be verified through the groundwater monitoring. Solid waste storage area performance must be protective of groundwater quality.

Response H-13

The comment questions the need for an Odor Management Plan (OMP) at manure only digesters at existing dairies. This waste discharge regulatory program and mitigation measures required by this Program EIR (e.g., an Odor Management Plan) do not pertain to dairies that maintain coverage under the General Order for Existing Dairies; including those with manure only digesters. The comment expresses concern that the requirements of Mitigation Measure 6.3b lack the flexibility to appropriately take into account site specific conditions. Mitigation Measure 6.3b has been revised on pages 1-12 and 6-27 of the draft Program EIR to read as follows:

> "**Measure 6.3b:** AD facilities that handle compostable material and are classified as a compost facility must develop an Odor Impact Minimization Plan (OIMP) pursuant to 14 CCR 17863.4. Otherwise, a~~A~~pplicants shall implement a~~n~~ site-specific Odor Management Plan (OMP) as part of each application submitted to establish digester and co-digester facilities under the waste discharge regulatory program. The OMP will specifically address odor control associated with digester operations and will include:
>
> - A list of potential odor sources.
> - Identification and description of the most likely sources of odor.

- Identification of potential, intensity, and frequency of odor from likely sources.
- A list of odor control technologies and management practices that could be implemented to minimize odor releases. These management practices shall include the establishment of the following criteria as appropriate:
    - Establish time limit for on-site retention of undigested odiferous co-substrates (i.e., organic co-substrates must be put into the digester within 48 hours of receipt).
    - Provide negative pressure buildings for indoor unloading of odiferous co-digestion substrates. Treat collected foul air in a biofilter or air scrubbing system.
    - Establish contingency plans for operating downtime (e.g., equipment malfunction, power outage).
    - Manage delivery schedule to facilitate prompt handling of odorous co-substrates.
    - Modification options for land application practices if land application of digestate results in unacceptable odor levels.
    - Protocol for monitoring and recording odor events.
    - Protocol for reporting and responding to odor events."

Response H-14

The commenter provides feedback on the list of environmental benefits on page 3-10 of the draft Program EIR. The commenter states that the reduction in mass attributable to AD is minimal; that the concentration of nutrients is a benefit of drying the materials and not AD; and that AD does not generally produce "clean liquid effluent". The commenter notes that the diversion of waste from sewer systems and landfills to generate biogas or produce compost or other soil amendments is a benefit of the process, and the AD process tends to preserve nutrients in the digestate.

The draft Program EIR (top of page 3-10) is revised as follows:

> "AD facilities at dairies provide a number of potentially environmental and economic benefits (Burke, 2001), which are summarized below. Environmental benefits are currently understood to include, but are not limited to:
>
> - Reduction in the mass of solid wastes;
> - Generation of ~~clean~~ liquid effluent that can be blended with irrigation water for irrigation and fertilization of crops, or recycled water use;
> - Concentration of nutrients in condensed solid for export or storage when AD process includes solids separation;
> - Reduction of pathogens in the solid and liquid waste;
> - Reduction in GHG emissions;

- Generation of renewable energy from the biogas;
- Diversion of organic materials (for co-digestion systems) from sewer systems and landfills to generate biogas, soil amendments and compost;
- Reduction or elimination of odors associated with waste products; and
- Reduction in flies.

The economic benefits of AD facilities at dairies include, but are not limited to:

- Diversion of organic materials from sewer systems and landfills;
- Time needed to move, handle, and process manure is reduced;
- Biogas can be used for energy recovery;
- Waste heat can be used to meet the heating and cooling requirements of the dairy;
- Concentration of nutrients through solids separation generates a high nutrients soil amendment, which can be sold to the public, nurseries, or other agricultural facilities;
- Reduction in the mass of solid waste also reduces the amount of export needed;
- Income can be obtained from the processing of imported food or agricultural wastes for co-digestion (tipping fees), the sale of organic fertilizer, potential GHG credits, and the sale of energy generated by biogas processing;
- Energy tax credits may be available for power produced;
- Greenhouse gas tax credits may be available for each ton of carbon reduction; and
- Other federal and State incentives available now or in the future related to generation of renewable energy and reduction of GHG emissions."

Response H-15

Commenter correctly points out that a dairy with a flush system will not necessarily result in larger anaerobic digestion facilities than one with a non-flush system when all manure collection and digester elements are considered. For example, a dairy with a flush system could be modified to have manure in flush lanes vacuumed and sent to a digester tank before the lanes are flushed. The draft Program EIR in Section 3.4.2 on page 3-11 is revised as follows:

> "In addition to the total number of cows at a dairy, specific ~~dairy operations affect the amount and quality of manure that are processed~~ operational variables at a dairy affect the amount and quality of manure that are processed at a dairy digester. Operational variables include, but are not limited to, animal housing, manure transport, manure pre-processing, animal bedding, and stormwater management (Burke, 2001). In regards to animal housing, free stall barns provide greater manure collection and quality compared to corral or open lot facilities. Manure handling practices which affect the dilution of waste include: vacuuming, dry scrape, flush, or some combination of the three. ~~A flush system for manure transport, which affects the dilution of waste, would require larger AD facilities than if the manure were collected using a scrape or vacuum system.~~ For manure pre-processing, the removal of organic solids

> through screening and sedimentation would reduce the amount of biomass available to undergo biogas conversion through AD…"

Response H-16

Comment noted. The last sentence on page 3-11 is revised as follows:

> "Co-digestion is considered to be ~~essential~~ an important element for dairy digester project financial viability (ECOregon, 2010)."

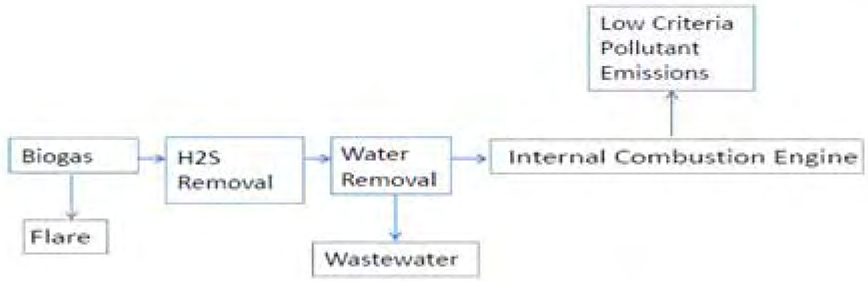
Response H-17

On page 3-12 of the draft Program EIR, the fourth paragraph should be revised as shown below:

> "…The lagoons are covered by an ~~floating,~~ impermeable cover that captures the biogas generated by AD…"

Response H-18

The schematic drawing for Alternative 1: Raw Combustion in Internal Combustion (IC) Engine or Flare on page 3-16 of the draft Program EIR has been revised to include removal of hydrogen sulfide and water from raw biogas before combustion in IC Engines. The drawing has also been revised to show cleanup of exhaust via catalytic treatment. This information is shown below:



Response H-19

Comment noted. In preparing the Program EIR the Central Valley Water Board has recognized the importance of internal combustion biogas engines for electricity generation. Internal combustion engines are shown as Alternative 1 on page 3-16 of the draft Program EIR. Table 4-1 on page 4-8 of the draft EIR shows electrical generation as the primary biogas end use and this electrical generation is primarily from internal combustion biogas engines. In agreement with the points raised, Table 4-1 shows one project that uses pipeline gas and no projects using fuel cells. The draft Program EIR does not eliminate the option for electricity generation, nor does it restrict the use of internal combustion biogas engines beyond those requirements found in current local air district regulations.

Response H-20

The first sentence of Section 3.5.3 in draft Program EIR on page 3-17 is revised as shown below:

> “Development of AD facilities ~~will~~may require the construction of various supporting infrastructure including, but not limited to, lined waste storage ponds and/or upgrades to existing dairy ponds, pipelines for transporting effluent to ~~disposal fields~~cropland, bypass valves, and ~~processes for~~ stormwater management facilities.”

Response H-21

In response to Comment H-21 and H-22, the bullet list on page 4-7 of the draft Program EIR is revised to read as follows:

- “Competitive electricity and renewable natural gas/biomethane prices;
- Increased demand for new energy sources;
- Increased demand for local renewable energy sources;
- Increased incentives for co-digester facilities;
- Improvements in dairy digester technologies; and
- Public financial support or the development of profitable business models; or
- Governmental measures (e.g., regulatory or otherwise) that incentivize the development of dairy digesters. ~~Regulations that require the development of energy-producing dairy digester facilities for specified dairies.~~”

Response H-22

See response to Comment H-21.

Response H-23

The commenter correctly notes this discrepancy. The Krich, et al. reference estimated a best case 140 megawatts based on an estimate of 1.7 million cows in California. This should be adjusted in the draft Program EIR to approximately 130 megawatts for the estimated 1.6 million cows in Region 5.

The second sentence of the fourth paragraph on page 3-3 of the draft Program EIR is revised as follows:

> “Based on calculations developed by Krich, it is ~~It has been~~ estimated that the ~~estimates dairies~~ 1.6 million cows in Region 5 could potentially generate approximately ~~14~~ 13 billion cubic feet of methane per year through manure only anaerobic digestion, which would correspond to ~~140~~ 130 megawatts of ~~annual~~ electrical capacity (Krich, et al., 2005)[2].”

The next to last sentence on page 4-7 of the draft Program EIR is revised as follows. The footnote has been deleted from the sentence.

> “~~Potentially,~~ Based on calculations developed by Krich, it is estimated that the 1.6 million cows ~~dairies~~ in Region 5 could potentially generate approximately ~~14.6~~ 13 billion cubic feet of methane per year through manure only anaerobic digestion, which would correspond to ~~140~~ 130 megawatts[3] of ~~annual~~ electrical capacity (Krich, et al., 2005).”
>
> “~~[3] This was based on an estimate of 1.7 million cows.~~”

Response H-24

Dairy Care agrees with the draft Program EIR finding that these project alternatives were appropriately selected for review and concurs with the finding that none of these projects is clearly environmentally superior to the proposed project.

I

Sustainable Conservation

August 20, 2010

Central Valley Water Board
Attn: Stephen Klein, Project Manager
1685 E Street
Fresno, CA 93706-2007

RE: Comment Letter – Dairy Digester and Co-Digester draft Program EIR

Dear Mr. Klein:

I appreciate the opportunity to comment on the draft Programmatic EIR for Dairy Digesters. This is an important and timely document that can help facilitate new facility permitting. However, I have some concerns that it will not have that effect without some key modifications. I do note that the document is very thorough and covers much ground. I have identified several issue areas that should be modified. They are as follows;

1) Section 1.4 – "Areas of Controversy and Unresolved Issues" is missing a least one very important issue, one that I brought up at one of the meetings. Cal Recycle (formerly the Integrated Waste Management Board) has stated they will be regulating dairy digesters (or at least those that meet certain conditions) as part of their existing authority. That would be detrimental, or worse, for further development of the emerging digester industry. Farm scale digester facilities are already heavily regulated at several levels including by the local Air District and Water Board. Existing rules and requirements have already caused a hiatus in most new facility installations. Adding another regulatory agency into the mix is both unnecessary and could result in the remaining dairy digester developers to abandon California. This is not idle speculation on my part but what I have heard directly from one of the few remaining digester developers left in California. Not only is Cal Recycle involvement unnecessary for most single waste and co-digestion facilities from both an environmental and public health standpoint it is also inconsistent with current regulations and statute. I know that Cal Recycle's intentions are honorable but in this instance their statutory and regulatory authority are largely absent. I will not delve into the specific limitations on their current authority but I will point out that Cal Recycle's reliance on existing transfer station and composting regulations (an aerobic process that is in many ways the antithesis of anaerobic digestion) is inappropriate and leads to some bizarre consequences. At the very least, this issue should be recognized in the document. I-1

2) The final bullet point of Section 1.4 relating the ability of biogas digesters engine generator sets to meet the existing San Joaquin Valley Air District NOx emission requirement is not yet settled. The position of the San Joaquin Valley Air Pollution Control District that there are two facilities that are meeting the requirement is not accurate. One of the facilities cited has operated with a variance from the Air District, has gone through eight to ten catalysts and uses an older engine technology that is no longer offered by the manufacturers for this application. The other dairy is using selective catalytic reduction (SCR) technology to meet the emission requirements but in a year or so of operation has not been able to consistently meet the emission limits even as many resources have been devoted to attaining compliance. And in both cases, the pollution control technologies are expensive and need constant attention to keep them running properly. The I-2

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good news is there are new technologies in development that may prove more reliable and cost effective. They will be installed later this year. But it is still premature to claim success. I-2 cont

3) One of the alternatives discussed in Chapter 17, "Alternative #4" does not characterize the impact of NOx emissions realistically. But let me first point out that emission control technology is not static. There are continuous improvements in emissions technology, including for NOx. BACT is currently at about 9ppm in the San Joaquin Valley Air Basin for this application. It is entirely feasible, some would say nearly certain, that within the next couple of years emission control technology for biogas IC engines will have comparable NOx emissions to combined cycle gas turbine power stations. If that happens, biogas engine generators will be displacing central station electricity because they produce base load power with no net NOx increase. But even if it doesn't happen, because digesters also often use both heat and power on site, they can have the net effect of lowering NOx emissions (using engine heat to displace propane on site, typical of dairy farms, yields a NOx reduction benefit) compared to central combined cycle gas turbines (i.e. lower total NOx emissions). That net NOx reduction benefit has been documented by NREL. I-3

   And that is not the only benefit. Digesters capture VOCs, ammonia, particulate matter and other emissions that would otherwise occur from dairy lagoons. Only VOCs emission reduction benefits appear to be valued in the analysis. Further, there are other environmental and public health benefits to farm scale versus centralized power generating facilities. Centralized natural gas plants have significant lifecycle impacts on water and air quality that are not factored into a localized air basin only analysis. The evidence for these impacts are well documented and will not be repeated here (but are available). It is important to recognize we are not only displacing combined cycle gas turbine power with digesters but also electricity generated from coal plants. Approximately 20% of California's electricity comes from coal. The amount of NOx, SO_2, lead, mercury, PM, etc. emissions that come from these facilities, and their local health impacts on communities, many of them poor or disadvantaged, are orders of magnitude greater than from distributed generation renewable energy facilities like biogas digesters. We have exported our air emission impacts outside of California. Concern for environmental and public health should not stop at our borders or air basin boundaries. Although that does not factor into an air quality permit, it should factor into an EIR. In fact, I would think it rather unconscionable if it does not.

4) Table 1-1 – "Environmental Impacts and Mitigation Measures" leads one to ask is the cure worse than the disease. Currently it is very difficult but not impossible to get a Water Board or Air District permit for digestion or co-digestion. With so many mitigation considerations involved in the Programmatic EIR, will the level of difficulty go down or up? Looking at the table, it is hard to believe it will go down. Would that defeat one of the purposes of doing a Programmatic EIR? I-4

5) The impact of digesters and co-digestion on special status plant or wildlife species is stated as "Significant" in Impact 9.1. The analysis talks about the possibility of impacts by destroying vernal pools etc. That potential impact is both overstated and unlikely. Every digester I have seen in California is on land that was long ago developed for crop production, equipment storage, field access, livestock confinement, etc. These farm environments are not sensitive wetlands, endangered species habitat or native plant areas, at least in the areas of the Central Valley where the dairies are located. Most were developed more than 50 or 100 years ago and have been intensively farmed. And although they are not devoid of wildlife, they contain few endangered birds, frogs, snakes, etc. In fact it is a sad but true reality that most ESA habitats I-5

have been both unintentionally and intentionally eliminated. And it is hard to imagine how any of the narrow trenches put in for pipelines that may run between farms are going to have any significant effect on endangered species or native plants that 100 years of farming, irrigating, spraying pesticides, leveling land, putting in fences, roads, etc. haven't already eliminate. As such, the level of threat identified is overstated and unsupported. Importantly, if the Programmatic EIR requires that a biologist go out and do an assessment on the applicants farm for endangered species or special status plant or wildlife, that very well could be a deal killer for most farmers. It is one more penalty for "doing good". I-5 cont

6) Impact 9.6 makes a similar reference (as above) to biological impacts, specifically cumulative impacts. On this point the analysis is particularly weak. It references the possibility of a digester contributing to more development nearby. The nature, proximity and size of the potential development is unspecified. To quote from the draft document, I-6

"While it is not expected that implementation of the project would lead to conversion of habitat to dairy farms, the project could facilitate additional development near dairies that would incrementally deplete native habitats and other biological resources. Most of the dairy digester and co-digester facilities would be constructed on, or in proximity to, existing dairies, on land that is unlikely to support sensitive biological resources. However, facilities that could be constructed on land not currently in active agricultural use could affect biological resources. In combination with other development in the project area, this conversion of potential habitat land represents a significant cumulative impact."

What is the author referring to? There is no documentation or examples given and it does not comport with anything I have seen or heard in the 10 years I have been working on digester projects. This is highly speculative and not supported by what has happened in California or in other States that have digesters. Dairy digesters are not analogous to industrial parks or even wind farms. Putting one in isn't creating an "energy park". I can see no basis for this statement.

7) Chapter 12 ascribes the likelihood of archeological resources impacts as "significant". This is disturbing (no pun intended). These are highly developed agricultural lands that have been farmed intensively for many decades. The likelihood of finding significant artifacts is limited and less than in most other developments. That doesn't mean it is zero but labeling the potential impact as "significant" and requiring a cultural resources inventory is inappropriate. A dairy could decide to install a manure pond in the exact same location of identical shape and depth. But it wouldn't require an archeological assessment. It shouldn't be required for dairy biogas digesters that generate renewable energy, destroy greenhouse gas and kill pathogens. It is another disincentive to build biogas digesters and it doesn't seem justified by the analysis. I-7

8) Chapters 1 (page 19), 5 (page 123) and 17 (page 310) make reference to the term "regional aquifer". However, that is an undefined term. A Google search of that term finds only one reference and it is as the San Joaquin Valley Regional Aquifer in a document entitled, "Spatial and Temporal Trends in Nitrate Concentration In the Eastern San Joaquin Valley Regional Aquifer and Implications for Nitrogen Fertilizer Management". The relevance is in context of disallowing importation waste for digestion from outside the "regional aquifer". That raises the question of where is the boundary of the regional aquifer and is it a reasonable one. And is the term synonymous with or distinct from the San Joaquin Valley Regional Hydraulic Region which is referenced repeatedly in the draft EIR? The document should both clarify what is meant and I-8

better justify the boundary. For a dairy with a digester on the edge of the boundary, that could potentially mean not importing waste from across the road or from a neighboring field. Is that reasonable, particularly if that waste is already coming into the region, however that is defined, and being used in a much less environmentally friendly way? That would seem unreasonable. I-8 cont

9) Chapter 5 page 36 makes reference to salt impacts and mitigation measure. However, there is one specific characterization in the document that is only partially accurate, at least for certain types of digesters, and should be corrected. The specific provision is as follows. I-9

"The digestion process neither adds nor reduces the total salt content of the substrate that it processes, but simply passes salt from the substrate through to the digester effluent. For every unit of salt that is fed into a digester from dairy wastes or other substrates, that same unit of salt is released from the digester in its effluent."

It is the last sentence that is not entirely correct. At least some types of digesters, such as the GHD design, may actually have less salt in the effluent, at least at the point of land application. That apparently has been documented by Washington State University. Some of the salts settle out in holding or storage ponds but at differential rates depending on the compound of salt (potassium, phosphorous, etc). Post solid separators also can remove salt with the solids. And other digester designs, such as covered lagoons, have some salt that builds up in the solids at the bottom of the digesters. The significance of that is it may allow dairymen to maintain a salt balance by exporting the settled or removed solids even while taking in substrate that yields a net increase in salt going into a digester over a manure only digester. That means the effluent that is land applied can have a lower concentration of total salt than the digester influent.

10) In Chapter 5 – Hydrology and Groundwater Quality, there are several references to managing the discharge from manure only or co-digestion digesters in ways that ensure protection of surface and groundwater. However, mitigation measure 5.3 is at best problematic and at worst, could spell the end of new digesters in the Central Valley. The provisions states: I-10

"Require all drainage be directed to a retention wastewater pond that has been designed to meet antidegradation provisions of Resolution 68-16 by an appropriately licensed professional;"

The anti-degradation provision referenced has been interpreted to mean what is essentially a hazardous waste facility design where a double liner with leachate collection system is used. That is not now the requirement for existing wastewater ponds. Dairies with biogas digesters have not had to use double lined retention ponds. Retention pond requirements should be as contained in the General Order. The draft Programmatic EIR appears to create a new rule. The effect of that very expensive requirement may be no new digesters in the Central Valley.

One final point before closing; it doesn't appear that the "status quo" or baseline impact of candidate substrates going for land disposal, solid waste landfilling, use as an industrial feedstock, or sending to a wastewater plant are adequately recognized or quantified. For example, food waste going to a landfill may emit H_2S, VOCs, methane and/or contribute to vectors, is not juxtaposed to farm scale digestion. California wants these organic waste streams diverted from landfills as stipulated by AB 939 and other laws and regulations and encourages beneficial reuse. As such, organic wastes going to digesters could be considered as mitigating the impact of solid waste landfills. It would be useful to recognize that tradeoff benefit. I-11

As a concluding observation, it is obvious that a lot of work went into this draft Programmatic EIR document. And ESA should be commended for their effort. However, the practical effect of the likely requirements and mitigation measures that result from using the Programmatic EIR are likely to have a discouraging effect on all but the most persistent and well funded project developers. That means government agencies (i.e. DOC), environmentally progressive utilities (i.e. SMUD) or large industries (i.e. food processor). If this is the outcome of the process, then the "raison d'être" for the Programmatic EIR will be largely unfulfilled. That would be a shame. I-12

I am happy to provide follow-up information or documentation to my comments if needed.

Sincerely,

Allen Dusault

Allen J. Dusault
Program Director
Sustainable Conservation

cc: Paul Miller, M.S., REA, Environmental Science Associates
Deborah Kruse, M.S., Environmental Science Associates

Response I-1

Please see also comment D-1 and the response.

The commenter states that Section 1.4 "Areas of Controversy and Unresolved Issues" on page 1-6 fails to include dairy digester regulation by CalRecycle as an area of controversy. To provide full disclosure of this issue, an additional area of controversy has been added to the end of Section 1.4 on page 1-7 of the draft Program EIR. The added text is as follows:

- "Concern has been raised by TAG members about CalRecycle involvement in review and permitting of dairy AD facilities. There is concern about the additional permitting and regulatory requirements. There is concern that CalRecycle's reliance on existing transfer station and composting regulations are inappropriate for regulating anaerobic digesters, because anaerobic digestion is a fundamentally different process than the "aerobic" process of composting. Other stakeholders indicate that adding an additional agency to the review process will work against the intent of the Program EIR to help streamline the permitting of dairy digester facilities and co-digester facilities."

Response I-2

Comment noted. The ability of biogas digester engine-generator sets to meet existing San Joaquin Valley Air Pollution Control District NOx emission requirements remains an area of controversy, which is why it was included in Section 1.4 "Areas of Controversy and Unresolved Issues". Sustainable Conservation provides information about the current difficulty of biogas digesters engine-generators sets to meet the existing San Joaquin Valley Air Pollution Control District NOx emission requirements. According to the commenter, there are no examples of relatively inexpensive and easy to maintain engines despite the SJVAPCD assertion that two dairies are currently meeting the NOx requirement (see the discussion in the last paragraph on page 1-6 of the draft Program EIR). Sustainable Conservation has previously expressed the concern that meeting the new stringent SJVAPCD standards is infeasible.

The commenter notes that new technologies in development may prove more reliable and cost effective.

Response I-3

The commenter identifies potential benefits associated with dairy digesters. There is already a list of environmental and economic benefits described in the Program EIR on page 3-10. See also response to Comment H-14.

The NOx benefit from dairy digester electricity generation described by the commenter from electricity displacement could reduce the impact to the local air shed in some cases, but since electricity is often generated at remote facilities, the potential benefit would often be outside the air basin. Even if there would be a net reduction of NOx in California, the increased NOx in non-attainment air basins such as the San Joaquin Valley Air Basin would still be an adverse impact to residents of the air basin.

It is acknowledged that the electrical generation from dairy digesters will have a variety of benefits in other power plant locations (where the electrical demand has been displaced by the dairy digester electrical generation), but it remains important that the electrical generation does not degrade the local air sheds where the dairies are located, especially with regard to NOx and ozone formation. That is why the “Reduced NOx Emissions Alternative” was considered beginning on page 17-10 of the draft Program EIR.

We appreciate the insight into improvements in internal combustion engines and encourage all efforts to improve the engines (see also comment B-1, that describes EPA efforts in this area).

Response I-4

Please see responses to Comments I-12 and J-1.

Response I-5

Comment noted. As stated in the first sentence of Impact 9-1, on page 9-11 of the draft Program EIR, it is unlikely that the dairy digester facilities would be located in areas that would impact special status plant and wildlife species. However, because this is a Program EIR, the exact location of the digester facilities to be permitted under the program is unknown and therefore any statement over the absence of special status plant and wildlife species cannot be made with certainty for all sites. As the commenter points out, the locations where digesters may be located “are not devoid of wildlife.” The mitigation measures have been written as a two step processes and if special status species are not identified in the first step (e.g., a biological site assessment), as is likely for most of the facilities, no additional mitigation would be required.

Response I-6

The text cited from the draft Program EIR is referring to potential impacts associated with centralized facilities and associated pipelines, which would be constructed on land not currently under agricultural use. To clarify, text within Impact 9.6 on page 9-16 of the draft Program EIR has been revised as follows:

> “While it is not expected that implementation of the project would lead to conversion of habitat to dairy farms, the project could facilitate additional development such as centralized facilities and associated pipelines, near dairies that would incrementally deplete native habitats and other biological resources. Most of the dairy digester and co-digester facilities would be constructed on, or in proximity to, existing dairies, on land that is unlikely to support sensitive biological resources. However, centralized facilities and associated pipelines that could be constructed on land not currently in active agricultural use could

affect biological resources. In combination with other development in the project area, this conversion of potential habitat land represents a significant cumulative impact."

Response I-7

Comment noted. As stated in the second paragraph of Impact 12.1, on page 12-17 of the draft Program EIR, the potential for discovery of archaeological resources, including human remains, varies depending on the sensitivity of a project area, but may be higher during trenching for underground pipelines and utility infrastructure. Because the exact location of the facilities is unknown, the sensitivity for cultural resources cannot be made with certainty for all project areas. Measure 12.1a, on page 12-19 of the draft Program EIR, states that a cultural resources survey may not be warranted to satisfy the requirements of CEQA based on the sensitivity of the project area for cultural resources. To further clarify the mitigation measures, Mitigation measures 12.1a and 12.1b have been modified to make them more straightforward. The following revised mitigations completely replace the mitigation measures (from the draft Program EIR) starting on pages 1-18 and 12-18 of the draft Program EIR.

> **"Measure 12.1a:** In order to determine whether a project may cause a significant impact to cultural resources, and therefore, have an adverse effect on the environment, the Central Valley Water Board shall require each application submitted for a discharge permit for a digester or co-digester facility to identify the project's potential impacts to cultural resources.
>
> Prior to ground-disturbing activities, the project applicant shall retain a qualified archaeologist to (1) conduct a record search at the appropriate information center of the California Historical Resources Information System (CHRIS) to determine whether the project area has been previously surveyed and whether cultural resources were identified; and (2) request a sacred lands search from the NAHC. The results of the record search and sacred lands search shall be included in the Cultural Resources Inventory Report provided to the Central Valley Water Board.
>
> In the event the CHRIS records search indicates that no previous survey has been conducted, the qualified archaeologist shall recommend whether a survey is warranted to satisfy the requirements of CEQA based on the sensitivity of the project area for cultural resources. If, for example, the existing dairy or agricultural land proposed for establishment of a digester or co-digester facility was constructed entirely on fill, as shown by original and final contour drawings, a surface survey for archaeological resources would not be warranted. Similarly, a surface survey may not be warranted if the project area has been extensively disturbed by dairy or agricultural use.
>
> For projects that constitute federal undertakings, as described in the Federal Agencies section of the Introduction (Chapter 2), the cultural resources study shall be prepared in accordance with Section 106 of the NHPA. The cultural resources study and inclusive mitigation measures shall form the basis for the cultural resources component of the project-level environmental documentation prepared for the project under Section 106.

If the survey, CHRIS record search, or NAHC search indicate cultural resources are located within a project area, the Cultural Resources Inventory Report shall include an assessment of the significance of the resources according to applicable federal, state, and local significance criteria. If the cultural resources are determined significant historical resources, the Lead Agency (usually the Central Valley Water Board) must review and approve the applicant's proposed treatment measures to ameliorate any "substantial adverse change" in the significance of each historical resource, in consultation with a qualified archaeologist or architectural historian, and other concerned parties. Treatment measures may include preservation through avoidance or project redesign, incorporation within open space or conservation easements, data recovery excavation of archaeological resources, formal documentation of built environment resources, public interpretation of the resource, or other appropriate treatment, and may be described in a project-level Cultural Resources Mitigation Plan included in the Cultural Resources Inventory Report to be approved by the Lead Agency.

Should the project area contain standing, built environment resources now 50 years of age, a qualified architectural historian shall be retained to evaluate the integrity and significance of the resource(s) unless the building(s) or structure(s) were covered in the existing survey report and determined not significant according to applicable federal, state, and local criteria. The results of that evaluation shall be included in the Cultural Resources Inventory Report.

If cultural resources identified within a project area are neither a historical resource nor unique archaeological resource, there would be no significant effect to the environment and no further treatment of those known resources would be required.

Measure 12.1b: Inadvertent discovery measures for cultural resources shall be implemented during all construction activities within the project area. Measures shall include procedures for discovery and protection of cultural resources, including human remains, during construction or earth-disturbing activities.

Within project areas of identified archaeological sensitivity, discovery measures would include: (1) a worker education course for all construction personnel; (2) monitoring of all earth-disturbing activities by a qualified archeologist; and (3) procedures for discovery of cultural resources, including human remains, during construction or ground-disturbing activities if an archaeological monitor is not present. Monitoring by a Native American with knowledge in cultural resources may also be required, as appropriate. Monitoring within recent fill deposits or non-native soil would not be required.

All construction or ground-disturbing activities shall be halted within 100 feet of a cultural resources discovery, including human remains, whether or not a monitor is present, until a qualified professional archaeologist can evaluate the find. If the find is determined to be a significant historical resource and cannot be avoided, then impacts on that resource will require mitigation. During evaluation or mitigative treatment, ground disturbance and construction work could continue on other parts of the project area.

If known or suspected human remains are discovered, in addition to halting all construction or ground-disturbing activities within 100 feet, the following steps must be taken before construction activities may be resumed within the stop-work area:

- The County Coroner has been immediately notified and has determined that no investigation of the cause of death is required; and
- If the remains are of Native American origin, the following steps have been taken:
  - The applicant has 24 hours to notify the NAHC, who should, in turn, notify the person identified as the proper descendant of any human remains. Under existing law, the descendant then has 24 hours to make recommendations regarding the disposition of the remains following notification from the NAHC of the discovery.
  - If the NAHC is unable to identify a descendant or if the descendant does not make recommendations within 24 hours, the applicant shall, with appropriate dignity, reinter the remains in an area of the property secure from further disturbance.
  - Should the applicant not accept the descendant’s recommendations, the applicant or the descendant may, under existing law, request mediation by the NAHC.

Impact Significance After Mitigation: Less than Significant

Implementation of the Mitigation Measures 12.1a and 12.1b would ensure that any identified or undocumented historical resource or archaeological resource, or inadvertent discoveries of cultural resources during construction or ground-disturbing activities, would be properly recorded and the historical significance of the resources documented.”

Response I-8

The comment requests clarification on the use of the term “regional aquifer” in Chapters 1, 5 and 17 and asks if it is reasonable to restrict importation of co-digestion substrates from outside the regional aquifer boundary. The reference to regional aquifer in Chapter 17, Alternatives, refers in general to the broad Hydrologic regions or watersheds. As discussed in Chapter 5 of the draft Program EIR, the Central Valley consists of different Hydrologic regions and subwatersheds as well as Groundwater Basins and subbasins. For the purposes of evaluating Alternatives to the proposed project, as required by CEQA, a hypothetical project where substrates are restricted by location, as well as other factors, was analyzed. However, it should be noted that this does not constitute the proposed project and therefore a full analysis of outlying projects that might be located on watershed boundaries is not warranted.

Response I-9

The comment finds the following statement on page 5-36 of the draft Program EIR to be only partially correct:

"The digestion process neither adds nor reduces the total salt content of the substrate that it processes, but simply passes salt from the substrate through to the digester effluent. For every unit of salt that is fed into a digester from dairy wastes or other substrates, that same unit of salt is released from the digester in its effluent."

The comment suggests that through the digestion process there can be stratification of salt content allowing for some of the higher salt content waste material to be exported as opposed to land applied. This claim does not refute the statement above for the overall process and does not eliminate a potential for excessive salt loading at some other location other than the subject digestion facility. The effluent as discussed above refers to both the liquid and solid wastes produced from the digestion and co-digestion processes. Therefore, the application of liquid effluent can be managed to minimize the land application of salts but there would still be a need to dispose of the salts contained in the remaining solid effluent. As a result, for the purposes of clarification, the beginning of the last paragraph on page 5-36 of the draft Program EIR shall be revised as follows:

> "The amount of salt that is contained in digester effluent depends on the substrate that is input into the digester. The digestion process neither adds nor reduces the total salt content of the substrate that it processes, but simply passes salt from the substrate through to the digester effluent. For every unit of salt that is fed into a digester from dairy wastes or other substrates, that same unit of salt is released from the digester in its <u>solid and liquid</u> effluent <u>which may be managed separately</u>……"

Response I-10

Comment noted. Please see response to Comment H-4 and H-5.

Response I-11

The commenter is correct in pointing out some of the positive aspects of co-digestion organic materials being diverted to dairy manure digesters. Please see response to Comment H-14. In response to Comment H-14 a new bullet has been added to the list of environmental benefits of the program that identifies the diversion of materials from landfills and sewer systems.

Response I-12

The Program EIR assesses the environmental impacts associated with the Central Valley Water Board's waste discharge regulatory program for dairy digesters and co-digesters. A primary goal of the Program EIR is to provide certainty to the CEQA environmental review process for dairy digester and co-digester projects by identifying potentially significant environmental program-level impacts absent knowledge of site specific conditions, and identify feasible mitigation measures to address the potential impacts. Based upon the specifics of a particular project, many of the mitigation measures will be relatively straightforward to implement at the start of a project, such as the initial biological, cultural, traffic and visual assessments. If no potential impacts are identified in the initial studies further studies would not be required. Furthermore, full consideration of a variety of these issues early in the process could help identify potential flaws in a particular site that might not be obvious otherwise. See also response to Comment J-1.

J

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August 23, 2010

Stephen Klein
Central Valley Water Board
1685 E Street
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Dear Mr. Klein:

RE: Draft Programmatic EIR for Dairy Digesters and Co-digestion Facilities

Western United Dairymen (WUD) is the largest dairy farmer trade association in California, representing approximately 1,000 families who produce 60% of California's milk. WUD assists members with milk pricing, animal welfare, environmental quality, and labor issues, and is a primary source for dairy information. Through a grant from the California Energy Commission, WUD has been involved in providing financial assistance to dairymen interested in installing anaerobic digesters on farms. These systems provide many benefits, including a reduction in greenhouse gas emissions. The Programmatic EIR (PEIR) is intended to assist dairy producers and developers in permitting digester projects. However, it is important that the PEIR not create additional hurdles that could further stifle the development of digesters in California. Unfortunately, it appears to us that this hurdle is yet to be overcome.

J-1 While we appreciate the amount of work by the number of agencies and people that went into this project, we fear it has fallen short. An EIR is intended to identify environmental impacts and associated mitigation measures that may be employed as necessary to relieve those impacts wherever possible. However, the intensity of the listed mitigation measures, while possibly appropriate for a large regional project, is far too extreme for simple on-farm projects. Since these smaller on-farm projects are the most likely to require the ability to tier off of a PEIR to develop their projects, some consideration should be given to providing a more streamlined or graduated process to provide the reports and technical documents the PEIR indicates necessary. As an example, adding a new covered lagoon digester to the existing waste management system at a dairy has minimal environmental impacts. A second situation is where co-digestion products grown on farm are used and simply cycled within the project boundary. Unless the smaller projects can be better facilitated, the PEIR will not achieve its intent. We hope that our comments will assist in resolving some of those real concerns.

Specific comments from Western United Dairymen's review of the draft PEIR follow.

J-2 1. Measure 5.2, page 1-9, requires that a tailwater return system be installed as a mitigation measure. The General Order Waste Discharge Requirements for Existing Milk Cow Dairies (WDR) prohibits the discharge of waste to surface waters from the fields receiving manure applications. There are multiple ways of complying with that requirement; one of those ways is with a tailwater return system. However, there are other options that can be just as effective that appear to be excluded here. Changing that mitigation to read "Requirements for tailwater return systems or other effective methods to minimize offsite discharges" would correct this issue. J-2 cont

2. Measure 5.3, page 1-9, requires that drainage be directed to a 68-16 pond. Clarification is necessary to cover how the use of existing ponds used to store drainage will be handled. We suggest that existing ponds are adequately governed by the current Dairy General Order and that the PEIR language should be changed to require that any new ponds be designed and constructed to 68-16 standards. J-3

This measure also requires the use of salt tolerant crops where practicable. It should be noted that forage production—fed back to the cows—simply recycles the salt within the facility. This distinction should be addressed. Small on-farm digester projects are different than a large centralized project and this difference should be addressed as discussed above. J-4

Additionally, this impact also requires that digestate be of neutral or alkaline pH before land application. The reason for this is not clear to us. In many cases, valley soils are alkaline and the addition of acidic materials is a common agronomic practice. Potential language could be: "Dairy digestate wastewater applied to cropland must be of adequate quality and pH for the appropriate planned agronomic use." J-5

Animal mortalities are excluded from digester feed stock options. We suggest that a blanket exclusion is inappropriate. Mortality management is increasingly a problem for California's livestock industry and alternatives are limited. We are aware that there is a prohibition against composting mammalian tissue; however, recent research has shown very positive results from composting. Digestion is expected to provide similar results and is used effectively in other states. This section needs to avoid an outright prohibition and be constructed to allow digestion of mammalian tissue if and when it is eventually approved. J-6

3. Measure 5.6, page 1-10, lists the cumulative water quality impacts as Significant and Unavoidable (SU). WUD believes that a designation of Less than Significant with Mitigation (LSM) is the proper designation. J-7

4. Measure 6.1b, page 1-11, requires equipment with Tier II engines and that they be inspected by a certified mechanic before use in construction of a dairy digester. This requirement should be restated to require compliance with applicable Air Resources Board and air district regulations. We do not believe it appropriate to task the dairy project to be the enforcement arm of the air quality agencies. A simple statement that all applicable air quality regulations must be followed by contracting entities should suffice. J-8

In addition, the last two bullets in this impact discuss fuel cells and alternatives such as vehicle fuel and direct injection as preferred alternatives to internal combustion engines. These alternatives are not sufficiently mature and proven technologies to list them as preferred. The final two bullet points in this section should be removed as they are constraining to digester development. They will be adequately and more appropriately dealt with in the permitting process J-9

5. Measure 6.3b, page 1-12, requires negative pressure buildings vented to a biofilter. This mitigation is more appropriate for large centralized digesters, not for on-farm digesters, J-10

J-10 cont and that differentiation should be identified. Certain feed stocks for co-digestion projects may be more or less odor intensive and this should also be identified. However, it should be noted that recent studies by university researchers have indicated that biofilters are not homogenous and that some production of N2O and NOx can be expected in certain portions of the biofilter. Again, the technology of biofilters is inadequately mature to be identified as a requirement in the PEIR.

J-11 We suggest a change in the fourth bullet point, second sentence, of this measure to replace the word "shall" with "may" as follows: "These management practices may include the establishment of …" This will allow the necessary flexibility to deal with the issues we have raised above.

J-12 6. Measure 6.4c, page 1-12, requires that H2S be scrubbed from the biogas. Some digester projects are using other technologies to reduce H2S, such as air injection. This measure seems to preclude other technologies. Also future technologies may be developed that can utilize biogas that contains H2S without negatively affecting air quality. This measure also precludes such future technologies. At a minimum, if the word "scrubbed" were changed to "controlled before emission to air can occur" the problem would be resolved.

J-13 7. Measure 9 inclusive, page 1-15, requires certain assessments for all projects. Those projects that are developed completely within the production area or its immediate environs, or projects covering an existing lagoon should not need to undergo this expense and the assessments should be deemed unnecessary. Perhaps the NOI could be used to determine the applicability of these measures without a formal report. Possibly language indicating an "initial assessment" with a "triggering mechanism" can be developed, and if negative the technical reports may be avoided where unnecessary.

J-14 8. Measure 12.1a requires a project-specific cultural resources evaluation. This does not seem appropriate for most dairy digester projects. These projects are normally located on highly developed agricultural land that has been significantly disturbed for decades. This measure should be more specific and applied only where warranted. Pipeline installations should be exempted from this requirement. A similar alternative as expressed for measure 9, including a "triggering mechanism", should be considered here as well.

J-15 9. The first line on page 3-2 states that the application of digestate to land is considered a "discharge to waters of the State". It is not. Rather, it is a "discharge to land." Discharges of dairy manure, wastewater, and digester digestate to waters of the state are strictly prohibited by the State Water Code. This error must be corrected.

J-16 10. The descriptions of manure handling at dairies on page 3-6 need to be revised. Some freestall dairies scrape their freestalls instead of flushing them. Basically, there are three methods of removing manure from animal housing and feeding areas: flushing, scraping, and vacuuming. Each of these methods may be employed to some degree in specific areas of most dairies, and in some cases may be substituted for each other as conditions warrant.

J-17 11. Table 4-1 on page 4-8 needs to be updated and corrected. We have attached the table with annotated corrections noted for your use.

12. We do not believe it is either appropriate or authorized by statute to require dairy digester development to undergo review by CalRecycle. Adequate review for issues that might be of concern to CalRecycle will be provided by the Regional Water Board. Adding an additional agency to the review process will negate the intent of the PEIR process. J-18

Western United Dairymen appreciates the opportunity to provide you with our comments. Western United Dairymen, requests a meeting with you to resolve these issues before the final draft is prepared. We are very concerned that the PEIR process established in the draft document will make digester development even more difficult than the current system. The final document absolutely must have a defined method to scale the degree of environmental review required for smaller, simpler projects. J-19

Very truly yours,

Michael L. H. Marsh, CPA
Chief Executive Officer

MM/kmr

cc: Paul Martin, Western United Dairymen
Paul Sousa, Western United Dairymen

For the purpose of cumulative impact analyses in the various resource chapters in this Program EIR, development of the digesters can be assumed to be concentrated geographically (within reasonable limits), to the extent that such assumptions will help to identify potentially significant cumulative impacts. The potential for central facilities to be connected to dairies by biogas pipelines would be one of the factors that would concentrate several dairy digester or co-digesters in a localized geographic area.

Operating Parameters of Future Dairy Digester Facilities

Based on the existing dairy digester data for California where 19 of the 21 digesters (operational and non-operational) used biogas for electricity or co-generation, this analysis projects that the majority of the dairy digesters to be developed will use the biogas for electricity or co-generation, which typically occurs on individual dairies. Of the 200 digesters, the analyses assumes that about 180 of the facilities would combust the biogas on-site through a generator and that 20 of these would be at centralized facilities. The analysis assumes there would be 5 centralized facilities that would process biogas piped from digesters at individual dairies and 5 centralized facilities that would have multiple digesters each to process manure that would be piped or trucked from dairies and co-digestion organic substrates that would be trucked to the central facilities.

TABLE 4-1
EXISTING DAIRY DIGESTERS IN CALIFORNIA

Facility	Digester Type	Biogas End Use(s)	Operational Status
Blakes Landing Dairy	Covered Lagoon	Electricity	Operational
Bob Giacomini Dairy	Covered Lagoon	Cogeneration	Operational
Bullfrog Dairy	Covered Lagoon	Electricity	Operational
~~Cal-Poly Dairy~~	~~Covered Lagoon~~	~~Electricity~~	~~Not Operating~~ -- digester removed
CAL-Denier Dairy	Covered Lagoon	Electricity	Operational
Castelanelli Bros. Dairy	Covered Lagoon	Electricity	Operational
CottonWood Dairy	Covered Lagoon	Cogeneration; Boiler/Furnace Fuel	Operational
Edenvale Dairy	Horizontal Plug Flow	Electricity	Not Operating
Fiscalini Farms	Complete Mix	Cogeneration	Operational
Hilarides Dairy	Covered Lagoon	Electricity; Vehicle Fuel	Operational
Inland Empire Utilities Agency - Reg Plant 5	Horizontal Plug Flow; Complete Mix	Electricity	Not Operating
Koetser Dairy	Horizontal Plug Flow	Electricity	Not Operating
Langerwerf Dairy	Horizontal Plug Flow	Cogeneration	Operational
Lourenco Dairy	Covered Lagoon	~~Flared Full Time~~ -- Electricity	Not Operating
Meadowbrook Dairy	Horizontal Plug Flow	Electricity	Operational
St. Anthony Dairy	Covered Lagoon	Cogeneration	Not Operating
~~Strauss Family Dairy~~	~~Covered Lagoon~~	~~Cogeneration~~ -- same facility as	~~Operational~~ -- Blakes Landing
Tollenaar Holsteins Dairy	Complete Mix	Cogeneration; Boiler/Furnace Fuel	Operational
Van Ommering Dairy	Horizontal Plug Flow	Electricity	~~Operational~~ -- Not Operating
~~Van Warmerdam Dairy~~	~~Unknown~~	~~Electricity~~	~~Operational~~ -- Never Built
Vintage Dairy	Covered Lagoon	Pipeline Gas	Not Operating

SOURCE: Western United Dairymen, 2010

NOTE: Corrections to the above chart provided by Western United Dairymen

Response J-1

The comment states that the intensity of the listed mitigation measures, while possibly appropriate for a large regional project, is far too extreme for simple on-farm projects.

In using the Program EIR and waste discharge programs developed, each development project will be evaluated according to the level of potential impact upon site-specific resources, from a small AD facility on an existing dairy (one that will include no new land disturbance) to a major centralized facility. See response to Comment I-12. As noted in response to Comment I-12, based upon the specifics of a particular project many of the mitigation measures will be relatively straightforward to implement at the start of a project, such as the initial biological, cultural, traffic and visual assessments. If no potential impacts are identified in the initial studies further studies would not be required. Furthermore, full consideration of a variety of these issues early in the process could help identify potential flaws in a particular site that might not be obvious otherwise.

The field surveys and reports required to ensure that no biological or cultural resources are adversely affected are expected of new projects in California and, although a cost and time consideration, are not expected to be excessive or different than what is required for similar levels of new land development.

The Program EIR is expected to reduce the permitting time for other State and local agencies with discretionary permit responsibilities by providing a program-level analysis that can be relied upon or tiered from for region wide environmental and regulatory settings, project alternatives analyses and cumulative impacts analyses. For other agencies with discretionary permits this should be a benefit for all dairy digesters, since those agencies will have the program-level analysis available.

The draft Program EIR, once certified, will meet its objective of assessing the broad range of environmental impacts associated with the construction and operations of dairy digester and co-digester facilities in Region 5. The Program EIR will provide CEQA documentation for the water quality GOs, Individual WDRs, or CWs issued by the Central Valley Water Board to the owners and operators of those facilities. Once certified, the Program EIR may be used by other state and local agencies with discretionary permit responsibilities to expedite the review process by providing the first tier review of a project. Meeting CEQA through the Program EIR cannot substitute for acquiring project-specific regulatory permits required by the state and local resource agencies responsible for issuing air quality, water quality, biological resource and other permits. However, the technical information and analysis in the Program EIR can be used toward obtaining those permits through completing standardized mitigation measures identified in the Program EIR and included in the waste discharge regulatory programs that will be developed.

With or without the Program EIR, these site-specific permits would be required to construct and operate dairy manure digesters. There is always the option of dairy operators not using the Program EIR, and addressing CEQA using another CEQA document if they determine relying upon the Program EIR is more difficult that the current system.

Response J-2

The comment points out that there are other ways to effectively comply with requirements to minimize offsite discharges besides tailwater return systems. The seventh bullet in Mitigation Measure 5.2 on pages 5-35 and 1-9 of the draft Program EIR shall be revised as follows:

- "Requirements for tailwater return systems <u>or other effective methods</u> to minimize offsite discharges; "

Response J-3

Comment noted. Please see response to Comment H-4 and H-5.

Response J-4

The comment suggests that a distinction be made regarding facilities that would grow crops used for feeding the cows thereby recycling the salt within the facility. As stated in the draft Program EIR on page 5-42 (Mitigation Measure 5.3; the first bullet), any proposed digestion or co-digestion facility would be required to prepare and implement a Salt Minimization Plan (SMP) as approved by the Central Valley Water Board. In addition (Mitigation Measure 5.3; the 5th bullet), proposed facilities would be required "to the extent practicable, [to] use crops that maximize salt uptake." How a facility would manage salt content of land applied liquid and solid wastes would be detailed within the site-specific SMP, regardless of whether the facility was a small on-farm digester project or a large centralized project. The choice of crop and its capacity for salt uptake would be one of the elements covered within the SMP; to minimize the potential migration of salts in the underlying groundwater. See also response to Comment H-8.

Response J-5

The comment suggests revising language within Mitigation Measure 5.3 that calls for neutral or alkaline pH in dairy digestate wastewater applied to cropland. The commenter adds that many areas have alkaline soils where the addition of acidic materials is common practice. This pH requirement in Mitigation Measure 5.3 was developed primarily to address the possibility of metals being discharged from co-digesters given the lack of information regarding specific feedstock characteristics. Dissolved metals (arsenic, cadmium, chromium, copper, nickel, lead, selenium, zinc, and mercury) that have been identified in some co-digester feedstock materials may be mobile under acidic conditions. Repeated application of acidic wastewater that contains dissolved metals increases the risk that this material may leach through the soil column and into groundwater. By requiring that the wastewater to be of neutral to slightly alkaline pH, the mobility of any dissolved metals contained within the wastewater is greatly reduced or eliminated. Nonetheless, there may be instances where the use of an acidic pH digestate wastewater might be appropriate. The 16th bullet from the list of measures in Mitigation Measure 5.3 on pages 1-10 and 5-42 of the draft Program EIR is revised as shown below:

- "Maintain a neutral or alkaline pH for dairy digestate waste water applied to cropland unless conditions warrant otherwise as detailed in the NMP;"

Response J-6

The comment suggests that a strict prohibition on mammalian tissue should not be made and recent research has shown positive results from composting. In general, the draft Program EIR cannot speculate on potential future outcomes of research and the analysis but must rely on the best available science.

The comment also suggests avoiding an outright prohibition of mammalian tissue. Title 14 Section 17855.2 of the California Code of Regulations (CCR) prohibits the composting of mammalian tissues, except when from the food service industry, grocery stores, or residential food scrap collection, or as part of a research composting operation.

The 17th bullet from the list of measures in Mitigation Measure 5.3 on pages 1-10 and 5-42 of the draft Program EIR is revised as shown below:

- "Prohibit hazardous waste, mammalian tissues (with the exception of mammalian tissue as contained in compostable material from the food service industry, grocery stores, or residential food scrap collection), dead animals, and human waste from all discharges; and"

The use of mammalian tissue, dead animals and human waste (e.g., sludge, septage, domestic and municipal wastewater), in a co-digester, or application of these materials to a land application area is prohibited largely because of complex pathogenic risks (e.g., prion-protein contamination associated with Bovine Spongiform Encephalitis [BSE] or Mad Cow's Disease) associated with the use of these materials.

Response J-7

Comment suggests the cumulative water quality impact be changed to Less than Significant with Mitigation. Comment is noted. However, as stated in the draft Program EIR on pages 5-45 and 5-46, "…Past projects that have historically discharged to cropland have led in some instances to the degradation of both surface waters and groundwater in various areas of Region 5… [G]iven the existing, significant cumulative impacts caused by other projects to groundwater throughout Region 5, and in particular those areas most likely to be affected by the future development of dairy digesters and co-digesters, the program's potential incremental contribution to groundwater quality remains cumulatively considerable, even after mitigation." Therefore, the conclusion remains Significant and Unavoidable.

Response J-8

Comment noted. Tier II engine usage is not a requirement under regulation at this point, however, the Tier II engine mitigation identified on pages 1-11 and 6-24 of the Program EIR was specifically included in the SJVAPCD Scoping Comment Letter (April 22, 2010) as recommended feasible mitigation. Tier II engines greatly reduce NOx emissions. The fifth bullet of Mitigation Measure 6.1b has been revised as follows:

- “Maintain all equipment in proper working condition according to manufacturer’s specifications. ~~The equipment must be checked by a certified mechanic and determine to be running in proper condition before it is operated.~~”

Response J-9

It is understood that the technologies identified on pages 1-11 and 6-24 of the Program EIR, including fuel cells, are not typically used for biogas right now, but these technologies do resolve many of the air quality issues associated with internal combustion engines. The language “where feasible” was included due to uncertainties regarding the feasibility of these technologies at this time for the various digester scenarios analyzed in the Program EIR. Feasible means capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors (CEQA Guidelines §15364). It is not anticipated that these technologies would be determined to be feasible for most projects in the near-term. However, they need to be considered for the air quality benefits they could provide with the understanding that changes in economic, environmental, legal, social, and technological factors may make them feasible at the time of project initiation (i.e., given that this EIR is for a program). See also the expanded discussion of these options in the Reduced NOx Emissions Alternative beginning on page 17-10 of the draft Program EIR.

Response J-10

Comment noted. Please see response to Comment H-13 which details revisions to Mitigation Measure 6.3b.

Response J-11

Comment noted. Please see response to Comment H-13.

Response J-12

The comment recommends that the draft Program EIR mitigation of H_2S (as described in Mitigation Measure 6.4c) be revised in order allow for other technologies in addition to scrubbing. The text on page 1-12 and 6-29 of the draft EIR shall be revised as follows:

> “**Measure 6.4c:** H_2S contained in the biogas shall be ~~scrubbed~~ controlled before emission to air can occur.”

Response J-13

Mitigation Measures in Chapter 9 require the preparation of a site assessment to determine if sensitive biological resources are present in the project area. If resources are present, then additional measures are outlined. This process is consistent with the “initial assessment” and “trigger mechanism” mentioned in the comment letter.

Response J-14

Comment noted. Please also see response to Comment I-7.

Response J-15

The commenter is correct, the first sentence on page 3-2 of the draft Program EIR has been revised as follows:

> “Liquid and solid digestate application to land is considered to be a “discharge of waste” ~~to waters of the state~~, as defined in the Porter-Cologne Water Quality Act.”

Response J-16

The comment recommends that the draft Program EIR description of manure handling (see Section 3.2 Project Location and Dairy Overview) be revised in order to clarify the various methods employed at dairies. The text on page 3-6 of the DEIR shall be revised as follows:

> “Dairies in Region 5 employ manure handling practices as a matter of manure management and general animal husbandry. Manure handling practices include: vacuuming, dry scrape, flush, or some combination of the ~~two~~ three. Each of these manure collection methods may be employed to some degree on specific areas of most dairies, and in some cases may be substituted for each other as conditions warrant. ~~Dry scrape operations occur at dairies where stock are housed in open corrals and manure is scraped from the corrals several times during the year. Stormwater runoff and process wastewater generated within the milk barn at these facilities are piped directly to the wastewater retention system.~~
>
> Dairy cows are generally housed in two different types of housing. In freestall housing the cows lay in areas that are partitioned to orient them in a specific direction to ease in manure collection and provide a clean, dry place to lie. There are paved lanes where the cows stand to eat and lanes used to access the freestall resting areas. At freestall dairies, most of the animal manure is deposited on the concrete lanes. Freestall facilities often have exercise pens where the cows can go during good weather. Cows are also housed in open lot corrals with or without shades. Open lot corrals also have a paved feed lane where the cows stand to eat. At open lot dairies, most of the animal manure is deposited in the corrals.
>
> Manure from the paved lanes at both freestall facilities and open lot facilities can be collected by scrape, vacuum or flush systems or a combination of the three. Manure from the open lot corrals and exercise pens is scraped several times during the year and handled as a dry material. When flushing is used, the lanes are flushed daily with process wastewater from the milk barn and recycled wastewater from the wastewater retention system. Stormwater may be routed through the flush system or piped directly to the wastewater retention system depending on the dairy.

> ~~Flush operations occur at dairies that house their stock in flushed free stalls and allow only intermittent access to open loafing pens. At flush dairies, most of the animal waste is deposited on concrete flush lanes, which are flushed with process wastewater from the milk barn and recycled wastewater from the wastewater retention system. Stormwater is routed through the flush system into the wastewater retention system. Flush manure management practices tend to occur at newer larger dairies.~~
>
> ~~Dairies that employ both dry scrap and flush are dairies that house their herds in open corrals with flushed concrete lanes designed to capture manure deposited while the cows are eating. At these facilities, the corrals are scraped several times a year while the lanes are flushed daily with process wastewater from the milk barn and recycled wastewater from the wastewater retention system. Stormwater is routed through the flush system or piped directly to the wastewater retention system.~~”

Response J-17

The following table on page 4-8 of the draft Program EIR has been revised to correct the data provided.

TABLE 4-1
EXISTING DAIRY DIGESTERS IN CALIFORNIA

Facility	Digester Type	Biogas End Use(s)	Operational Status
Blakes Landing Dairy	Covered Lagoon	Electricity	Operational
Bob Giacomini Dairy	Covered Lagoon	Cogeneration	Operational
Bullfrog Dairy	Covered Lagoon	Electricity	Operational
~~Cal Poly Dairy~~	~~Covered Lagoon~~	~~Electricity~~	~~Not Operating~~ Digester removed
CAL-Denier Dairy	Covered Lagoon	Electricity	Operational
Castelanelli Bros. Dairy	Covered Lagoon	Electricity	Operational
CottonWood Dairy	Covered Lagoon	Cogeneration; Boiler/Furnace Fuel	Operational
Edenvale Dairy	Horizontal Plug Flow	Electricity	Not Operating
Fiscalini Farms	Complete Mix	Cogeneration	Operational
Hilarides Dairy	Covered Lagoon	Electricity; Vehicle Fuel	Operational
Inland Empire Utilities Agency - Reg Plant 5	Horizontal Plug Flow; Complete Mix	Electricity	Not Operating
Koetser Dairy	Horizontal Plug Flow	Electricity	Not Operating
Langerwerf Dairy	Horizontal Plug Flow	Cogeneration	Operational
Lourenco Dairy	Covered Lagoon	~~Flared Full Time~~ Electricity	Not Operating
Meadowbrook Dairy	Horizontal Plug Flow	Electricity	Operational
St. Anthony Dairy	Covered Lagoon	Cogeneration	Not Operating
~~Strauss Family Dairy~~	~~Covered Lagoon~~	~~Cogeneration~~	~~Operational~~ Same as Blakes Landing
Tollenaar Holsteins Dairy	Complete Mix	Cogeneration; Boiler/Furnace Fuel	Operational
Van Ommering Dairy	Horizontal Plug Flow	Electricity	~~Operational~~ Not Operating
~~Van Warmerdam Dairy~~	~~Unknown~~	~~Electricity~~	~~Operational~~ Never Built
Vintage Dairy	Covered Lagoon	Pipeline Gas	Not Operating

SOURCE: Western United Dairymen, 2010

Response J-18

The strong concern about the potential role of CalRecycle has been added to Areas of Controversy in the Executive Summary of the draft Program EIR (see response to Comment I-1). Commenter questions the statutory authority of the Department of Resources Recycling and Recovery or CalRecycle over dairy digester development. See Comment D-1 and response to Comment D-1. Specifically, attached to CalRecycle's comment letter (D) is a publication entitled *How Anaerobic Digestion Fits Current Board Regulatory Structure* (note that CalRecycle was previously known as the California Integrated Waste Management Board). This publication can be accessed online at www.calrecycle.ca.gov/Publications/Organics/2009021.pdf. CalRecycle indicates in its Comment D-1 that the determination of the appropriate level of authorization or permit for an activity involving anaerobic digestion is made by the Local Enforcement Agency.

Response J-19

See response to Comment J-1.

CRWach, SJK JK-PEE

K

MIWOK United Auburn Indian Community
MAIDU of the Auburn Rancheria

David Keyser
Chairman

Kimberly DuBach
Vice Chair

Gene Whitehouse
Secretary

Brenda Conway
Treasurer

Calvin Moman
Council Member

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September 7, 2010

Pamela C. Creedon, Executive Officer
California Regional Water Quality Control Board
Central Valley Region
11020 Sun Center Drive, #200
Rancho Cordova, CA 95670-6114

Subject: Environmental Impact Report (EIR) for the Dairy Manure Digesters and Co-Digesters

Dear Ms. Creedon:

Thank you for initiating formal consultations with the United Auburn Indian Community (UAIC) of the Auburn Rancheria. The UAIC would like to consult under SB 18 on the proposed Environmental Impact Report (EIR) for the Dairy Manure Digesters and Co-Digesters. The UAIC is comprised of Miwok and Nisenan (Southern Maidu) people whose tribal lands are within Placer County and ancestral territory spans into Eldorado, Nevada, Sacramento, Sierra, Sutter, and Yuba counties. The UAIC is concerned about development within its aboriginal territory that has potential to impact the lifeways, cultural sites, and landscapes that may be of sacred or ceremonial significance. We appreciate the opportunity to comment on this and other projects in your jurisdiction. K-1

We would like to make a few general points for consideration in developing the scope and content of the Environmental Impact Report (EIR) for Dairy Manure Digesters and Co-Digesters:

- The UAIC recommends that projects within the Dairy Manure Digesters and Co-Digesters EIR jurisdiction be designed to incorporate known cultural sites into open space or other protected areas; K-2

- The UAIC is interested in holding conservation easements for culturally significant prehistoric sites; K-3

- The UAIC would like the opportunity to provide Tribal representatives to monitor projects if excavation and data recovery are required for prehistoric cultural sites, or in cases where ground disturbance is proposed at or near sensitive cultural resources; K-4

- The UAIC is interested in receiving cultural materials from prehistoric sites where excavation and data recovery has been performed; K-5

- The UAIC would like to receive copies of environmental notices and documents for projects within the jurisdiction of the EIR for Dairy Manure Digesters and Co-Digesters; K-6

- The UAIC would like to receive all confidential cultural and archaeological reports within the jurisdiction of for the Dairy Manure Digesters and Co-Digesters EIR. K-7

Thank you in advance for taking these matters into consideration, and for involving the UAIC in the planning process as early as possible. We look forward to meeting with you in the near future, and to reviewing the EIR. Please contact Marcos Guerrero, cultural resources specialist, at (530) 883-2364 or email at mguerrero@auburnrancheria.com.

Sincerely,

Greg Baker
Tribal Administrator

CC: Marcos Guerrero, UAIC

Response K-1

The interest by UAIC is noted. Consultation under SB 18 does not apply since this EIR does not entail land use planning by California cities or counties. The EIR does not propose the adoption of a general plan, specific plan, amendment to such plans, or designation of open space land. Nonetheless, the Program EIR team conducted a phone conference with the UAIC representative on November 1, to clarify issues related to the Program EIR and procedures for cultural resources that would be implemented at the time that site-specific projects are proposed under the Program EIR.

Response K-2

The purpose of initial cultural resources surveys (Mitigation Measure 12.1a on page 12-18 of the draft Program EIR) is to identify any significant resources so they can be avoided or otherwise have any impacts to cultural resources minimized. See also response to Comment I-7.

Response K-3

As appropriate, the UAIC would be contacted should a culturally significant prehistoric site(s) be identified within a project area within UIAC tribal lands or ancestral territory. Appropriate mitigation measures would be identified for the site specific situation, which could include conservation easements.

Response K-4

As appropriate, the Lead agency at the project level would be responsible for contacting local Native American tribes, as recommended by the Native American Heritage Commission, regarding monitoring during data recovery or within archaeologically sensitive areas as provided under Mitigation Measures 12.1a and 12.1b. See also response to Comment I-7.

Response K-5

The Lead agency at the project level, in consultation with the Native American Heritage Commission, would be responsible, for determining the appropriate repository of any cultural material collected during data recovery mitigation.

Response K-6

Mitigation Measure 12.1a requires specific projects to consult with the NAHC to determine whether known sacred sites or traditional cultural resources are situated within the project area, and identify the Native American(s) to contact to obtain information about the project area. See also response to Comment I-7.

Response K-7

The Lead agency at the project level would be responsible for determining the appropriateness and legality of providing any confidential reports to the UAIC.

CHAPTER 4

Responses to Oral Comments

4.1 Fresno Public Meeting

The Central Valley Water Board held a public meeting on Tuesday August 3, 2010 its Fresno office from 6:30 p.m. to 8:00 p.m. to provide participants with an opportunity to comment on the draft Program EIR. Below are the responses to comments made during the public meeting. Table 4-1 lists the commenters and organizes their comments by number and identifies where a particular comment can be found within the meeting transcript by page number. The transcript for the Fresno Public Meeting directly follows the Chapter 4 responses to comments.

TABLE 4-1
LIST OF ORAL COMMENTERS ON THE DRAFT PROGRAM EIR (FRESNO)

Comment Number	Commenter	Page
1-1	Craig Hartman, Four Creeks	4-17
2-1	Nettie Drake	4-17
2-2	Nettie Drake	4-18
3-1	Marvin Mears	4-19
3-2	Marvin Mears	4-20
3-3	Marvin Mears	4-21
3-4	Marvin Mears	4-21

1-1 The Program EIR covers the program-level analysis for both dairy manure digesters and dairy manure co-digesters. A project could be phased to begin as a manure digester at an existing dairy regulated under Order No. R5-2007-0035, Waste Discharge Requirement for Existing Milk Cow Dairies (Dairy General Order) and later convert to manure co-digester. However, because the Dairy General Order prohibits the introduction of co-digestion substrates into a dairy's waste stream, a Report of Waste Discharge (RWD) would need to be submitted to the Central Valley Water Board for the material change (e.g., character, quantity, and location) in the waste discharge from co-digestion. To receive permit coverage under the waste discharge regulatory program the applicant would have to demonstrate compliance (i.e., typically through the submission of technical reports) with the Program EIR's mitigation measures. New permit coverage could come from either a General Order or Individual Waste Discharge Requirements (WDRs).

2-1 The commenter concerns and observations about consistency between the different offices are noted.

As identified in the first paragraph on page 2-1 of the draft Program EIR, the Program EIR covers the jurisdiction boundaries of the Central Valley Region (Region 5). Region 5 includes the Fresno, Redding and Rancho Cordova offices. The benefits of the Program EIR will be available for all of the proposed dairy digester facilities in Region 5, as describe in the second paragraph on page 2-1 of the draft Program EIR as shown below:

> "The Program EIR is intended to provide a comprehensive analysis of the environmental impacts of the development of dairy manure digester and co-digester facilities, including construction and operation. As such, it is expected to facilitate and enhance the CEQA process for individual dairy manure digester and co-digester facilities throughout Region 5."

2-2 The goal of the draft Program EIR is to remain general in most of the analyses and not to identify specific technologies or vendors. With regard to meeting local air district standards, the primary mitigation measure is Mitigation Measure 6.1a, beginning on page 6-23 of the draft Program EIR. Mitigation Measure 6.1a does not specify specific technologies but identifies that equipment must be in compliance with local air district New Source Review and Best Available Control Technology (BACT) requirements.

3-1 Aesthetics mitigation within the Program EIR is designed to encourage future digester and co-digester facilities to remain unobtrusive within the existing visual setting. As described in Section 11, Aesthetics, the visual effect of the digesters developed as a result of the project would not be likely to substantially degrade the visual character of the site and its surroundings, and would still be subject to potential discretionary review from local jurisdictions. Mitigation for impacts to scenic vistas or highways refers to specific, locally designated regulations regarding development within counties, with which digester development would be required to comply.

3-2 Comment noted. As stated in Mitigation Measure 9.1a, a biological site assessment report, which would identify any potential biological resources at the project site, is to be submitted to the California Department of Fish and Game (CDFG).

3-3 The positive effects of dairy digesters identified by the commenter are embedded in the program objectives. See bullets three (reducing greenhouse gases in support of AB 32) and four (providing renewable green energy sources) on page 1-1 of the draft Program EIR.

3-4 There will be a fee structure for the waste discharge requirement (WDR) orders. The fee rating will be specified in the WDR orders.

4.2 Rancho Cordova Public Meeting

The Central Valley Water Board held a public meeting on Wednesday August 4, 2010 its Rancho Cordova office from 6:30 p.m. to 8:00 p.m. to provide participants with an opportunity to comment on the draft Program EIR. Below are the responses to comments made during the public meeting. Table 4-2 lists the commenters and organizes their comments by number and identifies where a particular comment can be found within the meeting transcript by page number. The public meeting transcript directly follows the Chapter 4 responses to comments (after the transcript for the Fresno Public Meeting).

TABLE 4-2
LIST OF ORAL COMMENTERS ON THE DRAFT PROGRAM EIR (RANCHO CORDOVA)

Comment Number	Commenter	Page
4-1	Dan Weller, Air Resources Board	4-37
4-2	Dan Weller, Air Resources Board	4-42
4-3	Dan Weller, Air Resources Board	4-43
4-4	Dan Weller, Air Resources Board	4-46
4-5	Dan Weller, Air Resources Board	4-46
4-6	Dan Weller, Air Resources Board	4-49
4-7	Dan Weller, Air Resources Board	4-50
4-8	Dan Weller, Air Resources Board	4-51
5-1	Justin Ellerby, California Center for Cooperative Development	4-39
5-2	Justin Ellerby, California Center for Cooperative Development	4-43
5-3	Justin Ellerby, California Center for Cooperative Development	4-45
5-4	Justin Ellerby, California Center for Cooperative Development	4-46
6-1	Bill Van Dam, Alliance of Western Milk Producers	4-48
6-2	Bill Van Dam, Alliance of Western Milk Producers	4-48

4-1 The dairy digesters ESA toured during the preparation of the draft Program EIR were Tollenaar Holsteins Dairy in Elk Grove, Castelanelli Brothers Dairy in Lodi, and Fiscalini Dairy in Modesto.

4-2 The draft Program EIR focused on three types of basic anaerobic digestion (AD) systems, but noted that there are many variations and gradations and that the basic digestion processes covered by these are likely to be used in any digester design. This concept is described in Section 3.4.5 on page 3-12 of the draft Program EIR as shown below.

> ### " 3.4.5 Digestion
>
> The three types of basic AD systems that are the most suitable for California dairies at this time include ambient-temperature anaerobic covered lagoons, plug-flow digesters, and complete mix systems (Krich, et al., 2005; Anders, 2007). An example of each type of digester is depicted in **Figure 3-5.** There are many variations and gradations between these basic types of AD systems, however, the basic digestion processes covered

> by these three types are likely to be used in any digester design. The three basic digester types are described below."

4-3 The estimated number of dairy digesters was selected after a review of many factors that could affect the future growth rate of dairy digester in Region 5. As answered in the public meeting several factors were considered in estimating the future growth of dairy digesters (200 dairy digesters over the next 10 years in Region 5). These factors included a review of the growth rate of digesters nationwide from the Ag Star database and also the European growth rate. The estimate also considered state initiatives to develop local, renewable energy sources.

4-4 Impact 6.1 analyzes air quality impacts resulting from construction. This discussion begins on page 6-22 of the draft Program EIR.

4-5 Impact 6.2 deals with air quality impacts resulting from increased truck traffic on the local roadway network (including haul trucks for co-digester facilities and for potential waste or biogas transport to centralized facilities). This discussion begins on page 6-24 of the draft Program EIR.

4-6 The catalysts discussed would be used in the electrical generation engines. If catalysts are fouled they would have to be replaced or cleaned to meet the engine specifications of the local air district. The draft Program EIR does not explore the catalysts that may be used or the interaction of co-digestion materials with the catalysts. Specific information on the control technologies will need to be included in the air permits for individual and approved by the local air district. The air permits will contain provisions for monitoring of the exit gases (continuously or at specified times) to identify that the air pollution control system are functioning properly. If fouling occurs than modification may be needed in the co-digestion materials or the gas clean-up systems.

4-7 The EIR did not consider the co-digestion of animal mortalities as they are expected to be prohibited under the waste discharge regulatory program.

4-8 The Program EIR efforts for CalRecycle and the Central Valley Water Board cover two fairly distinct areas of opportunity with regard to the anaerobic digestion of waste. CalRecycle is preparing a statewide Program EIR for anaerobic digestion facilities for mixed solid waste either co-located with other solid waste facilities (i.e., compost facilities, transfer stations or landfills) or within industrial zoned locations. The Central Valley Water Board is preparing a region-wide Program EIR for manure digester and co-digester facilities at individual dairies and centralized locations in areas that are predominately agricultural in nature.

5-1 As answered in the meeting, the Program EIR itself is part of the solutions to expediting projects. Projects will be able to use the Program EIR or tier off the Program EIR with supplemental analysis to comply with CEQA.

The commenter also referred to permit challenges of co-digestion substrates. As noted in the draft Program EIR (see page 3-18) CalRecycle may require a Composting Permit or Transfer Processing Permit for projects that add co-digestion substrates. See also responses to Comments D-1 and I-1.

5-2 The dairies operating in compliance are Cottonwood Dairy (Gallo) and Fiscalini Dairy. This information shown below was received on May 17, 2010 in a correspondence from Dave Warner, Director of Permit Services at the San Joaquin Valley Air Pollution Control District.

Cottonwood Dairy (Gallo) – New rich burn engine with catalyst. Did not have problems meeting the Rule 4702 NOx limit but had difficulty meeting the 9 ppmv Best Available Control Technology (BACT) limit for new equipment. Now operating in compliance with the 9 ppm limit.

Fiscalini Dairy – New lean burn engine with Selective Catalytic Reduction. Engine currently operating and SCR system has recently been achieving less than 11 ppmv NOx to comply with BACT. The new engine did not have problems meeting 4702 NOx limits but was subject to the BACT limit for NOx. (Note: 11 ppm from a lean burn engine is equivalent to 9 ppm from a rich burn engine.)

5-3 As indicated in the public meeting, the draft Program EIR analyzed the Thermal Conversion Alternative, which included pyrolysis and gasification processes. The EIR analysis starts on page 17-8. Some of the potential impacts of the Thermal Conversion Alternative were identified as potentially greater than the dairy anaerobic digesters (see Table 17-1 starting on page 17-14 of the draft Program EIR). As indicated at bottom of page 17-9 of the draft program EIR:

> “Thermal conversion technologies only treat the screened/dried, solid portion of manure. This alternative would limit opportunities for on-site treatment of dairy manure process water. This could undermine the objective to create alternate waste treatment methods for dairy manure and other organic waste streams to the extent it would exclude the liquid component of the dairy manure. While the Thermal Conversion Alternative still meets the alternate waste treatment method objective, it does not meet it as efficiently as the project.”

5-4 Preparation of the draft Program EIR included the review of literature on dairy digesters, outreach effort through the Technical Advisory Group (TAG) and outreach to other states, including calls to New York to discuss their regulations. The review of co-digestion restrictions and limits being implemented in other states was one source of information researched to define the Additional Co-digestion Substrate Restrictions Alternative (see pages 17-6 and 17-7 of the draft Program EIR).

6-1 Although Mr. Weller did not have a response at the meeting, some percentage restrictions from other states are based on volume. The draft Program EIR does not limit co-digester feedstocks by weight or volume.

6-2 As indicated in the meeting there is a separate economic study being conducted for dairy digesters but it is not part of the environmental analysis in the draft Program EIR. CEQA Guidelines §15131 states that economic or social information may be included in an EIR or may be presented in another form. Reports looking at the economic feasibility of dairy digesters have been presented to the Technical Advisory Group (TAG) and revised based on comments from the TAG, which includes representatives from federal, state, and local agencies, academia, environmental organizations, environmental justice organizations, investor owned utilities, the dairy industry, digester developers, and individuals. The Technical Advisory Committee Members are identified in Section 18.2 of the draft Program EIR.

ORIGINAL

WATER QUALITY CONTROL BOARD

DIGESTERS & CO-DIGESTERS SCOPING MEETING

TUESDAY, AUGUST 3, 2010

6:30 P.M.

-oOo-

REPORTED BY: MIRANDA K. CRAIN, CSR NO. 13453

Fresno Court Reporters & Legal Videography

MR. KLEIN: I'd like to welcome everyone here tonight. This is the dairy digester and draft E.I.R. public meeting. There will be a second meeting tomorrow night at the same time in Rancho Cordova. I'd like to thank everyone for coming tonight, we really appreciate it here.

We are fortunate tonight to have a board member present, Julian Isham with the Water Board; he is present here with us. On the left here is Paul Miller, he's the project manager from ESA. I'm Stephen Klein, I'm the project manager with the Central Valley Water Board. We have, kind of, a small group tonight. So I think some introductions would be nice. If we want to go around the room.

VOICE: Completely voluntary.

(Whereupon, introductions were made.)

MR. KLEIN: Thank you. Now I'm going to turn over the meeting to Paul Miller. He's going to give a short presentation on the E.I.R. and then, after that, we'll open the floor to your comments. It's a pretty small group, so if you want to make your comments here, or if you're more comfortable, come up to the podium, as well, and give your comments.

MR. MILLER: Okay. Tonight, as part of the CEQA process, they recommend you have public meetings where people can give comments on the draft E.I.R. And this is the first of those meetings. The Central Valley Water Board is the lead agency under the CEQA process for the program E.I.R. And Stephen is their project manager in this process. I work for Environmental Science Associates out of the Sacramento office, and we're consultants hired by the Central Valley Water Board to help prepare the CEQA documents. Our company specializes in preparing E.I.R.s of all kinds. Right now we're also preparing another E.I.R. for an anaerobic digester project for Cal Recycling. We're actually working on two projects with anaerobic digestion at this point.

Other subconsultants on ESA's team, we've got several specialists; Integrated Waste Management Consulting, which is a composting specialist; Smithline Group, Scott Smithline with part of the City of Los Angeles Technology Review on their around the world trip where they looked at anaerobic digesters in other countries. CirclePoint's our other public facilitator group and also handle the technical advisory group for this project. And if you ever have any questions about this process, you can contact CirclePoint and they'll make sure they direct you to the right place.

Carolla Engineers is on our team. Carolla, one of the largest waste water engineering firms in the United States, they've got a lot of experience with complete mix anaerobic digesters as they're used in the waste water treatment world. And Parus Consulting is another subconsultant that helps us with the CEQA work.

What we've done so far on the E.I.R. is to prepare notice of preparation and initial study that went out March 18th. That was followed up immediately with public scoping meetings to cover what should be in the E.I.R. and comments on the notice of preparation. Those were held in Fresno and in Rancho Cordova. And then, geez, about three weeks ago, we published the draft E.I.R. on July 8th. So right now we're in the middle of a 45-day review period for comments on that draft E.I.R.

One of the parts of this process that's been very helpful is we formed a technical advisory group, which is comprised of almost 80 members right now. We've had three meetings of the Tag, and at the meetings, we've had about -- oh, any place from 15 to 30 people at the Tag meetings and several, also, attending by conference calls. And the Tag had helped the E.I.R. team to focus on the potential environmental impacts of the dairy manure digesters and co-digester facilities. Also, the Tag has helped to identify economic and regulatory challenges for dairy digester and co-digester facilities.

Part of the program overview, the main purpose of the E.I.R. is for the Central Valley Water Board to develop waste discharge regulatory program for dairy manure digesters and co-digesters within Region 5. The waste discharge regulatory program will involve adoption of water board waste discharge requirements, general orders to regulate the discharge of digestate to lay in.

The program E.I.R. evaluates the environmental effects of the digester, so the waste discharge program should help the ability of digesters to be permitted in California. So the E.I.R. looks at the environmental effects of dairy digesters and co-digesters. Not just in terms of water quality, but we also looked at other environmental topics; such as, air quality, land use, cultural resources, traffic; they're all in the program E.I.R.

So the boundaries -- Region 5 goes from the Oregon border up in Modoc County all the way down to the great five for the boundaries in the Region 5; and that's the area that's being looked at for this program E.I.R. Some of, sort of, characteristics of Region 5, about 1.6 million cows, 1400 dairies are in the region; dairy cows, on the average, produce about 112 pounds of manure a day, which equates to about 180 million pounds of manure generated per day in Region 5. So this is a substantial amount of manure; it has the potential to produce biogas, which is a renewable source of energy.

And this shows where the dairies are located in the Central Valley. And in this -- this picture is also in the -- in the draft E.I.R., and it shows the locations of some of the existing dairy digesters in the state. So there's a clustering of both where the dairies are and also where the dairy digesters are located right now. And this was helpful because there's actually digesters that are out there working right now, and our team was able to go review some of those facilities.

Now, the primary objectives of the program, which are spelled out in the project description of E.I.R., is to protect the beneficial uses of surface and groundwater within the Central Valley region from the discharges that would be associated with dairy manure digesters and co-digesters, and these could be located both on dairies or off-site of dairies.

Other primary objectives to provide a regulatory framework that water quality aspects of dairy manure digesters and co-digesters and to assist the state in meeting greenhouse gas reduction measures in support of AB 32 through the production of biogases from dairy manure.

Not only do they produce biogas from the dairy manure, but in that process it reduces the amount of methane that would be produced currently from dairy operations. And these objectives are important because in the E.I.R. that's one of the things we look at; what are the objectives, how you look at the effects from the objectives. And when we have to look at alternatives to the project, the objectives are important.

And the last -- the next two objectives, one is for renewable green energy resources to help meet renewable portfolio standard in California. The utilities are required to have certain percentages of their electricity provided by renewable sources, and the utilities are struggling to get those renewable sources. So dairy digesters qualified and could help in that regard.

The last one on this slide is to reduce the time required to develop and issue water quality permits for dairy manure digesters and co-digesters. And this draft E.I.R. should help that process by getting some of the information out and the feedback we receive on the draft E.I.R.

Last objective is to reduce the permitting time for other state and local agencies with discretionary permits, because they can also rely upon the E.I.R., or tier off the E.I.R., in preparing documents for CEQA that they're required to prepare. Oops, I guess I fell behind. Okay.

Now, general processes in facilities in the dairy digester operation, on the left-hand side, we have the pre-processing. And if co-digestion is involved that could bring co-digestion substraight to the dairy. The digester, which we didn't find many impacts from the actual digester, because that's enclosed and controlled. And then on the back end, there's the handling of the gas, the liquids and the solids. There's several things that can happen there and this flowchart sort of helped different parts of the E.I.R. consider each of those portions.

The types of digesters; we looked at the three basic types; I have digesters that we think will occur in California that are out there right now that covered a good digester, plug flow digesters and complete mix digesters. This is a picture of the electrical generators at three of the dairy digesters that we visited. And it -- it's the most common use of the gas throughout the U.S. is to use it to make electricity. So that had to be considered in this process.

The types of facilities that are looked at in the E.I.R., we have got individual dairy digesters, the three types we just discussed. Centralized facilities; centralized facilities could be either on or off of the dairy, and the centralized facilities could be centralized digester or a centralized biogas cleanup facility to produce a different fuel from the biogas. Feed stocks, there's the manure only digesters.

And then we look at -- for co-digesters, we looked at a broad group of materials that could be used for co-digestion. And in the meetings we had with the Tag, this was pretty clear that there were folks on the Tag that thought that could -- a lot of materials could be used for co-digestion, and so they didn't want to see that limited; it was not limited in the E.I.R.

E.I.R. analysis, if you look at the E.I.R., which is available on download on the website from the Central Valley, chapters one through four sort of layout the E.I.R., they're the fundamentals of the E.I.R. Chapters five through fifteen are the key resources area water quality, air quality, et cetera. And then cumulative impacts are also considered.

And the cumulative scenario, we spent a lot of time working on that, and came up looking at a scenario of up to 200 dairy digesters built over a ten-year period. Right now there's 15 or 20 digesters out there and maybe 15 operating right now. And so, that's a lot of growth that we looked at in the cumulative scenario.

Also one of the things that an E.I.R. needs to do is look at alternatives to the project; it's one of the requirements of the CEQA regulations, and we looked at four alternatives. No project alternative; alternative called the co-digester substraight restriction alternative. We looked at thermal conversion alternative; use a thermal process rather than anaerobic digestion. And we looked at reduced nox emissions alternatives, which was ways to use the gas without creating so much nox in the air district.

The conclusion that was reached at the end of all these alternatives were that none of the alternatives were found to be clearly superior to the project. And this was because some of the positive aspects of the digesters could be reduced by each of the alternatives. So none of the alternatives were considered to be environmentally superior. The E.I.R. really does identify the environmental benefits from what dairy digesters do.

And other conclusions that are important to the E.I.R., it's suggested the mitigations were identified to avoid or reduce all but two of the potentially significant impacts. The E.I.R.s look for significant impacts and try to analyze those and reduce those. All were reduced for two, and the two that remains significant and unavoidable were the cumulative impact from air quality and the cumulative impact from water quality. On an individual project basis, all the impacts were determined to be able to be mitigated.

The next steps in the CEQA process, the comment period will close August 23rd at the end of the day; I think -- that's a Monday. Verbal and written comments will be considered and responded to as appropriate in the final program E.I.R. So if you make comments about the E.I.R., we'll respond to those point by point in the final E.I.R. And we really encourage, if you have comments, to make the E.I.R. better, better mitigations that you know, other clarifications, please submit those; those will be good to have as part of the final E.I.R. We encourage that.

Verbal comments that you give tonight, we've got a court reporter here and she's recording what's said tonight, and those will have the same weight as the written comments, 'cause we'll get a transcript from tonight's meeting and we'll respond to those. So if you give the comments verbally, they will be responded to in the final E.I.R. So both written and verbal are the same.

After the final E.I.R. is produced, the Central Valley Water Board will decide in a public hearing whether to certify the program E.I.R. and whether to approve the program that's proposed in the E.I.R. Individual projects under the program E.I.R. would be approved or tiered from the program E.I.R. So that's sort of the next steps, that's how we get to project approval.

Public comments -- I think, we just did that slot; either tonight or by August 23rd. This is in your package, want to make sure you knew of the website, it's on their pressroom portion of the Central Valley Water Board website, you can download the entire E.I.R. I think what's interesting about the E.I.R., the new technologies, if you have a computer, you can download that all, it's one file; you can search in that file for any word you want to search for; if you're looking for a particular document, you can search the whole document in minutes to find out what's in there and not in there.

And with that, we can open up to public comments. We'd really like to hear what your specific comments about the E.I.R. or also about the program that's being produced by the Water Board.

Stephen, do you have any other comments?

MR. KLEIN: No. Just like to open the floor and offer forward, if you want, just say your name clearly so that the court reporter can hear. And if you like, you can come up to the podium.

Would anyone like to start off here?

CRAIG HARTMAN: Craig Hartman with 4 Creeks. I haven't really read the whole document, so excuse me.

1-1 One of the things I wanted to make sure, the manure only to have co-digestion working with developers and such, they have to cash flow these projects, and sometimes it's easier to start one or the other and not both. So if there's some language in there, such that you can go from one to the other with doing some requirements and such, that would be helpful.

MR. KLEIN: Anybody else have any comments they want to make tonight?

NETTY DRAKE: Well, I will. Netty Drake. I read most of it, I took the highlights.

MR. MILLER: I don't think anybody's read all of it yet.

NETTY DRAKE: It's good bedtime material, if nothing else.

2-1 Couple things and more general statements at this point. I will have individual itemized things prepared and submitted by the 23rd. But one comment -- one thing that's come up, because I work not only with this office but work with the Rancho Cordova and Redding office for various projects. And comments have been made at those other two offices that have

2-1 (cont)

been a bit concerning, because I've seen it happen with other issues related to water in this big, huge valley that Region 5 has to do with.

And that's -- when I mentioned the E.I.R., people in both offices said, "Well, that's not our problem, that's being handled at the Fresno office."

And I said, "Isn't it just for the whole region and not just the south?"

And they're, like, "Yes" -- there's real animosity toward it; and that's real concerning, because if the other two offices feel like they don't have a role in this, perceived or otherwise, when someone has got to go to two other offices and they don't see this thing the way this office sees it, that's going to create a lot of havoc for projects; both in attitude and approach. And I don't know how that would be dealt with through, you know, the infrastructure within the agency itself.

But that is definitely something that's going to come up. And if there's not consistency between the three offices, that's going to, you know, become very difficult to deal with from both sides; from your side and from some, you know, project side, as well. So that's one concern, only because I've seen it really screw up other things in the past.

2-2

The only other comment is the biggest concern of any of the area of this E.I.R. is the air side. And there's not a

2-2 (cont)

lot anyone in this room can do about it, and I do understand that. But there are quite a few assumptions that are made, quite a few statements that are made, that are very questionable, I suppose, would be a good way to say it. And I'll have more individual comments.

But some of the technologies that are being stated to me -- and I don't know on the E.I.R., perhaps I'm off on this. But on an E.I.R., I thought it was supposed to stay more general. And there's some specific technologies that should -- could potentially be used. And, you know, the ones that are recommended -- not "recommended." The ones that are identified have not proven themselves to be totally efficient or effective in what we need them to do on these dairies. And I -- there's -- I'd like to see this a little more general in stating "These are the goals we need to meet." Not necessarily identifying specific technologies, because there are some that will come, some that will go and some we don't know right now. And when you start putting stuff like this in a project, we can go sideways pretty quick. So those are generally speaking.

MR. KLEIN: Thank you.

MARVIN MEARS: My name is Marvin Mears, and I'll submit some written comments.

3-1

But there are a couple of things that somewhat perplex me in the -- in the E.I.R. And they're relative to things like scenic view. There's nothing that I can do to control that. I'm going to try to stay within the height limits that would be normal for a dairy. I'm not going to -- I'm not going to be distracting. All of the technology will be closed in a building. So that kind of a thing.

3-1
(cont)

And one of the -- I guess the other thing that frightens me, because I was in a project a number of years ago and it has to do with biologicals and plants and critters, and we got stopped cold on a project that we were into for a couple of million dollars because somebody had reported this area as being habitat to the Macedonia blue butterfly.

3-2

We never found one; we never really knew what one looked like; there was no real encyclopedia that we could go to to find out. And yet, the project was stopped cold, and that's been almost 20 years ago. And we had -- we had sign-off and buy in by everybody we needed to do this project, they wanted it, and out of nowhere, after we had, like I said, spent years and a lot of money and the project just cratered and went away.

And we're going to do projects on dairies that are the central part of the dairy. And if we as developers and you as regulators have all of our dreams come true, we're still going to have 1200 dairies that haven't done nearly as much with mitigation, waste and converting and contributing.

And then I have one last comment, and I don't know how do this yet, I haven't figured it out. But I'm going to work on it. And that is the dairy projects that we're looking at could basically offset the carbon footprint for the population of Kings County. And we need to be able to make that pronouncement and sell it and show that the dairies are contributing in a significant way; not only by producing energy, but helping the county become carbon neutral. 3-3

And I've read the document, I don't really totally understand it. But it -- it's a lot to read. I've learned a lot. It's been a very, very good educational tool.

I have one last question: Is there a fee when we make our applications? Is there a fee structure involved? 3-4

MR. KLEIN: Yes, correct. There is a fee structure.

MARVIN MEARS: Okay. That's --

MR. KLEIN: At the Water Board for a permit there is a fee; generally there's an application fee, and then --

MARVIN MEARS: So there's a schedule I can look at?

MR. KLEIN: There will be a schedule that you can look at, yes.

MARVIN MEARS: I couldn't imagine that we'd get this far without there being a fee.

MR. MILLER: And the air quality section does say some very positive things about the carbon footprint, the greenhouse savings.

MARVIN MEARS: And I think that we can promote that and be a positive influence in the community.

MR. MILLER: Any other comments? You guys have all been helpful.

MR. KLEIN: Don't be shy.

MR. MILLER: Don't be shy. We're all here and anxious to hear what people think about the future of the digesters.

MR. KLEIN: Well, that looks like it for tonight.

MR. MILLER: Looks like it.

MR. KLEIN: So, again, everybody, thank you for coming. Both Paul and I really appreciate it, taking your time out of your day to be here with us tonight. Thanks.

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(Whereupon, the meeting concluded at 7:06 p.m.)

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STATE OF CALIFORNIA)
) ss.
COUNTY OF FRESNO)

I, MIRANDA K. CRAIN, a Certified Shorthand Reporter of the State of California, do hereby certify:

That the foregoing proceedings were taken at the time and place herein set forth; that any witnesses in the foregoing proceedings, prior to testifying, were placed under oath; that a verbatim record of the proceedings was made by me using machine shorthand which was thereafter transcribed under my direction; further, that the foregoing is an accurate transcription thereof.

I further certify that I am neither financially interested in the action nor a relative or employee of any attorney of any of the parties.

In witness whereof, I have subscribed my name.

MIRANDA K. CRAIN, CSR NO. 13453

PUBLIC MEETING

DRAFT PROGRAM ENVIRONMENTAL IMPACT REPORT FOR A WASTE DISCHARGE REGULATORY PROGRAM FOR DAIRY MANURE DIGESTER AND DAIRY MANURE CO-DIGESTER FACILITIES WITHIN CENTRAL VALLEY REGION (REGION 5)

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ORIGINAL

Central Valley Regional Water Quality Control Board
Sacramento Main Office
11020 Sun Center Drive, Suite 200
Rancho Cordova, California
Wednesday, August 4, 2010
6:30 p.m.

REPORTED BY: WENDY E. ARLEN, CSR #4355, CRR, RMR
JOB 429968

A T T E N D E E S

PROJECT TEAM:

Paul Miller, ESA

Stephen Klein, ESA

--oOo--

PROCEEDINGS

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MR. KLEIN: Good evening. Welcome to the second dairy digester and co-digester facilities public Draft EIR public meeting. This is the second meeting. We had a meeting yesterday in Fresno at the same time at our Fresno office.

I'd first like to thank everybody here tonight for coming in the evening. We appreciate it. I think we had about -- how many people did we have in Fresno?

MR. MILLER: About 20.

MR. KLEIN: About 20? Yeah. Tonight we're fortunate to have a board member with us, Dan Odenweller. Dan, we appreciate you coming tonight.

Over here is Paul Miller. He's the project manager with ESA Consultants. They are the ones who are preparing the EIR document.

My name is Stephen Klein. I'm a project manager with the Central Valley Water Board.

We have a small group tonight. I'd like to go around and have everybody introduce themselves.

MR. MAYER: I'm Alex Mayer, staff counsel, Central Valley Water Board.

MR. GARNER: James Garner of Dolphin Group.

MR. VAN DAM: Bill Van Dam, Alliance of Western Milk Producers manager and chairman of Dairy Cares.

MR. ROGERS: Clay Rogers, Central Valley Water Board.

MR. FISHER: Eric Fisher, project director ESA.

MR. ODENWELLER: Dan Odenweller again.

MS. SPARKS: Gen Spark, Central Valley Water Board.

MR. CHAN: Victor Chan, Solano County.

MR. SPERBER: Michael Sperber.

MR. WELLER: I'm Dan Weller, Air Resources Board.

MR. KLEIN: With that, I'm going to turn the meeting over to Paul Miller. He's going to give a short presentation on the Draft EIR and after that we'll open up the floor and you can talk from your seats. If you want to come up and talk from the podium, that's fine, too. Whatever you're comfortable with.

MR. MILLER: As Stephen mentioned, this is the second meeting. We met last night in Fresno. It was the first meeting for the Draft EIR public meeting and tonight is the second meet and the final meeting for the verbal comments on the Draft EIR.

Introductions we just went through. Stephen's the project manager for the water board and the Central

Valley Water Board is the lead agency for the Program EIR.

ESA is the consultant hired by the Central Valley Water Board to help prepare the EIR. ESA has been preparing CEQA documents for California public agencies for 40 years now, and I'd like to note that we are also now preparing a similar EIR, Program EIR for CalRecycle for anaerobic digesters that would process mixed solid waste. So that's another place that we've seen the impacts of digesters.

Our subconsultant team also includes five other groups, Integrated Waste Management Consulting, primarily the principal, Matt Cotton, who is an expert, nationwide expert in composting. The Smithline Group, Scott Smithline, some good experience he brought to the team. Went to the city of Los Angeles around the world tour looking at various conversion technologies. Several of those were anaerobic digesters.

CirclePoint is the public involvement firm that's helping to coordinate this overall effort. CirclePoint, if you have any questions about the process, you can call Jennifer Tencati at CirclePoint and she'll make sure that those questions all get answered.

Carollo Engineers is a nationwide company that does a lot of wastewater treatment plant engineering and Carollo has substantial experience using complete mix digesters in the wastewater treatment arena.

And finally Parus Consulting, who is another firm that helps us in preparing some of the EIR resources sections.

What we've done so far in the process, the process kicked off in December last year on March 18th, we issued the Notice of Preparation Initial Study. Shortly following that meeting we had public scoping meetings, one in Fresno and two in Rancho Cordova, to go over the content of the EIR, get public comments on that. So that helped modify our approach.

And most recently we published the Draft Program EIR on July 8th. Now, the Draft EIR has a 45-day comment period, and so we're about halfway through that comment period now, and that's the purpose of this meeting. We're in the comment period.

The overall development effort for this project included forming a Technical Advisor Group. We call it the TAG. It now includes about 80 members. We've had three meetings of the TAG. There have been anyplace between 15 and 30 TAG members at each of those meetings attending in person and several over teleconference. So those have been very important meetings for the process.

The TAG helped the EIR focus on the potential impacts of dairy manure digesters and co-digester facilities. The TAG also helped identify the real world economic and regulatory challenges faced by dairy digester and co-digester projects.

Now, I will run through a program overview these next several slides. The Central Valley Water Board is proposing to develop a waste discharge regulatory program for dairy manure digesters and co-digesters within the regional boundaries of the Central Valley region, which is Region 5.

The waste discharge regulatory program will involve the adoption of one or more waste discharge requirements, WDR's, general orders to regulate the discharge of digestate to land.

The Program EIR evaluates the environmental effects that could result from the development and operation of dairy digesters.

The map here shows -- it's a little faint up on the screen there, but it shows the outline of Region 5 which goes from the Oregon border down to the Grapevine just north of Los Angeles, and it's the largest of the regions in California.

Within that region there are approximately 1.6 million cows and 1400 dairies. Dairy cows on average produce approximately 112 pounds of manure per day, which would equate to about 180 million pounds of manure generated per day within Region 5. This substantial quantity of manure has the potential to produce biogas, which is a renewable source of energy.

This next slide shows the location of the dairies in Region 5. The yellow dots, there's about a dozen yellow dots on that page as well, and those are locations of existing dairy digesters. So there are several digesters already in operation and our team got to visit three of those dairies during the process.

The next few slides will look at the primary objectives for the project, and these are outlined in Chapter 3 of the EIR, and they're sort of -- they are the objectives of the project.

First is to protect the beneficial uses of surface and groundwater within the Central Valley region from discharges to land associated with dairy manure digester and co-digesters on or offsite dairies; to provide a regulatory framework for the water quality aspects of dairy manure digesters and co-digesters; and assist the state in meeting greenhouse gas reduction measures. That would be part of AB 32 goals.

That would be done in a couple ways. One is that these projects will produce biogas, which is a renewable fuel, and the other is that these projects would also reduce fugitive emissions, methane emissions from current dairy operations. Methane, the manure would be more contained.

Next objective, provide a renewable green energy source to help meet the California Renewables Portfolio Standard. The utilities are required to have certain percentage of their utility electricity generated from renewable green energy sources, and this project would qualify for that. So all the utilities are challenged by meeting the RPS goals set for 2010 and 2020.

Next one is to reduce the time required to develop and issue water quality permits for dairy manure digesters and co-digesters. That is one of the concerns that was identified during the TAG meetings.

And the next objective is to reduce the permitting time for other state and local agencies with discretionary permit responsibilities by providing a Program EIR that can be relied upon or tiered from by the other agencies. So this EIR will have value to other agencies as well as the water board.

Now, the next slide shows the -- it's a figure, actually -- shows the general processes and facilities that we reviewed in the EIR, and on the far left side are the preprocessing activities of the materials before they go into the digester and we've sort of put a box around the co-digestion only. If co-digestion is used, there is actually traffic that would come, bring offsite materials. So we looked at that as well. And there's the digestion phase.

And on the right-hand side to the right of the digester is the post processing activities. And we considered the potential impacts that would occur from the gas, the liquids and also the solids in the EIR.

The Draft EIR covers the three basic types of digesters that are expected to be proposed in California, which are the covered lagoon digester shown at the top of this slide, and in the middle is the plug flow digester, and then the bottom the buildings there with the white caps, those are complete mix digesters, and there are many different types of complete mix digesters that are being developed at this point.

The next slide shows electrical generation components, and the EIR considers these because the main use of biogas through our research and nationwide is the generation of electricity, and in California right now the generation of electricity is also the main use of the biogas, the digesters that have been developed and are in operation.

Types of facilities that we looked at, individual dairy digesters which we showed in that earlier slide, all three types, and then also we looked at centralized facilities which are centralized dairy digesters which could get manure from various farms and also centralized biogas cleanup facilities, and those facilities the biogas would be basically piped from farms to the centralized facility. And in these cases, the centralized facilities could be either on a dairy or offsite of dairies.

The EIR analysis. When you get the EIR -- Stephen has a hard copy of it there -- the Notice of Preparation helped us to determine the topics that would be fully analyzed in the Draft EIR. The first four chapters identify, sort of go through the process what we looked at. We have the executive summary in one, there's an introduction that gives an overview of CEQA and the CEQA requirements, project description or the program description describes in detail what I've just gone through. Some of those photos were pulled from the program description, and then there's an analysis of the approach to environmental analysis.

Chapters 5 through 15 are the key environmental resource areas. Certainly 5 is water quality and 6 is air quality. Within each of the chapters, cumulative impacts are considered. The cumulative scenario which is described in Chapter 4 looks at a cumulative build-out of 200 dairy digesters over the next ten years, approximately 20 digesters per year, and that's described in Chapter 4.

Another important chapter in the ER is the alternatives analysis, Chapter 15, and in that chapter we are required by CEQA to look at a range of reasonable alternatives. We've got a no project alternative in there that's required by CEQA which basically is what would happen if the program is not approved. So we describe that. It would be pretty much the status quo was the result of that analysis.

We looked at three other reasonable alternatives that could be considered. One is restrictions on co-digestion substrates, one is thermal conversion alternatives rather than using anaerobic digestion process, and the fourth alternative was to restrict the uses of the biogas to low NOx emissions alternatives.

The conclusion that was reached in the alternatives was that although there were some benefits of these various alternatives, none of the alternatives were found to be clearly superior to the project. This was mainly because of the positive environmental aspects of the project would in some way be reduced by the alternatives if the restrictions were added.

In the EIR, the potential impacts, we found that there are mitigation measures that would avoid or reduce all but two of the potentially significant impacts to a less than significant level. In all cases the individual project impacts could be mitigated.

The significant unavoidable impacts were the cumulative impacts from water quality on groundwater and also the cumulative impacts from air pollutants related to the build-out of the 200 digesters and the use of what we assume to be the energy generation and the NOx emissions that would come off of the cumulative scenario.

The next steps we have in the CEQA process are that the comment period will close on August 23rd, that's a Monday, 5:00 o'clock. We will receive verbal and written comments, and we will respond to those as appropriate in the Final EIR. The Central Valley water board will decide at a public hearing whether to certify the Program EIR and to approve the program.

After that , if it is certified, then individual projects could be approved under the Program EIR or tiered from the Program EIR.

Your chance for verbal comments is tonight.

Get ready. We're anxious to hear what everybody has to say this evening. And written comments will be mailed in to Stephen Klein at the address shown on this slide by August 23rd.

The EIR is available for download at the Web site of the Central Valley Water Board. We put the address up there. And I do want to note that it's in PDF format and it's all in one file. So if you're interested in a particular topic, you can search the entire PFD and look for information on that topic. I think that's a really nice approach to finding what you're looking for in the document.

And with that, I've given my introduction to the Draft EIR now and we are available to take public comments at this time.

MR. KLEIN: Does someone want to start out tonight?

MR. WELLER: Did you mention that we have a court reporter? We have a court reporter present tonight. So any comments you made will be fully recorded, you know, so they carry the same weight as your written comments.

You mentioned you visited three dairies with digesters. Could you tell us what those were, just out of curiosity. 4-1

MR. MILLER: Tollenaar, Castelanelli Brothers and Fiscalini. They all have different processing flows at each of those digesters.

John Menke from State Water Resources Control Board joined us during the presentation.

MR. MENKE: I promised not to make problems at the meeting tonight. So I'm going to not have any questions right now but probably written questions later on, and hopefully they won't be problematic for you, but I don't have any comments for the public session really.

I've read the darn thing. It hasn't been an easy read. I see some issues I'll be discussing with your guys through the Technical Advisor Group process, but I don't think there is anything I would want to bring up as a public issue because it looks to me like it's going along pretty good.

MR. ELLERBY: Is this the appropriate place for a question?

MR. MILLER: We were hoping for comments. We'll try questions.

MR. ELLERBY: I'm Justin Ellerby from California Center for Cooperative Development. We've been approached by numerous organizations wanting to start cooperative manure digesters in dairy and outside of dairy.

5-1

One question that I have is what does it take to -- well, I understand that you have to have a solid waste handler's permit if you take a single ounce of material onto a digester which would be co-digestate facility if it's from off of your facility. What is it going to take to see more of those facilities built in cooperation, in coordination with municipalities and other entities that would be contributing substrate?

MR. WELLER: Do you want to rephrase that question so we can follow it?

MR. ELLERBY: My question is there is an awful lot of interest in developing co-digestion facilities. Municipalities, schools, all kinds of people generating organic waste are interested in linking up with dairies, from what I've heard and people I've talked about, but my understanding is it's very difficult to do that right now with the regulatory regime that's in place because it requires you to get a solid waste handler's permit. Even though your principal business may be that of a dairy, you are required to now get a permit for an operation that is really only meant to help the feasibility of taking care of your own waste streams. What are some possible solutions or possible streamlining to that process?

MR. ROGERS: My name is Clay Rogers with the

Central Valley Water Board. I don't know that I can answer all your questions, but let me tell you a little bit and reiterate a little bit about what the purpose of our EIR is.

The purpose of the EIR is that we understand that there is a very large regulatory maze to be able to permit these facilities from a number of different regulatory agencies. One of the major hurdles that has to be cleared for anybody, just like our permits are discretionary permits, is to you have meet the requirements of the California Environmental Quality Act.

The purpose of this EIR is to get an environmental document out there that either those agencies can use to meet their CEQA requirements, or if they feel they need to add some supplemental analysis that they can tier off of in order to satisfy CEQA so that they can proceed with their discretionary permits.

That really is one of the big goals here. We tried to incorporate all of the agencies that we're knowledgeable of into the Technical Advisor Group so that we can address as many of those issues as possible within this document to minimize that.

It is an effort along -- we're going to be preparing at least one general order and maybe multiple general orders to streamline our permitting process. We think these projects have a lot of environmental benefits, and so that, you know, we don't have to write individual permits for every facility, we can streamline that and then bring facilities in underneath that meet the conditions of those individual ones.

So I think that's the primary purpose here is to try and -- I hesitate to use the word a little bit, but to streamline the permitting process so that we can get the benefits of that, but at the same time so that the agencies can fulfill their regulatory responsibilities, as with the water board, to be protective of surface and groundwater quality.

So I think that's the effort. You know, how that's going to be accomplished will have to be achieved by the individual agencies that are responsible for their own permitting, but we are trying to do that so that there is a more concerted effort so that we can minimize the regulatory maze to get those facilities permitted that can meet the requirements of the CEQA document and the different orders that are being proposed.

MR. WELLER: I was curious, you guys were in Fresno last night, right?

MR. MILLER: Yes.

MR. WELLER: Did you guys have anybody there from San Joaquin Valley, the Air Pollution Control District?

MR. MILLER: No.

MR. WELLER: I was kind of curious to see if they had any comments on that, especially considering they're about to change their designation for ozone and all that. Just wanted to throw that in there.

MR. MILLER: They've been very active with comments up to this point on the process.

MR. WELLER: I would assume so. I want to make sure.

MR. MILLER: I'm sure we'll get a full letter from them on the Draft EIR.

MR. WELLER: Yeah, I would assume.

MR. KLEIN: Just to make it clear, the San Joaquin Air Pollution Control District has had representation on the TAG. They've been very active with the TAG group in this process.

MR. WELLER: I think that will be pretty helpful. Also, I know you guys probably don't deal with this as much as I probably deal with it on the Air Resources Board. We are getting calls on modular digesters, everything from cement pipes and seal off, you know, that sort of situation. I don't know if you

4-2

considered those.

Essentially from my point of view a digester is a digester. Depends on where the gas goes. This might be a water issue. I'm not sure. I've gotten a few calls on those lately. I don't know if you've considered those.

4-2 (cont)

Then my main concern just out of curiosity is why you based your cumulative scenario to 200 dairy digesters. Is that just an arbitrary number?

4-3

MR. MILLER: We tried to look at the growth rate of digesters nationwide from the Ag Star database and also the European growth rate, and we also wanted to make sure we didn't underrepresent the number of digesters that might be covered by the process. We felt 200 was a pretty good number that perhaps shouldn't understate the impacts.

MR. KLEIN: We're also looking at state initiatives on the state level. We represented that in the objectives. So those were considered in terms of that 200 because there obviously is a push to have digesters in California in interest to the state.

MR. ELLERBY: In the summary of areas of controversy and unresolved issues, it mentions San Joaquin Valley Air Pollution Control District has found that the two newest facilities that they were looking at

5-2

5-2 (cont)

actually did meet their famously stringent standards. What are those two facilities?

MR. MILLER: I don't have that data right now. We got a letter that sort of indicated that.

MR. WELLER: Gallo and Fiscalini. That's what my assumption would be. Last I understood Gallo was operating under a variable permit for a while to basically demonstrate compliance. Last I talked to San Joaquin, they were compliant. And Fiscalini put in a whole new setup. Some of these guys are definitely on flexible permit at this point trying out new technologies and that sort of thing. So I'm not sure how that will fit in, but it's possible.

MR. MILLER: It's certainly one of the challenges that the TAG brought up. To get to the 200 dairy digesters, certainly we understood that there could be a need for public funding to help capitalize the facilities.

MR. WELLER: Realistically speaking, 200 is pretty optimistic without some sort of funding. We have 12 or 13 tops in the state right now, and to my knowledge, every one of those has been pretty substantially subsidized. Really, you know, it's a capital expense. Two or three four or five million dollars or more. Hopefully the streamlining the permit process will bring the price down.

MR. ROGERS: I think in that 200 number, too, that also includes some centralized facilities that would actually incorporate more than 200 dairies in that total.

MR. WELLER: Yeah, it's definitely possible. I just worry that San Joaquin is going to get heart failure over a couple hundred number. Because realistically speaking there's only maybe 10 or 15 percent of the dairies that are going to be pipeline injectable, if at all. Realistically at this point fuel cells are kind of out of the picture and microturbines are not necessarily proven yet. Talking about a lot of engines and in San Joaquin Valley and the air quality situation, not interested in firing up another motor. That's why I say, I mean, I'm glad you've been in contact with San Joaquin. That's going to help quite a bit.

MR. ELLERBY: I'm curious if this project before it's first started whether other -- what kinds of biogas technologies were assessed or if there are other assessments out there like for pyrolytic gasification, technologies that have less of an impact or potentially have less of an impact on water quality. 5-3

MR. MILLER: That is one of the alternatives we looked at in there, a thermal alternative. It didn't seem extremely well suited for the dairy manure because it starts out so wet. So the thermal systems have a lot of liquid to overcome.

And we have seen a lot of movement and progress in some of the other states on dairy digesters. So it seem like it can get some momentum. So this is just one step in that process.

MR. WELLER: Our process might be a little more complicated, though. We do have some special issues in California.

MR. MILLER: We do.

MR. WELLER: I think that's kind of the hangup here. When you guys looked at the air and water impacts -- I mean, I haven't looked at this yet, so forgive me -- you guys took into consideration all the construction and that sort of stuff; is that correct?

4-4

MR. MILLER: Yes.

MR. WELLER: In your scenarios you're looking at co-digesters, you're also looking at offsite truck traffic, that sort of stuff.

4-5

MR. MILLER: Uh-huh.

MR. WELLER: Okay. Good.

MR. ELLERBY: Speaking of other states, is there any work being done towards a dairy group and

5-4

5-4 (cont)

working with comparing notes, if you will, the work that's being done in New York state by the Dairy Sustainability Council, I believe it's called, and the work that they're doing on organizing not just digesters, but the entire system from cow to electrical outlet?

MR. MILLER: I don't think so. I don't think we followed up on that much. We did talk to New York because they had one of the provisions -- one of the alternatives we have talks about co-digestion restrictions, and New York is one of the states that has a restriction that you can do co-digestion just as long as the co-digestion material is less than a certain percentage. So they're one of the states we looked at and got that information from.

MR. ELLERBY: Is that a relatively high level that they have allowable?

MR. MILLER: I think it was 10 or 15 percent.

MR. WELLER: It's fairly low.

MR. MILLER: And that's what we saw in all the states. It seemed like that that low percentage really was so that these remain dairy digesters and not mixed solid waste digesters. If that percentage went up very high, then all the sudden they might be primarily used for something else. So I think the low percentage was meant that they would stay on farms and be dairy digesters, and that 10 percent, what we've seen in the research is that the 10 or 15 percent addition of a co-digestion substrate can dramatically increase the methane production in the system. That was an important feature. A lot of economic reports indicate that's critical to long-term sustainability of the project.

MR. VAN DAM: Bill Van Dam, Alliance of Western Milk Producers. When you were looking at that co-digestion and you used a percentage, was that a percentage on a dry matter basis? Do you know, Dan?

6-1

MR. WELLER: I don't know right off the top of my head.

MR. MILLER: I think it's a weight. I think it was weight, the ones I saw. I'm not sure about that.

MR. VAN DAM: I read something about it. Forgive me. One other question. I believe what you were required to do here is a technical analysis of the emissions and all the inputs and disposals thereof, but you did not do an economic analysis of this.

6-2

MR. MILLER: There's a separate economic activity that's going on in the TAG, but CEQA really doesn't --

MR. VAN DAM: Doesn't even see that.

MR. MILLER: Doesn't look at the economics.

MR. VAN DAM: That's what I thought. I'm trying to get a perspective what you're working on here.

MR. MILLER: So this is mainly the environmental impacts.

MR. WELLER: Going back to the co-digestion real quick. Co-digestion, food waste issues and who knows what else because who knows what goes into some of the stuff you're digesting, so probably end up with some certain things that might create unknown constituents in your biogas. I mean, that could be leading to a fouling of catalysts, things like that. I mean, have you guys considered that? 4-6

MR. MILLER: The fouling of the catalysts?

MR. WELLER: The catalysts.

MR. MILLER: That's discussed in there a little bit. There's a little bit of a discussion there. And the materials likely to come to the dairy digesters we don't think are materials that would likely have siloxates that cause all the problems at the wastewater treatment plants. Those pretty much come down from the sewer system, as I understand it, that's the toothpaste, shampoos, things like that, personal hygiene items that end with the siloxates that have been such a problem. I don't think what we've seen in the literature of dairy digesters, those aren't the type of co-digestion materials folks did.

MR. WELLER: Typically not. You don't know.

MR. MILLER: But you don't know.

4-7

MR. WELLER: Have you guys considered like animal mortalities also? I mean, is that considered in co-digestion?

MR. MILLER: We didn't add those. Those are expected to be restricted. That is a problem, but this project didn't believe that we could solve that.

MR. WELLER: I was curious whether you addressed it at all.

MR. MILLER: Anybody want to make any formal comments at this point then? Any other questions from the group?

MR. VAN DAM: This is a bit of a formal comment. I was in on the very first meetings on this thing and got my arm twisted in several places politically that this had to happen. But I am impressed that you guys pushed through this as quickly and put together a pretty impressive piece of work that will be a good foundation for going through.

I guess you can sense from the few questions and comments I made that I'm concerned about the economics of this whole thing and whether it can work or not, but we can't even test those without having this solved first. So my commendations to you. This was pulled together nicely. Nice to see something like that done as quickly as that. So kudos.

MR. KLEIN: We appreciate that.

MR. VAN DAM: Sometimes a little pat on the back is worth it, isn't it? I had one once. I liked it.

MR. WELLER: Could you potentially give us a little idea on how it might fit with the other CalRecycle protocol for a DEIR, Program EIR? 4-8

MR. MILLER: They are quite different, the two, just the whole nature of dairy manure on a dairy and the land application that they do now. It's just the CalRecycle EIR will be really completely different. I think they won't have that same setting. So they'll need to figure out how to manage the digestates. It won't be so obvious how to manage those. They just have got a different waste stream and a lot of contamination. The manure, the way the dairies operate now, is a pretty good source of materials to get the digesters started.

MR. KLEIN: Anything else before we close the meeting? Okay. Thank you for coming tonight. We'll close the meeting now. Thank you.

(Whereupon the Public Meeting was adjourned at 7:19 p.m.)

CERTIFICATE OF CERTIFIED SHORTHAND REPORTER

I, WENDY E. ARLEN, hereby certify that I am a Certified Shorthand Reporter; that I reported in shorthand writing the foregoing matter at the time and place therein stated; that the foregoing pages are a full, true and complete transcript of my said shorthand notes and is a full, true and correct record of the proceedings had in said matter at said time and place.

Dated: AUGUST 10, 2010

WENDY E. ARLEN, CSR NO. 4355, CRR, CMR

CHAPTER 5
Text Changes to the Draft Program EIR

The California Environmental Quality Act (CEQA) provides that a Final Program EIR shall include revisions to the draft Program EIR and any other information added by the lead agency. This Section includes revisions to the draft Program EIR based on responses to comment letters received during the public review period, as well as staff initiated text changes. Where responses have resulted in changes to the text of the draft Program EIR (DEIR), the changes are shown within quoted portions of the draft Program EIR text using the following conventions:

1. Text added to the wording in the draft Program EIR is shown in underline;
2. Text deleted from the wording in the draft Program EIR is shown in ~~strikeout~~; and
3. Text changes are shown in "quotation marks" and indented paragraphs.

All page number and paragraph references pertain to the published draft Program EIR. Original footnotes from the draft Program EIR are not included in the text revisions presented in this chapter unless the footnotes themselves are being revised.

The following are all of the official revisions to the draft Program EIR (DEIR):

Changes to Chapter 1. Executive Summary

Page 1-5 of the DEIR, second paragraph is revised as follows:

> "***Centralized Locations***
>
> There are two categories of centralized location facilities for dairies that will be assessed in this Program EIR: (1) Central AD Facility, whereby individual dairies would collect manure and transport the manure by pipeline or truck to a central facility; and (2) a Central Biogas Clean-Up Facility, whereby raw biogas from individual dairies (including dairies linked via underground gas pipelines) is piped to a central facility. These types of centralized facilities may be sited on or off-site of dairies. For both location options, the central facility would have the potential to receive manure, manure plus co-digestion substrate, and/or raw biogas. Biogas at centralized facilities could be used to generate electricity using internal combustion engines/turbines or fuel cells or used for boilers, transportation fuel, or for utility pipeline injection."

Page 1-5 of the DEIR, the second sentence of the third paragraph is revised as follows:

> "The feedstocks for co-digestion could include food processing ~~residues~~residuals, the organic fraction of municipal solid waste, fats, oils, grease, agricultural residues, and biomass energy crops."

Page 1-5 of the DEIR, the fourth sentence of the third paragraph is revised as follows:

> "Co-digestion substrates can increase the electrical capacity of a proposed system by ~~a magnitude~~ two to five times or greater than that of dairy manure alone (ECOregon, 2010)."

Page 1-5 of the DEIR, the last sentence of the third paragraph is revised as follows:

> "The use of co-digestion substrates is generally considered by dairy digester project developers as an important element that can be used to help achieve project viability. Where additional scientific research on co-digestion with organic feedstocks is necessary, California Department of Food and Agriculture's Specialty Crop Block Grant Program is a potential funding source."

Page 1-7 of the DEIR, an additional area of controversy has been added to the end of Section 1.4 as follows:

> "Concern has been raised by TAG members about CalRecycle involvement in review and permitting of dairy AD facilities. There is concern about the additional permitting and regulatory requirements. There is concern that CalRecycle's reliance on existing transfer station and composting regulations are inappropriate for regulating anaerobic digesters, because anaerobic digestion is a fundamentally different process than the "aerobic" process of composting. Other stakeholders indicate that adding an additional agency to the review process will work against the intent of the Program EIR to help streamline the permitting of dairy digester facilities and co-digester facilities."

Page 1-9 of the DEIR, Mitigation Measure 5.2, first bullet is revised as follows:

> "Prohibitions against any surface water discharges (unless exempt from NPDES permitting requirements or covered by separate NPDES permit),"

Page 1-9 of the DEIR, Mitigation Measure 5.2, seventh bullet is revised as follows:

> "Requirements for tailwater return systems or other effective methods to minimize offsite discharges;"

Page 1-9 of the DEIR, Mitigation Measure 5.3, first bullet is revised as follows:

> "Prepare and implement site-specific Salt Minimization Plan (SMP) as approved by the Central Valley Water Board. The SMP shall consider the elimination, decommissioning, or the reduction in use of regenerative water softeners on process water distribution

> networks or, alternatively, evaluate and install alternate technology that reduces or eliminates on-site brine disposal;”

Page 1-9 of the DEIR, Mitigation Measure 5.3, second bullet is revised as follows:

> “Prepare and implement a site-specific NMP that incorporates analytical data for soils, wastewater, manure, digester solids, groundwater and/or surface water supply. The required analytical data is to be generated by a site-specific monitoring and reporting program. In the case of groundwater, data from an approved representative groundwater monitoring program may be substituted for some or all site-specific groundwater monitoring, if appropriate. The NMP will be reconciled annually based on results of the monitoring and reporting program and site-specific measurements of agronomic rates; ~~includes a soils and groundwater monitoring and reporting program that include a variety of waste constituents, as well as yearly reconciliation based on sampling results that measure agronomic rates;~~”

Page 1-9 of the DEIR, Mitigation Measure 5.3, fourth bullet is revised as follows:

> “~~Prohibit, decommission, or reduce use of regenerative water softeners on process water distribution networks or, alternatively, evaluate and install alternate technology that reduces or eliminates on-site brine disposal;~~”

Page 1-10 of the DEIR, Mitigation Measure 5.3, 13th bullet is revised as follows:

> “Perform vector control and ~~Develop and implement a vector attraction~~ reduction ~~plan~~;”

Page 1-10 of the DEIR, Mitigation Measure 5.3, 14th bullet is revised as follows:

> “Monitor ~~digestate, and~~ groundwater for pathogen indicator organisms;”

Page 1-10 of the DEIR, Mitigation Measure 5.3, 15th bullet is revised as follows:

> “Require that solid wastes be stored on ~~impermeable~~ surfaces designed in accordance with a site-specific Waste Management Plan prepared for the facility by an appropriate California registered professional in accordance with WDR requirements;”

Page 1-10 of the DEIR, Mitigation Measure 5.3, 16th bullet is revised as follows:

> “Maintain a neutral or alkaline pH for dairy digestate waste water applied to cropland unless conditions warrant otherwise as detailed in the NMP;”

Page 1-10 of the DEIR, Mitigation Measure 5.3, 17th bullet is revised as follows:

> “Prohibit hazardous waste, mammalian tissues (with the exception of mammalian tissue as contained in compostable material from the food service industry, grocery stores, or

> residential food scrap collection), dead animals, and human waste from all discharges; and”

Page 1-10 of the DEIR, Mitigation Measure 5.3, the first sentence of the last paragraph is revised as follows:

> “Each facility shall prepare a site-specific ~~BPTC~~Waste Management Plan ~~plan~~ in accordance with the WDR requirements for review and approval to the Central Valley Water Board prior to commencement of operations.”

Page 1-10 of the DEIR, Mitigation Measure 5.4 is revised as follows:

> “**Measure 5.4:** WDRs for digester and co-digester facilities shall include design requirements for individual or centralized anaerobic digester or co-digester facilities~~, application croplands,~~ and associated facilities to protect them from FEMA 100-year flood events. Design measures may include, but are not limited to: facility sitting, access placement, grading foundation soils above projected water elevation, and site protection.”

Page 1-11 of the DEIR, Mitigation Measure 6.1b, the fifth bullet is revised as follows:

> “Maintain all equipment in proper working condition according to manufacturer’s specifications. ~~The equipment must be checked by a certified mechanic and determine to be running in proper condition before it is operated.~~”

Page 1-12 of the DEIR, Mitigation Measure 6.3b is revised as follows:

> “**Measure 6.3b:** AD facilities that handle compostable material and are classified as a compost facility must develop an Odor Impact Minimization Plan (OIMP) pursuant to 14 CCR 17863.4. Otherwise, a~~A~~pplicants shall implement ~~an~~ site-specific Odor Management Plan (OMP) as part of each application submitted to establish digester and co-digester facilities under the waste discharge regulatory program. The OMP will specifically address odor control associated with digester operations and will include:
>
> - A list of potential odor sources.
> - Identification and description of the most likely sources of odor.
> - Identification of potential, intensity, and frequency of odor from likely sources.
> - A list of odor control technologies and management practices that could be implemented to minimize odor releases. These management practices shall include the establishment of the following criteria as appropriate:
>   - Establish time limit for on-site retention of undigested odiferous co-substrates (i.e., organic co-substrates must be put into the digester within 48 hours of receipt).

- Provide negative pressure buildings for indoor unloading of odiferous co-digestion substrates. Treat collected foul air in a biofilter or air scrubbing system.
- Establish contingency plans for operating downtime (e.g., equipment malfunction, power outage).
- Manage delivery schedule to facilitate prompt handling of odorous co-substrates.
- Modification options for land application practices if land application of digestate results in unacceptable odor levels.
- Protocol for monitoring and recording odor events.
- Protocol for reporting and responding to odor events."

Page 1-12 of the DEIR, Mitigation Measure 6.4c is revised as follows:

> "**Measure 6.4c:** H_2S contained in the biogas shall be ~~scrubbed~~ controlled before emission to air can occur."

Page 1-13 of the DEIR, Mitigation Measure 7.4 is revised as follows:

> "**Measure 7.4:** Whenever feasible, project related facilities off-site ~~project related facilities~~of a dairy should not be sited on Important Farmland as defined by the California Department of Conservation's Farmland Mapping and Monitoring Program."

Page 1-14 of the DEIR, Mitigation Measure 8.5a is revised as follows:

> "**Measure 8.5a:** Prior to construction, for installation of pipelines in existing roadways, the project sponsor will coordinate with the appropriate local government departments, Caltrans, and utility districts and agencies regarding the timing of construction projects that would occur near project sites. Specific measures to mitigate potential significant impacts will be determined as part of the interagency coordination, and could include measures such as employing flaggers during key construction periods, designating alternate haul routes, and providing more outreach and community noticing."

Page 1-15 of the DEIR, Mitigation Measure 9.1a is revised as follows:

> "**Measure 9.1a:** The project applicant or agency(s) responsible shall document that ~~submit , as part of the NOI,~~ a site assessment report for dairy digester and co-digester facilities to be constructed (including the location of digestate application) has been submitter to CDFG for its review. ~~in areas that contain undisturbed land and/or any agricultural fields that have been fallow for more than 1 year~~. This report shall be prepared by a qualified biologist. It shall evaluate the project site's potential to support special-status plant and wildlife species (including critical habitat) and whether special-status species could be affected by dairy digester and co-digester development, including construction and operations. If

> there are no special-status species or critical habitat present, no additional mitigation would be required.”

Page 1-15 of the DEIR, Mitigation Measure 9.2a is revised as follows:

> **“Measure 9.2a:** The project applicant or agency(s) responsible shall submit~~, with the NOI,~~ a site assessment report prepared by a qualified biologist that determines if the project is likely to affect biologically unique or sensitive natural communities. This information could be included in the report prepared under Mitigation Measure 9.1a. If there are no biologically unique or sensitive natural communities present, no further mitigation is required. “

Page 1-15 of the DEIR, Mitigation Measure 9.3a is revised as follows:

> **“Measure 9.3a:** The project applicant or agency(s) responsible shall submit~~, with the NOI,~~ a site assessment report prepared by a qualified biologist that evaluates if the project is likely to affect waters of the State and/or U.S., including wetlands. This information could be included in the report prepared under Mitigation Measure 9.1a. If there are no waters present, no further mitigation would be required.”

Page 1-16 of the DEIR, Mitigation Measure 10.1 is revised as follows:

> “**Mitigation Measure 10.1:** Prior to final project design and any earth disturbing activities, the applicant or agency(s) responsible shall conduct a standard “Phase I Type” electronic record search. If no incidents are identified within a quarter mile of the construction area, standard construction practices can be implemented. If the record search identifies soil or water quality contamination open cases within a quarter mile of the construction area, a ~~Site Assessment. The~~ Phase I Environmental Site Assessment (ESA) shall be prepared by a Registered Environmental Assessor (REA) or other qualified professional to assess the potential for contaminated soil or groundwater conditions at the project site; specifically in the area proposed for construction of dairy digester or co-digester facilities…”

Starting on page 1-18 of the DEIR, Mitigation Measures 12.1a and 12.1b have been modified to make them more straight forward and completely replace those included in the DEIR, as follows:

> **“Measure 12.1a:** In order to determine whether a project may cause a significant impact to cultural resources, and therefore, have an adverse effect on the environment, the Central Valley Water Board shall require each application submitted for a discharge permit for a digester or co-digester facility to identify the project’s potential impacts to cultural resources.
>
> Prior to ground-disturbing activities, the project applicant shall retain a qualified archaeologist to (1) conduct a record search at the appropriate information center of the California Historical Resources Information System (CHRIS) to determine whether the project area has been previously surveyed and whether cultural resources were identified; and (2) request a sacred lands search from the NAHC. The results of the record search and sacred lands

search shall be included in the Cultural Resources Inventory Report provided to the Central Valley Water Board.

In the event the CHRIS records search indicates that no previous survey has been conducted, the qualified archaeologist shall recommend whether a survey is warranted to satisfy the requirements of CEQA based on the sensitivity of the project area for cultural resources. If, for example, the existing dairy or agricultural land proposed for establishment of a digester or co-digester facility was constructed entirely on fill, as shown by original and final contour drawings, a surface survey for archaeological resources would not be warranted. Similarly, a surface survey may not be warranted if the project area has been extensively disturbed by dairy or agricultural use.

For projects that constitute federal undertakings, as described in the Federal Agencies section of the Introduction (Chapter 2), the cultural resources study shall be prepared in accordance with Section 106 of the NHPA. The cultural resources study and inclusive mitigation measures shall form the basis for the cultural resources component of the project-level environmental documentation prepared for the project under Section 106.

If the survey, CHRIS record search, or NAHC search indicate cultural resources are located within a project area, the Cultural Resources Inventory Report shall include an assessment of the significance of the resources according to applicable federal, state, and local significance criteria. If the cultural resources are determined significant historical resources, the Lead Agency (usually the Central Valley Water Board) must review and approve the applicant’s proposed treatment measures to ameliorate any “substantial adverse change” in the significance of each historical resource, in consultation with a qualified archaeologist or architectural historian, and other concerned parties. Treatment measures may include preservation through avoidance or project redesign, incorporation within open space or conservation easements, data recovery excavation of archaeological resources, formal documentation of built environment resources, public interpretation of the resource, or other appropriate treatment, and may be described in a project-level Cultural Resources Mitigation Plan included in the Cultural Resources Inventory Report to be approved by the Lead Agency.

Should the project area contain standing, built environment resources now 50 years of age, a qualified architectural historian shall be retained to evaluate the integrity and significance of the resource(s) unless the building(s) or structure(s) were covered in the existing survey report and determined not significant according to applicable federal, state, and local criteria. The results of that evaluation shall be included in the Cultural Resources Inventory Report.

If cultural resources identified within a project area are neither a historical resource nor unique archaeological resource, there would be no significant effect to the environment and no further treatment of those known resources would be required.

Measure 12.1b: Inadvertent discovery measures for cultural resources shall be implemented during all construction activities within the project area. Measures shall include procedures for discovery and protection of cultural resources, including human remains, during construction or earth-disturbing activities.

Within project areas of identified archaeological sensitivity, discovery measures would include: (1) a worker education course for all construction personnel; (2) monitoring of all earth-disturbing activities by a qualified archeologist; and (3) procedures for discovery of cultural resources, including human remains, during construction or ground-disturbing activities if an archaeological monitor is not present. Monitoring by a Native American with knowledge in cultural resources may also be required, as appropriate. Monitoring within recent fill deposits or non-native soil would not be required.

All construction or ground-disturbing activities shall be halted within 100 feet of a cultural resources discovery, including human remains, whether or not a monitor is present, until a qualified professional archaeologist can evaluate the find. If the find is determined to be a significant historical resource and cannot be avoided, then impacts on that resource will require mitigation. During evaluation or mitigative treatment, ground disturbance and construction work could continue on other parts of the project area.

If known or suspected human remains are discovered, in addition to halting all construction or ground-disturbing activities within 100 feet, the following steps must be taken before construction activities may be resumed within the stop-work area:

- The County Coroner has been immediately notified and has determined that no investigation of the cause of death is required; and
- If the remains are of Native American origin, the following steps have been taken:
    - The applicant has 24 hours to notify the NAHC, who should, in turn, notify the person identified as the proper descendant of any human remains. Under existing law, the descendant then has 24 hours to make recommendations regarding the disposition of the remains following notification from the NAHC of the discovery.
    - If the NAHC is unable to identify a descendant or if the descendant does not make recommendations within 24 hours, the applicant shall, with appropriate dignity, reinter the remains in an area of the property secure from further disturbance.
    - Should the applicant not accept the descendant's recommendations, the applicant or the descendant may, under existing law, request mediation by the NAHC."

Changes to Chapter 2. Introduction

Page 2-2 of the DEIR, third paragraph is revised as follows:

> "…The order affects projects such as the one proposed in this Program EIR and the anticipated Program EIR being prepared by the Department of Resources Recycling and

> Recovery (CalRecycle) for anaerobic digester facilities that would use food waste, green material, and mixed solid waste as feedstocks; thus diverting these materials from landfills. CalRecycle will be analyzing the development and operation of AD facilities that would be sited at solid waste facilities and in industrial areas. The CalRecycle Program EIR will not cover AD facilities sited at dairies and other agricultural areas."

Page 2-4 of the DEIR, the sixth bullet is revised as follows:

> "General Order Dairies with manure only digesters using only manure generated by onsite animals will remain under the Dairy General Order but may, if required, submit a ~~Notice of Intent~~ Report of Waste Discharge seeking coverage under a dairy digester G~~eneral~~ O~~rder~~ or Individual WDRs."

Changes to Chapter 3. Program Description

Page 3-2 of the DEIR, the first sentence of the first paragraph is revised as follows:

> "Liquid and solid digestate application to land is considered to be a "discharge of waste" ~~to waters of the state~~, as defined in the Porter-Cologne Water Quality Act."

Page 3-3 of the DEIR, the second sentence of the fourth paragraph is revised as follows:

> "Based on calculations developed by Krich, it is ~~It has been~~ estimated that the ~~estimates dairies~~ 1.6 million cows in Region 5 could potentially generate approximately ~~14~~ 13 billion cubic feet of methane per year through manure only anaerobic digestion, which would correspond to ~~140~~ 130 megawatts of ~~annual~~ electrical capacity (Krich, et al., 2005)[2]."

Page 3-6 of the DEIR, the second, third, and fourth paragraphs have been revised as follows:

> "Dairies in Region 5 employ manure handling practices as a matter of manure management and general animal husbandry. Manure handling practices include: vacuuming, dry scrape, flush, or some combination of the ~~two~~ three. Each of these manure collection methods may be employed to some degree on specific areas of most dairies, and in some cases may be substituted for each other as conditions warrant. ~~Dry scrape operations occur at dairies where stock are housed in open corrals and manure is scraped from the corrals several times during the year. Stormwater runoff and process wastewater generated within the milk barn at these facilities are piped directly to the wastewater retention system.~~
>
> Dairy cows are generally housed in two different types of housing. In freestall housing the cows lay in areas that are partitioned to orient them in a specific direction to ease in manure collection and provide a clean, dry place to lie. There are paved lanes where the cows stand to eat and lanes used to access the freestall resting areas. At freestall dairies, most of the animal manure is deposited on the concrete lanes. Freestall facilities often have exercise pens where the cows can go during good weather. Cows are also housed in open lot corrals with or without shades. Open lot corrals also have a paved feed lane

> where the cows stand to eat. At open lot dairies, most of the animal manure is deposited in the corrals.
>
> Manure from the paved lanes at both freestall facilities and open lot facilities can be collected by scrape, vacuum or flush systems or a combination of the three. Manure from the open lot corrals and exercise pens is scraped several times during the year and handled as a dry material. When flushing is used, the lanes are flushed daily with process wastewater from the milk barn and recycled wastewater from the wastewater retention system. Stormwater may be routed through the flush system or piped directly to the wastewater retention system depending on the dairy.
>
> ~~Flush operations occur at dairies that house their stock in flushed free stalls and allow only intermittent access to open loafing pens. At flush dairies, most of the animal waste is deposited on concrete flush lanes, which are flushed with process wastewater from the milk barn and recycled wastewater from the wastewater retention system. Stormwater is routed through the flush system into the wastewater retention system. Flush manure management practices tend to occur at newer larger dairies.~~
>
> ~~Dairies that employ both dry scrap and flush are dairies that house their herds in open corrals with flushed concrete lanes designed to capture manure deposited while the cows are eating. At these facilities, the corrals are scraped several times a year while the lanes are flushed daily with process wastewater from the milk barn and recycled wastewater from the wastewater retention system. Stormwater is routed through the flush system or piped directly to the wastewater retention system.~~”

Page 3-10 of the DEIR, the environmental and economic benefits have been revised as follows:

> “AD facilities at dairies provide a number of potentially environmental and economic benefits (Burke, 2001), which are summarized below. Environmental benefits are currently understood to include, but are not limited to:
>
> - Reduction in the mass of solid wastes;
> - Generation of ~~clean~~ liquid effluent that can be blended with irrigation water for irrigation and fertilization of crops, or recycled water use;
> - Concentration of nutrients in condensed solid for export or storage when AD process includes solids separation;
> - Reduction of pathogens in the solid and liquid waste;
> - Reduction in GHG emissions;
> - Generation of renewable energy from the biogas;
> - Diversion of organic materials (for co-digestion systems) from sewer systems and landfills to generate biogas, soil amendments and compost;
> - Reduction or elimination of odors associated with waste products; and

- Reduction in flies.

The economic benefits of AD facilities at dairies include, but are not limited to:

- Diversion of organic materials from sewer systems and landfills;
- Time needed to move, handle, and process manure is reduced;
- Biogas can be used for energy recovery;
- Waste heat can be used to meet the heating and cooling requirements of the dairy;
- Concentration of nutrients through solids separation generates a high nutrients soil amendment, which can be sold to the public, nurseries, or other agricultural facilities;
- Reduction in the mass of solid waste also reduces the amount of export needed;
- Income can be obtained from the processing of imported food or agricultural wastes for co-digestion (tipping fees), the sale of organic fertilizer, potential GHG credits, and the sale of energy generated by biogas processing;
- Energy tax credits may be available for power produced;
- Greenhouse gas tax credits may be available for each ton of carbon reduction; and
- Other federal and State incentives available now or in the future related to generation of renewable energy and reduction of GHG emissions.”

Page 3-10 of the DEIR, the footnote is revised as follows:

> “As described in Section 4.3 ‘General Order Dairies with manure only digesters using only manure generated by onsite animals will remain under the Dairy General Order but may, if required, submit a Report of Waste Discharge~~Notice of Intent~~ seeking coverage under a dairy digester GO or Individual WDRs.’”

Page 3-11 of the DEIR, second paragraph is revised as follows:

“*Centralized Locations*

> There are two categories of centralized location facilities for dairies that will be assessed in this Program EIR: (1) Central AD Facility, whereby individual dairies would collect manure and transport the manure by pipeline or truck to a central facility; and (2) a Central Biogas Clean-Up Facility, whereby raw biogas from individual dairies (including dairies linked via underground gas pipelines) is piped to a central facility. These types of centralized facilities may be sited on or off-site of dairies. For both location options, the central facility would have the potential to receive manure, manure plus co-digestion substrate, and/or raw biogas. Biogas at centralized facilities could be used to generate electricity using internal combustion engines/turbines or fuel cells or used for boilers, transportation fuel, or for utility pipeline injection.”

Page 3-11 of the DEIR, Section 3.4.2 is revised as follows:

> “In addition to the total number of cows at a dairy, specific ~~dairy operations affect the amount and quality of manure that are processed~~ operational variables at a dairy affect the amount

> and quality of manure that are processed at a dairy digester. Operational variables include, but are not limited to, animal housing, manure transport, manure pre-processing, animal bedding, and stormwater management (Burke, 2001). In regards to animal housing, free stall barns provide greater manure collection and quality compared to corral or open lot facilities. Manure handling practices which affect the dilution of waste include: vacuuming, dry scrape, flush, or some combination of the three. ~~A flush system for manure transport, which affects the dilution of waste, would require larger AD facilities than if the manure were collected using a scrape or vacuum system.~~ For manure pre-processing, the removal of organic solids through screening and sedimentation would reduce the amount of biomass available to undergo biogas conversion through AD…”

Page 3-11 of the DEIR, the fourth sentence of the last paragraph is revised as follows:

> “Co-digestion substrates can increase the electrical capacity of a proposed system by ~~a magnitude~~ two to five times or greater than that of dairy manure alone (ECOregon, 2010).”

Page 3-11 of the DEIR, the last sentence of the last paragraph is revised as follows:

> “Co-digestion is considered to be ~~essential~~ an important element for dairy digester project financial viability (ECOregon, 2010).”

Page 3-12 of the DEIR, the second sentence of the fourth paragraph is revised as follows:

> “…The lagoons are covered by an ~~floating,~~ impermeable cover that captures the biogas generated by AD…”

Page 3-16 of the DEIR, the schematic for Alternative 1: Raw Combustion in Internal Combustion (IC) Engine or Flare is revised as follows:

Page 3-16 of the DEIR, last paragraph is revised as follows:

> “…The separated solids and liquids would then be applied pursuant to the applicable nutrient management plan. As an example, the solids could be used for land application, compost, fertilizer, or potentially landfill alternative daily cover and the liquid portion of the effluent could be recycled for flush water, used for land application, or at a centralized facility it could potentially be sent to a sanitary sewer. If a landfill operator proposes to use the

> solid digestate as Alternative Daily Cover (ADC), a site-specific demonstration project would be required in compliance with Title 27 Section 20690(b).”

Page 3-17 of the DEIR, Section 3.5.3 is revised as follows:

> “Development of AD facilities ~~will~~may require the construction of various supporting infrastructure including, but not limited to, lined waste storage ponds and/or upgrades to existing dairy ponds, pipelines for transporting effluent to ~~disposal fields~~cropland, bypass valves, and ~~processes for~~ stormwater management facilities.”

Page 3-18 of the DEIR, Table 3-2, first row under the “State Permits/Approvals” heading is revised as depicted in the following excerpt:

TABLE 3-2
PERMITS AND APPROVALS POTENTIALLY NEEDED FOR PROGRAM IMPLEMENTATION OF MANURE DIGESTER AND CO-DIGESTION FACILITIES

Permit	Permitting Authority	Potentially Affected Resources
State Permits/Approvals		
Composting Permit or, Transfer Processing Permit	Local Enforcement Agency; with concurrence required by the California Department of Resources Recycling and Recovery (CalRecycle)	Incoming co-digestion substrates

Changes to Chapter 4. Approach to Environmental Analysis

Page 4-2 of the DEIR, the sixth bullet is revised as follows:

- “General Order Dairies with manure only digesters using only manure generated by onsite animals will remain under the Dairy General Order but may, if required, submit a ~~Notice of Intent~~ Report of Waste Discharge seeking coverage under a dairy digester G~~eneral Order~~ or Individual WDRs.”

Page 4-7 of the DEIR, the bullet list is revised as follows:

- “Competitive electricity and renewable natural gas/biomethane prices;
- Increased demand for new energy sources;
- Increased demand for local renewable energy sources;
- Increased incentives for co-digester facilities;
- Improvements in dairy digester technologies; and
- Public financial support or the development of profitable business models; or

- Governmental measures (e.g., regulatory or otherwise) that incentivize the development of dairy digesters. ~~Regulations that require the development of energy-producing dairy digester facilities for specified dairies.~~”

Page 4-7 of the DEIR, the next to last sentence is revised as follows, including deletion of the footnote:

> “~~Potentially,~~ Based on calculations developed by Krich, it is estimated that the 1.6 million cows ~~dairies~~ in Region 5 could potentially generate approximately ~~14.6~~ 13 billion cubic feet of methane per year through manure only anaerobic digestion, which would correspond to ~~140~~ 130 megawatts[3] of ~~annual~~ electrical capacity (Krich, et al., 2005).”
>
> “~~[3] This was based on an estimate of 1.7 million cows.~~”

Page 4-8 of the DEIR, Table 4-1 is revised as follows:

TABLE 4-1
EXISTING DAIRY DIGESTERS IN CALIFORNIA

Facility	Digester Type	Biogas End Use(s)	Operational Status
Blakes Landing Dairy	Covered Lagoon	Electricity	Operational
Bob Giacomini Dairy	Covered Lagoon	Cogeneration	Operational
Bullfrog Dairy	Covered Lagoon	Electricity	Operational
~~Cal Poly Dairy~~	~~Covered Lagoon~~	~~Electricity~~	~~Not Operating~~ Digester removed
CAL-Denier Dairy	Covered Lagoon	Electricity	Operational
Castelanelli Bros. Dairy	Covered Lagoon	Electricity	Operational
CottonWood Dairy	Covered Lagoon	Cogeneration; Boiler/Furnace Fuel	Operational
Edenvale Dairy	Horizontal Plug Flow	Electricity	Not Operating
Fiscalini Farms	Complete Mix	Cogeneration	Operational
Hilarides Dairy	Covered Lagoon	Electricity; Vehicle Fuel	Operational
Inland Empire Utilities Agency - Reg Plant 5	Horizontal Plug Flow; Complete Mix	Electricity	Not Operating
Koetser Dairy	Horizontal Plug Flow	Electricity	Not Operating
Langerwerf Dairy	Horizontal Plug Flow	Cogeneration	Operational
Lourenco Dairy	Covered Lagoon	~~Flared Full Time~~ Electricity	Not Operating
Meadowbrook Dairy	Horizontal Plug Flow	Electricity	Operational
St. Anthony Dairy	Covered Lagoon	Cogeneration	Not Operating
~~Strauss Family Dairy~~	~~Covered Lagoon~~	~~Cogeneration~~	~~Operational~~ Same as Blakes Landing
Tollenaar Holsteins Dairy	Complete Mix	Cogeneration; Boiler/Furnace Fuel	Operational
Van Ommering Dairy	Horizontal Plug Flow	Electricity	~~Operational~~ Not Operating
~~Van Warmerdam Dairy~~	~~Unknown~~	~~Electricity~~	~~Operational~~ Never Built
Vintage Dairy	Covered Lagoon	Pipeline Gas	Not Operating

SOURCE: Western United Dairymen, 2010

Changes to Chapter 5. Hydrology and Water Quality

Page 5-11 of the DEIR, the second sentence of the third paragraph is revised as follows:

> "The region is bound on the north by the Delta, the east by the Sierra Nevada, the west by the Diablo Range and the south by the ~~Tehachapi Mountains~~San Joaquin River."

Page 5-18 of the DEIR, the second sentence of the second paragraph is revised as follows:

> "Toxicity ~~increases~~ decreases as pH decreases and as temperature decreases."

Page 5-27 of the DEIR, the first sentence of the bottom paragraph is revised as follows:

> "The Central Valley Water Board is responsible for establishing and implementing the Basin Plans for the Sacramento, and San Joaquin Rivers, and the Tulare Lake Basin."

Page 5-28 of the DEIR, the third sentence of the fourth paragraph is revised as follows:

> "In particular, the purpose of this policy is to protect~~s~~ water bodies where existing quality is higher than necessary for the protection of beneficial uses."

Page 5-29 of the DEIR, the second sentence of the second paragraph is revised as follows:

> "The Plan will serve as the basis for amendments to the three Basin Plans that cover the Central Valley Region (Sacramento River and San Joaquin River Basin Plan, the Tulare Lake Basin Plan and the ~~Sacramento/San Joaquin Rivers Bay-Delta Plan~~San Francisco Bay Basin Water Quality Control Plan)."

Page 5-35 of the DEIR, Mitigation Measure 5.2, first bullet is revised as follows:

> "Prohibitions against any surface water discharges (unless exempt from NPDES permitting requirements or covered by separate NPDES permit),"

Page 5-35 of the DEIR, Mitigation Measure 5.2, seventh bullet is revised as follows:

> "Requirements for tailwater return systems or other effective methods to minimize offsite discharges;"

Page 5-36 of the DEIR, the second paragraph is revised as follows:

> "Based on a study conducted by J.L. Meyer in 1973, ~~"reasonable"~~ salt loading rates ~~under normal situations~~ of no more than 2,000 pounds per acre for single-cropped land and 3,000 pounds per acre for double-cropped land may help ~~were determined to help~~ prevent the vertical migration of salts within the soil profile (Meyer, 1973 as cited in RWQCB, 2008). ~~Unless environmental conditions show differently, "reasonable" is~~

> ~~accepted to be a maximum annual non-nitrate salt loading rate of 2,000 pounds per acre for single-cropped land and 3,000 pounds per acre for double-cropped land.~~"

Page 5-36 of the DEIR, the beginning of the last paragraph is revised as follows:

> "The amount of salt that is contained in digester effluent depends on the substrate that is input into the digester. The digestion process neither adds nor reduces the total salt content of the substrate that it processes, but simply passes salt from the substrate through to the digester effluent. For every unit of salt that is fed into a digester from dairy wastes or other substrates, that same unit of salt is released from the digester in its solid and liquid effluent which may be managed separately……"

Page 5-37 of the DEIR, numbers 3 and 4 at the top of the page, are revised as follows:

3. Centralized digesters that serve~~ing~~ one or more dairies and are located on or off-site of~~from~~ a dairy, which~~ that are~~ accept~~ing~~ manure substrate only (*manure only*); and
4. Centralized digesters that serve~~ing~~ one or more dairies~~,~~ and are located on or off-site of a dairy, which accept~~ing~~ additional non-dairy waste co-digestion substrates (*manure plus other substrates*).

Page 5-37 of the DEIR, the third paragraph is revised as follows:

> "**Centralized digesters serving one or more dairies (*manure only*).** Centralized dairy digester facilities ~~located offsite~~ that treat only dairy waste from two or more dairies, would also result in the release of salts in digester effluent."

Page 5-37 of the DEIR, the fourth paragraph is revised as follows:

> "**Centralized digesters serving one or more dairies (*manure plus other substrates*).** Centralized ~~For off site~~ digesters that also accept an additional or supplemental co-digestion substrate, all of the salt contained in that additional co-digestion substrate would be processed through the digester, and would be released as digester effluent."

Page 5-39 of the DEIR, the first sentence of the last paragraph is revised as follows:

> "**Pathogens**
>
> Pathogens including bacteria, viruses, and parasites most commonly associated with ~~diary~~dairy manure include cryptosporidium, E. Coli 0157, and salmonella."

Page 5-41 of the DEIR, the third bullet is revised as follows:

> "In ground ~~digester tanks~~vessel (e.g., lagoon, pond, tank, etc.),"

Page 5-42 of the DEIR, Mitigation Measure 5.3, first bullet is revised as follows:

> “Prepare and implement site-specific Salt Minimization Plan (SMP) as approved by the Central Valley Water Board. The SMP shall consider the elimination, decommissioning, or the reduction in use of regenerative water softeners on process water distribution networks or, alternatively, evaluate and install alternate technology that reduces or eliminates on-site brine disposal;”

Page 5-42 of the DEIR, Mitigation Measure 5.3, second bullet is revised as follows:

> “Prepare and implement a site-specific NMP that incorporates analytical data for soils, wastewater, manure, digester solids, groundwater and/or surface water supply. The required analytical data is to be generated by a site-specific monitoring and reporting program. In the case of groundwater, data from an approved representative groundwater monitoring program may be substituted for some or all site-specific groundwater monitoring, if appropriate. The NMP will be reconciled annually based on results of the monitoring and reporting program and site-specific measurements of agronomic rates; ~~includes a soils and groundwater monitoring and reporting program that include a variety of waste constituents, as well as yearly reconciliation based on sampling results that measure agronomic rates;~~”

Page 5-42 of the DEIR, Mitigation Measure 5.3, fourth bullet is revised as follows:

> “~~Prohibit, decommission, or reduce use of regenerative water softeners on process water distribution networks or, alternatively, evaluate and install alternate technology that reduces or eliminates on-site brine disposal;~~”

Page 5-42 of the DEIR, Mitigation Measure 5.3, 13th bullet is revised as follows:

> “Perform vector control and ~~Develop and implement a vector attraction~~ reduction ~~plan~~;”

Page 5-42 of the DEIR, Mitigation Measure 5.3, 14th bullet is revised as follows:

> “Monitor ~~digestate, and~~ groundwater for pathogen indicator organisms;”

Page 5-42 of the DEIR, Mitigation Measure 5.3, 15th bullet is revised as follows:

> “Require that solid wastes be stored on ~~impermeable~~ surfaces designed in accordance with a site-specific Waste Management Plan prepared for the facility by an appropriate California registered professional in accordance with WDR requirements;”

Page 5-42 of the DEIR, Mitigation Measure 5.3, 16th bullet is revised as follows:

> “Maintain a neutral or alkaline pH for dairy digestate waste water applied to cropland unless conditions warrant otherwise as detailed in the NMP;”

Page 5-42 of the DEIR, Mitigation Measure 5.3, 17th bullet is revised as follows:

> "Prohibit hazardous waste, mammalian tissues (with the exception of mammalian tissue as contained in compostable material from the food service industry, grocery stores, or residential food scrap collection), dead animals, and human waste from all discharges; and"

Page 5-43 of the DEIR, Mitigation Measure 5.3, the first sentence of the paragraph preceding the Impact Significance After Mitigation heading, is revised as follows:

> "Each facility shall prepare a site-specific ~~BPTC~~Waste Management Plan ~~plan~~ in accordance with the WDR requirements for review and approval to the Central Valley Water Board prior to commencement of operations."

Page 5-44 of the DEIR, Mitigation Measure 5.4 is revised as follows:

> "**Measure 5.4:** WDRs for digester and co-digester facilities shall include design requirements for individual or centralized anaerobic digester or co-digester facilities~~, application croplands,~~ and associated facilities to protect them from FEMA 100-year flood events. Design measures may include, but are not limited to: facility sitting, access placement, grading foundation soils above projected water elevation, and site protection."

Page 5-45 of the DEIR, the sixth sentence of the first paragraph under Impact 5.6 is revised as follows:

> "However, the operation of digesters and co-digesters, as required by Mitigation Measure 5.2, would be prohibited from discharging into surface waters unless exempt from NPDES permitting requirements or covered by a separate NPDES permit with effluent limitations to protect surface water quality."

Changes to Chapter 6. Air Quality and Greenhouse Gas Emissions

Page 6-5 of the DEIR, the fourth sentence of the first paragraph is revised as follows:

> "The term "natural greenhouse effect" refers to how greenhouse gases trap heat with the ~~system~~ surface-troposphere system; the term "enhanced greenhouse effect" refers to an increased concentration of greenhouse gases, which results in an increase in temperature of the surface-troposphere system."

Page 6-7 of the DEIR, the third sentence of the first paragraph is revised as follows:

> "Anthropogenic sources of nitrous oxide include fertilizer application, production of nitrogen fixing crops~~, nitric acid production~~, animal manure management, sewage treatment, combustion of fossil fuels, and nitric acid production (CAT, 2006; CAPCOA, 2009)."

Page 6-24 of the DEIR, Mitigation Measure 6.1b, the fifth bullet is revised as follows:

> “Maintain all equipment in proper working condition according to manufacturer’s specifications. ~~The equipment must be checked by a certified mechanic and determine to be running in proper condition before it is operated.~~”

Page 6-27 of the DEIR, Mitigation Measure 6.3b is revised as follows:

> “**Measure 6.3b:** AD facilities that handle compostable material and are classified as a compost facility must develop an Odor Impact Minimization Plan (OIMP) pursuant to 14 CCR 17863.4. Otherwise, a~~A~~pplicants shall implement a~~n~~ site-specific Odor Management Plan (OMP) as part of each application submitted to establish digester and co-digester facilities under the waste discharge regulatory program. The OMP will specifically address odor control associated with digester operations and will include:
>
> - A list of potential odor sources.
> - Identification and description of the most likely sources of odor.
> - Identification of potential, intensity, and frequency of odor from likely sources.
> - A list of odor control technologies and management practices that could be implemented to minimize odor releases. These management practices shall include the establishment of the following criteria as appropriate:
>   - Establish time limit for on-site retention of undigested odiferous co-substrates (i.e., organic co-substrates must be put into the digester within 48 hours of receipt).
>   - Provide negative pressure buildings for indoor unloading of odiferous co-digestion substrates. Treat collected foul air in a biofilter or air scrubbing system.
>   - Establish contingency plans for operating downtime (e.g., equipment malfunction, power outage).
>   - Manage delivery schedule to facilitate prompt handling of odorous co-substrates.
>   - Modification options for land application practices if land application of digestate results in unacceptable odor levels.
>   - Protocol for monitoring and recording odor events.
>   - Protocol for reporting and responding to odor events.”

Page 6-29 of the DEIR, Mitigation Measure 6.4c is revised as follows:

> “**Measure 6.4c:** H_2S contained in the biogas shall be ~~scrubbed~~ controlled before emission to air can occur.”

Changes to Chapter 7. Land Use and Agricultural Resources

Page 7-9 of the DEIR, Mitigation Measure 7.4 is revised as follows:

> "**Measure 7.4:** Whenever feasible, project related facilities off-site ~~project related facilities~~of a dairy should not be sited on Important Farmland as defined by the California Department of Conservation's Farmland Mapping and Monitoring Program."

Changes to Chapter 8. Transportation and Traffic

Page 8-10 of the DEIR, Mitigation Measure 8.5a is revised as follows:

> "**Measure 8.5a:** Prior to construction, for installation of pipelines in existing roadways, the project sponsor will coordinate with the appropriate local government departments, Caltrans, and utility districts and agencies regarding the timing of construction projects that would occur near project sites. Specific measures to mitigate potential significant impacts will be determined as part of the interagency coordination, and could include measures such as employing flaggers during key construction periods, designating alternate haul routes, and providing more outreach and community noticing."

Changes to Chapter 9. Biological Resources

Page 9-13 of the DEIR, Mitigation Measure 9.1a is revised as follows:

> "**Measure 9.1a:** The project applicant or agency(s) responsible shall document that ~~submit , as part of the NOI,~~ a site assessment report for dairy digester and co-digester facilities to be constructed (including the location of digestate application) has been submitter to CDFG for its review. ~~in areas that contain undisturbed land and/or any agricultural fields that have been fallow for more than 1 year~~. This report shall be prepared by a qualified biologist. It shall evaluate the project site's potential to support special-status plant and wildlife species (including critical habitat) and whether special-status species could be affected by dairy digester and co-digester development, including construction and operations. If there are no special-status species or critical habitat present, no additional mitigation would be required."

Page 9-14 of the DEIR, Mitigation Measure 9.2a is revised as follows:

> **"Measure 9.2a:** The project applicant or agency(s) responsible shall submit~~, with the NOI,~~ a site assessment report prepared by a qualified biologist that determines if the project is likely to affect biologically unique or sensitive natural communities. This information could be included in the report prepared under Mitigation Measure 9.1a. If there are no biologically unique or sensitive natural communities present, no further mitigation is required. "

Page 9-14 of the DEIR, Mitigation Measure 9.3a is revised as follows:

> **“Measure 9.3a:** The project applicant or agency(s) responsible shall submit~~, with the NOI,~~ a site assessment report prepared by a qualified biologist that evaluates if the project is likely to affect waters of the State and/or U.S., including wetlands. This information could be included in the report prepared under Mitigation Measure 9.1a. If there are no waters present, no further mitigation would be required.”

Page 9-16 of the DEIR, the Impact 9.6 discussion is revised as follows:

> “While it is not expected that implementation of the project would lead to conversion of habitat to dairy farms, the project could facilitate additional development such as centralized facilities and associated pipelines, near dairies that would incrementally deplete native habitats and other biological resources. Most of the dairy digester and co-digester facilities would be constructed on, or in proximity to, existing dairies, on land that is unlikely to support sensitive biological resources. However, centralized facilities and associated pipelines that could be constructed on land not currently in active agricultural use could affect biological resources. In combination with other development in the project area, this conversion of potential habitat land represents a significant cumulative impact.”

Changes to Chapter 10. Hazards and Hazardous Materials

Page 10-9 of the DEIR, Mitigation Measure 10.1 is revised as follows:

> “**Mitigation Measure 10.1:** Prior to final project design and any earth disturbing activities, the applicant or agency(s) responsible shall conduct a standard “Phase I Type” electronic record search. If no incidents are identified within a quarter mile of the construction area, standard construction practices can be implemented. If the record search identifies soil or water quality contamination open cases within a quarter mile of the construction area, a ~~Site Assessment. The~~ Phase I Environmental Site Assessment (ESA) shall be prepared by a Registered Environmental Assessor (REA) or other qualified professional to assess the potential for contaminated soil or groundwater conditions at the project site; specifically in the area proposed for construction of dairy digester or co-digester facilities…”

Page 10-10 of the DEIR, the Impact Significance After Mitigation discussion for Impact 10.1 is revised as follows:

> “**Impact Significance After Mitigation:** Less than Significant
>
> Mitigation Measure 10.1 requires ~~preparation of a~~ Phase I ESA record reviews to identify the potential for known soil or groundwater contamination on or in the vicinity of proposed construction of dairy digester or co-digester facilities…”

Changes to Chapter 12. Cultural Resources

Starting on page 12-18 of the DEIR, Mitigation Measures 12.1a and 12.1b have been modified to make them more straight forward and completely replace those included in the DEIR, as follows:

> **"Measure 12.1a:** In order to determine whether a project may cause a significant impact to cultural resources, and therefore, have an adverse effect on the environment, the Central Valley Water Board shall require each application submitted for a discharge permit for a digester or co-digester facility to identify the project's potential impacts to cultural resources.
>
> Prior to ground-disturbing activities, the project applicant shall retain a qualified archaeologist to (1) conduct a record search at the appropriate information center of the California Historical Resources Information System (CHRIS) to determine whether the project area has been previously surveyed and whether cultural resources were identified; and (2) request a sacred lands search from the NAHC. The results of the record search and sacred lands search shall be included in the Cultural Resources Inventory Report provided to the Central Valley Water Board.
>
> In the event the CHRIS records search indicates that no previous survey has been conducted, the qualified archaeologist shall recommend whether a survey is warranted to satisfy the requirements of CEQA based on the sensitivity of the project area for cultural resources. If, for example, the existing dairy or agricultural land proposed for establishment of a digester or co-digester facility was constructed entirely on fill, as shown by original and final contour drawings, a surface survey for archaeological resources would not be warranted. Similarly, a surface survey may not be warranted if the project area has been extensively disturbed by dairy or agricultural use.
>
> For projects that constitute federal undertakings, as described in the Federal Agencies section of the Introduction (Chapter 2), the cultural resources study shall be prepared in accordance with Section 106 of the NHPA. The cultural resources study and inclusive mitigation measures shall form the basis for the cultural resources component of the project-level environmental documentation prepared for the project under Section 106.
>
> If the survey, CHRIS record search, or NAHC search indicate cultural resources are located within a project area, the Cultural Resources Inventory Report shall include an assessment of the significance of the resources according to applicable federal, state, and local significance criteria. If the cultural resources are determined significant historical resources, the Lead Agency (usually the Central Valley Water Board) must review and approve the applicant's proposed treatment measures to ameliorate any "substantial adverse change" in the significance of each historical resource, in consultation with a qualified archaeologist or architectural historian, and other concerned parties. Treatment measures may include preservation through avoidance or project redesign, incorporation within open space or conservation easements, data recovery excavation of archaeological resources, formal documentation of built environment resources, public interpretation of the resource, or

other appropriate treatment, and may be described in a project-level Cultural Resources Mitigation Plan included in the Cultural Resources Inventory Report to be approved by the Lead Agency.

Should the project area contain standing, built environment resources now 50 years of age, a qualified architectural historian shall be retained to evaluate the integrity and significance of the resource(s) unless the building(s) or structure(s) were covered in the existing survey report and determined not significant according to applicable federal, state, and local criteria. The results of that evaluation shall be included in the Cultural Resources Inventory Report.

If cultural resources identified within a project area are neither a historical resource nor unique archaeological resource, there would be no significant effect to the environment and no further treatment of those known resources would be required.

Measure 12.1b: Inadvertent discovery measures for cultural resources shall be implemented during all construction activities within the project area. Measures shall include procedures for discovery and protection of cultural resources, including human remains, during construction or earth-disturbing activities.

Within project areas of identified archaeological sensitivity, discovery measures would include: (1) a worker education course for all construction personnel; (2) monitoring of all earth-disturbing activities by a qualified archeologist; and (3) procedures for discovery of cultural resources, including human remains, during construction or ground-disturbing activities if an archaeological monitor is not present. Monitoring by a Native American with knowledge in cultural resources may also be required, as appropriate. Monitoring within recent fill deposits or non-native soil would not be required.

All construction or ground-disturbing activities shall be halted within 100 feet of a cultural resources discovery, including human remains, whether or not a monitor is present, until a qualified professional archaeologist can evaluate the find. If the find is determined to be a significant historical resource and cannot be avoided, then impacts on that resource will require mitigation. During evaluation or mitigative treatment, ground disturbance and construction work could continue on other parts of the project area.

If known or suspected human remains are discovered, in addition to halting all construction or ground-disturbing activities within 100 feet, the following steps must be taken before construction activities may be resumed within the stop-work area:

- The County Coroner has been immediately notified and has determined that no investigation of the cause of death is required; and
- If the remains are of Native American origin, the following steps have been taken:
    - The applicant has 24 hours to notify the NAHC, who should, in turn, notify the person identified as the proper descendant of any human remains. Under existing

law, the descendant then has 24 hours to make recommendations regarding the disposition of the remains following notification from the NAHC of the discovery.

- If the NAHC is unable to identify a descendant or if the descendant does not make recommendations within 24 hours, the applicant shall, with appropriate dignity, reinter the remains in an area of the property secure from further disturbance.
- Should the applicant not accept the descendant's recommendations, the applicant or the descendant may, under existing law, request mediation by the NAHC.

Changes to Chapter 14. Noise

Page 14-10 of the DEIR is revised as follows:

> "… During these times, outdoor activities at the affected residences would be negatively affected by noise and indoor activities (typically 20 to 25 ~~20~~ dBA quieter than outdoor noise levels) could be negatively affected…"

Appendix A

Mitigation Monitoring and Reporting Plan

MITIGATION MONITORING AND REPORTING PLAN

Impact	Mitigation Measure	Responsibility for Compliance	Method for Compliance	Timing of Compliance
5. Hydrology and Water Quality				
Impact 5.2: Digester and co-digester development could adversely affect surface waters.	**Measure 5.2:** WDRs for digester and co-digester facilities shall include design and operational requirements to manage all wastes and discharges to protect surface waters. Requirements shall include the following: • Prohibitions against any surface water discharges (unless exempt from NPDES permitting requirements or covered by separate NPDES permit), • Prohibitions against any discharges that would cause exceedance of surface water quality objectives, • Setbacks from surface water bodies • Drainage requirements for co-digestion substrates/waste storage/receiving/handling areas to drain to on-site wastewater retention ponds, • Lining requirements for retention ponds in new facilities and operational dairies, • Monitoring requirements that include sampling data of soils, retention water, and waste streams to reconcile annually with Nutrient Management Plan (NMP), • Requirements for tailwater return systems or other effective methods to minimize offsite discharges; • Prohibitions against any unreasonable effects on beneficial uses of nearby surface waters.	Applicant	Submit a site specific Facility Information Report (FIR) describing the waste discharge and containing sufficient information to demonstrate that the discharger can comply with Mitigation Measure 5.2.	RWD Review
		CVRWQCB	Review FIR for completeness.	RWD Review
		Applicant	Comply with water quality permit conditions for digester and co-digester facilities.	Operations
		CVRWQCB	Enforce water quality permit conditions for digester and co-digester facilities.	Operations
Impact 5.3: Digester and co-digester development could adversely affect groundwater quality.	**Measure 5.3:** WDRs for the discharge to land from dairy digester and co-digester facilities shall include the following BPTC requirements or equivalent: • Prepare and implement site-specific Salt Minimization Plan (SMP) as approved by the Central Valley Water Board. The SMP shall consider the elimination, decommissioning, or the reduction in use of regenerative water softeners on process water distribution networks or, alternatively, evaluate and install alternate technology that reduces or eliminates on-site brine disposal; • Prepare and implement a site-specific NMP that incorporates analytical data for soils, wastewater, manure, digester solids, groundwater and/or surface water supply. The required analytical data is to be generated by a site-specific monitoring and reporting program. In the case of	Applicant	Submit a site specific FIR describing the waste discharge and containing sufficient information to demonstrate that the discharger can comply with Mitigation Measure 5.3.	RWD Review
		CVRWQCB	Review RWD for completeness.	RWD Review
		Applicant	Comply with water quality permit conditions for digester and co-digester facilities.	Operations
		CVRWQCB	Enforce water quality permit conditions for digester and co-digester facilities.	Operations

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MITIGATION MONITORING AND REPORTING PLAN

Impact	Mitigation Measure	Responsibility for Compliance	Method for Compliance	Timing of Compliance
	groundwater, data from an approved representative groundwater monitoring program may be substituted for some or all site-specific groundwater monitoring, if appropriate. The NMP will be reconciled annually based on results of the monitoring and reporting program and site-specific measurements of agronomic rates; • Require all drainage be directed to a retention wastewater pond that has been designed to meet antidegradation provisions of Resolution 68-16 by an appropriately licensed professional; • To the extent practicable, use crops that maximize salt uptake; • Apply liquid digestate consistently with crop water uptake rates; • Prohibit hazardous substances in co-digestion substrates processed by each facility as verified by laboratory analytical testing; • Apply digestate at an approved rate commensurate with agronomic rate; • Properly time application of digestate in accordance with crop requirements; • Avoid excess irrigation; • Maintain cover crops and vegetative buffer zones; • Develop co-substrate acceptance criteria; • Perform vector control and reduction; • Monitor groundwater for pathogen indicator organisms; • Require that solid wastes be stored on surfaces designed in accordance with a site-specific Waste Management Plan prepared for the facility by an appropriate California registered professional in accordance with WDR requirements; • Maintain a neutral or alkaline pH for dairy digestate waste water applied to cropland unless conditions warrant otherwise as detailed in the NMP; • Prohibit hazardous waste, mammalian tissues (with the exception of mammalian tissue as contained in compostable material from the food service industry, grocery stores, or residential food scrap collection), dead animals, and human			

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Impact	Mitigation Measure	Responsibility for Compliance	Method for Compliance	Timing of Compliance
	waste from all discharges; and - Incorporate lined digester and co-digestion substrate storage facilities that meet the antidegradation provisions of Resolution 68-16, as relevant, into project design in order to prevent groundwater contamination with salts, nutrients, and other constituents. Each facility shall prepare a site-specific Waste Management Plan in accordance with the WDR requirements for review and approval to the Central Valley Water Board prior to commencement of operations. Annual monitoring reports shall be reviewed by the Central Valley Water Board and any revisions deemed necessary to the handling, storage, or land application of wastes shall be incorporated into facility operations.			
Impact 5.4: Development of dairy digester and co-digester facilities could be exposed to flooding hazards.	**Measure 5.4:** WDRs for digester and co-digester facilities shall include design requirements for individual or centralized anaerobic digester or co-digester facilities and associated facilities to protect them from FEMA 100-year flood events. Design measures may include, but are not limited to: facility sitting, access placement, grading foundation soils above projected water elevation, and site protection.	Applicant	Submit a site specific FIR describing the waste discharge and containing sufficient information to demonstrate that the discharger can comply with Mitigation Measure 5.4.	RWD Review
		CVRWQCB	Review FIR for completeness.	RWD Review
		Applicant	Comply with water quality permit conditions for digester and co-digester facilities.	Operations
		CVRWQCB	Enforce water quality permit conditions for digester and co-digester facilities.	Operations
Impact 5.6: Development of dairy digester and co-digester facilities could contribute to cumulative impacts to water quality.	**Measure 5.6:** Implement Mitigation Measures 5.2, 5.3 and 5.4.	Applicant	Implement Mitigation Measures 5.2, 5.3, and 5.4.	On-going
6. Air Quality and Greenhouse Gas Emissions				
Impact 6.1: Construction of dairy digester and co-digester facilities within Region 5 would generate short-term emissions of criteria air pollutants: ROG, NOx, CO, SO_2, PM10, and PM2.5 that could contribute to existing nonattainment conditions and further degrade air quality.	**Measure 6.1a:** Applicants shall prepare and submit an Air Quality Technical Report as part of the environmental assessments for the development of future dairy digester or co-digester facilities on a specific project-by-project basis. The technical report shall include an analysis of potential air quality impacts (including a screening level analysis to determine if construction and operation related criteria air pollutant emissions would exceed applicable air district thresholds, as well as any health risk associated with TACs from all dairy digester or co-digester facility sources) and reduction measures as necessary associated with	Applicant	Submit Air Quality Technical Report.	RWD Review
			Implement Construction Agreement with Air Quality BMPs.	Pre-construction
		Local Air District	Enforce construction and operational air quality rules and regulations (including Regulation VIII in SJVAPCD).	Construction and Operations

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MITIGATION MONITORING AND REPORTING PLAN

Impact	Mitigation Measure	Responsibility for Compliance	Method for Compliance	Timing of Compliance
	digester developments through the environmental review process. Preparation of the technical report should be coordinated with the appropriate air district and shall identify compliance with all applicable New Source Review and Best Available Control Technology (BACT) requirements. The technical report shall identify all project emissions from permitted (stationary) and non-permitted (mobile and area) sources and mitigation measures (as appropriate) designed to reduce significant emissions to below the applicable air district thresholds of significance, and if these thresholds cannot be met with mitigation, then the individual digester project could require additional CEQA review or additional mitigation measures. **Measure 6.1b:** Applicants shall require construction contractors and system operators to implement the following Best Management Practices (BMPs) as applicable during construction and operations: • Facilities shall be required to comply with the rules and regulations from the applicable AQMD or APCD. For example, development of dairy digester and co-digester facilities in the SJVAPCD jurisdiction shall comply with the applicable requirements of Regulation VIII (Fugitive PM10 Prohibitions) and Rule 9510 (Indirect Source Review). • Use equipment meeting, at a minimum, Tier II emission standards, as set forth in §2423 of Title 13 of the California Code of Regulations, and Part 89 of Title 40 Code of Federal Regulations. • Minimize idling time either by shutting equipment off when not in use or reducing the time of idling to 5 minutes (as required by the state airborne toxics control measure [Title 13, §2485 of the California Code of Regulations]). Provide clear signage that posts this requirement for workers at the entrances to the site. • Comply with state regulations to minimize truck idling. • Maintain all equipment in proper working condition according to manufacturer's specifications. • Use electric equipment when possible. • Payment into an AQMD or APCD operated Voluntary Emission Reduction Agreement (VERA). • Incorporate fuel cells where feasible as an alternative to internal combustion engines, which generate NOx emissions, to generate energy from the biogas produced at	CVRWQCB	Confirm submittal of Air Quality Technical Report to Local Air District.	Pre-construction

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Impact	Mitigation Measure	Responsibility for Compliance	Method for Compliance	Timing of Compliance
	dairy digester and co-digester facilities. • Where feasible as an alternative to internal combustion engines, which generate NOx emissions, use biogas from dairy manure digester and co-digester projects as a transportation fuel (compressed biomethane) or inject biomethane into the utility gas pipeline system.			
Impact 6.2: Pre-processing, digestion, and post-processing operational activities of dairy digester and co-digester facilities in Region 5 would result in emissions of criteria air pollutants at levels that could substantially contribute to a potential violation of applicable air quality standards or to nonattainment conditions.	**Measure 6.2:** Implement Mitigation Measures 6.1a and 6.1b.	Applicant	Implement Mitigation Measure 6.1a.	On-going
Impact 6.3: Operation of dairy digester and co-digester facilities in Region 5 could create objectionable odors affecting a substantial number of people.	**Measure 6.3a:** Applicants for the development of digester facilities shall comply with appropriate local land use plans, policies, and regulations, including applicable setbacks and buffer areas from sensitive land uses for potentially odoriferous processes.	Applicant	Submit information on compliance with local plans, policies, and regulations (e.g., setback requirements) as part of Odor Impact Minimization Plan or Odor Management Plan (see Measure 6.3b).	RWD Review
		CVRWQCB	Confirm submittal of Odor Impact Minimization Plan or Odor Management Plan to Local Air District, Local Planning Department, and LEA if applicable.	RWD Review
	Measure 6.3b: AD facilities that handle compostable material and are classified as a compost facility must develop an Odor Impact Minimization Plan (OIMP) pursuant to 14 CCR 17863.4. Otherwise, applicants shall implement a site-specific Odor Management Plan (OMP) as part of each application submitted to establish digester and co-digester facilities under the waste discharge regulatory program. The OMP will specifically address odor control associated with digester operations and will include: • A list of potential odor sources. • Identification and description of the most likely sources of odor. • Identification of potential, intensity, and frequency of odor from likely sources. • A list of odor control technologies and management practices that could be implemented to minimize odor	Applicant	Submit Odor Impact Minimization Plan or Odor Management Plan to Local Air District, Local Planning Department, CVRWQCB, and LEA if applicable.	RWD Review
		CVRWQCB	Confirm submittal of Odor Impact Minimization Plan or Odor Management Plan to Local Air District, Local Planning Department and LEA if applicable.	RWD Review
		Local Air District, Local Planning Department, CVRWQCB, and LEA if applicable.	Provide feedback to applicant on Odor Impact Minimization Plan or Odor Management Plan.	RWD Review

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Impact	Mitigation Measure	Responsibility for Compliance	Method for Compliance	Timing of Compliance
	releases. These management practices shall include the establishment of the following criteria as appropriate: - Establish time limit for on-site retention of undigested odiferous co-substrates (i.e., organic co-substrates must be put into the digester within 48 hours of receipt). - Provide negative pressure buildings for indoor unloading of odiferous co-digestion substrates. Treat collected foul air in a biofilter or air scrubbing system. - Establish contingency plans for operating downtime (e.g., equipment malfunction, power outage). - Manage delivery schedule to facilitate prompt handling of odorous co-substrates. - Modification options for land application practices if land application of digestate results in unacceptable odor levels. - Protocol for monitoring and recording odor events. - Protocol for reporting and responding to odor events.	Applicant Local Air District, Local Planning Department, CVRWQCB, and LEA if applicable.	Control odors from digester facilities. Review odor log books.	Operations Operations
Impact 6.4: Construction and operation of dairy digester and co-digester facilities in Region 5 could lead to increases in chronic exposure of sensitive receptors in the vicinity to certain toxic air contaminants from stationary and mobile sources.	**Measure 6.4a:** Implement Mitigation Measures 6.1a and 6.1b.	Applicant	Implement Mitigation Measures 6.1a and 6.1b.	RWD Review Operations
	Measure 6.4b: Based on the Air Quality Technical Report (specified in Measure 6.1a), if the health risk is determined to be significant on a project-by-project basis with DPM as a major contributor, then the applicants shall either use new diesel engines that are designed to minimize DPM emissions (usually through the use of catalyzed particulate filters in the exhaust) or retrofit older engines with catalyzed particulate filters, which will reduce DPM emissions by 85%.	Operator Local Air District	Scrub H_2S as required. Verify H_2S removal meets Local Air District Rules and Regulations.	Operations Operations
	Measure 6.4c: H_2S contained in the biogas shall be controlled before emission to air can occur.			
Impact 6.6: Development of dairy digester and co-digester facilities in Region 5, together with anticipated cumulative development in the area, would contribute to regional criteria pollutants.	**Measure 6.6:** Implement Mitigation Measures 6.1a and 6.1b.	CVRWQCB	Confirm compliance with Mitigation Measures 6.1, 6.2, 6.3 and 6.4.	On-going

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MITIGATION MONITORING AND REPORTING PLAN

Impact	Mitigation Measure	Responsibility for Compliance	Method for Compliance	Timing of Compliance
7. Land Use and Agricultural Resources				
Impact 7.4: Implementation of the project could result in the permanent conversion of land designated by the Department of Conservation FMMP as Prime Farmland, Farmland of Statewide Importance or Unique Farmland.	**Measure 7.4:** Whenever feasible, project related facilities off-site of a dairy should not be sited on Important Farmland as defined by the California Department of Conservation's Farmland Mapping and Monitoring Program.	Applicant	Provide documentation determining whether off-site facilities are located on Important Farmland, and in the event that an off-site facility is situated on Important Farmland the applicant will provide over-riding justification for the choice of location.	RWD Review
8. Transportation and Traffic				
Impact 8.1: Construction of dairy digester and co-digester facilities would intermittently and temporarily increase traffic levels and traffic delays due to vehicle trips generated by construction workers and construction vehicles on area roadways.	**Measure 8.1:** The contractor(s) will obtain any necessary road encroachment permits prior to installation of pipelines within the existing roadway right-of-way. As part of the road encroachment permit process, the contractor(s) will submit a traffic safety / traffic management plan (for work in the public right-of-way) to the agencies having jurisdiction over the affected roads. Elements of the plan will likely include, but are not necessarily limited to, the following: • Develop circulation and detour plans to minimize impacts to local street circulation. Use haul routes minimizing truck traffic on local roadways to the extent possible. Use flaggers and/or signage to guide vehicles through and/or around the construction zone. • To the extent feasible, and as needed to avoid adverse impacts on traffic flow, schedule truck trips outside of peak morning and evening commute hours. • Limit lane closures during peak traffic hours to the extent possible. Restore roads and streets to normal operation by covering trenches with steel plates outside of allowed working hours or when work is not in progress. • Limit, where possible, the pipeline construction work zone to a width that, at a minimum, maintains alternate one-way traffic flow past the construction zone. • Install traffic control devices as specified in Caltrans' Manual of Traffic Controls for Construction and Maintenance Work Zones where needed to maintain safe driving conditions. Use flaggers and/or signage to safely direct traffic through construction work zones. • Coordinate with facility owners or administrators of sensitive land uses such as police and fire stations, hospitals, and schools. Provide advance notification to the facility owner or operator	Applicant CVRWQCB	Obtain road encroachment permits for construction within roadway right-of-ways. Confirm applicant has received encroachment permits.	Prior to Construction Prior to Construction

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MITIGATION MONITORING AND REPORTING PLAN

Impact	Mitigation Measure	Responsibility for Compliance	Method for Compliance	Timing of Compliance
	of the timing, location, and duration of construction activities. • To the maximum extent feasible, maintain access to private driveways located within construction zones. • Coordinate with the local public transit providers so that bus routes or bus stops in work zones can be temporarily relocated as the service provider deems necessary.			
Impact 8.3: Construction and operation of dairy digester and co-digester facilities could potentially cause traffic safety hazards for vehicles, bicyclists, and pedestrians on public roadways, and could increase traffic hazards due to possible road wear or to accident spills of manure, or co-digestion feedstocks or digestate.	**Measure 8.3a:** Implement Measure 8.1, which stipulates actions required of the contractor(s) to reduce potential traffic safety impacts to a less-than-significant level.	Applicant	Implement Mitigation Measure 8.1.	Prior to Construction
	Measure 8.3b: Prior to construction, the contractor(s), in cooperation with the agencies having jurisdiction over the affected roadways, will survey and describe the pre-construction roadway conditions on rural roadways and residential streets. Within 30 days after construction is completed, the affected agencies will survey these same roadways and residential streets in order to identify any damage that has occurred. Roads damaged by construction will be repaired to a structural condition equal to the condition that existed prior to construction activity.	Agency issuing encroachment permit and other agencies having jurisdiction over affected roadways.	Confirm roads damaged by construction are repaired to a structurally condition equal to the condition that existed prior to construction activity.	30 Days after Construction
Impact 8.4: Construction of dairy digester and co-digester facilities could intermittently and temporarily impede access to local streets or adjacent uses (including access for emergency vehicles), as well as disruption to bicycle/pedestrian access and circulation.	**Measure 8.4:** Implement Measure 8.1, which stipulates actions required of the contractor(s) to reduce potential access impacts to a less-than-significant level.	Applicant	Implement Mitigation Measure 8.1.	Prior to Construction.
Impact 8.5: Construction and operation of dairy digester and co-digester facilities could contribute to cumulative impacts to traffic and transportation (traffic congestion, traffic safety, and emergency vehicle access).	**Measure 8.5a:** Prior to construction, for installation of pipelines in existing roadways, the project sponsor will coordinate with the appropriate local government departments, Caltrans, and utility districts and agencies regarding the timing of construction projects that would occur near project sites. Specific measures to mitigate potential significant impacts will be determined as part of the interagency coordination, and could include measures such as employing flaggers during key construction periods, designating alternate haul routes, and providing more outreach and community noticing. **Measure 8.5b:** Implement Mitigation Measures 8.1 and 8.3b.	Applicant	Coordinate with appropriate local government departments and identify any additional measures needed as a result of other projects under construction at the same time.	Prior to Construction
			Forward memo of results and measures to CVRWQCB.	Prior to Construction
			Implement identified traffic control measures during construction.	Construction
		CVRWQCB	Confirm (from memo) that coordination occurred and that appropriate traffic control measures for construction will be implemented.	Prior to Construction.

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Impact	Mitigation Measure	Responsibility for Compliance	Method for Compliance	Timing of Compliance
9. Biological Resources				
Impact 9.1: The project could impact special-status plant or wildlife species or their habitats.	**Measure 9.1a:** The project applicant or agency(s) responsible shall document that a site assessment report for dairy digester and co-digester facilities to be constructed (including the location of digestate application) has been submitted to CDFG for its review. This report shall be prepared by a qualified biologist. It shall evaluate the project site's potential to support special-status plant and wildlife species (including critical habitat) and whether special-status species could be affected by dairy digester and co-digester development, including construction and operations. If there are no special-status species or critical habitat present, no additional mitigation would be required.	Applicant	Submit biological site assessment report.	RWD Review
		CVRWQCB	Verify submittal of biological site assessment report to California Department of Fish and Game for review.	RWD Review
	Measure 9.1b: If the site assessment determines that special-status species could be affected by facilities development, the project would not be eligible as part of the project (for the Central Valley Water Board discharge permit) unless the applicant submits a plan, prepared by a qualified biologist, to mitigate or avoid any significant impacts on special-status species. This plan must be forwarded to the appropriate regional office of the CDFG, the Endangered Species Unit of the USFWS in Sacramento, and/or NMFS for review and approval of the mitigation strategy, when appropriate. If the site assessment determines that a State or federally listed species would be affected by facilities development, the project applicant shall consult with CDFG, the Endangered Species Unit of the USFWS in Sacramento, and/or NMFS, as appropriate.	Applicant	Submit biological site assessment report.	RWD Review
		CVRWQCB	Verify submittal of biological site assessment report to California Department of Fish and Game for review and forwarding of the biological site assessment report to the appropriate regional office of CDFG, the Endangered Species Unit of the USFWS in Sacramento, and/or NMFS for review and approval of mitigation strategy, when appropriate.	RWD Review
		CDFG/USFWS/ or NMFS	Review and approval of mitigation strategy, as appropriate.	RWD Review
Impact 9.2: The project could result in impacts on biologically unique or sensitive natural communities.	**Measure 9.2a:** The project applicant or agency(s) responsible shall submit a site assessment report prepared by a qualified biologist that determines if the project is likely to affect biologically unique or sensitive natural communities. This information could be included in the report prepared under Mitigation Measure 9.1a. If there are no biologically unique or sensitive natural communities present, no further mitigation is required.	Applicant	Submit biological site assessment report.	RWD Review
		CVRWQCB	Verify submittal of biological site assessment report to California Department of Fish and Game for review.	RWD Review
	Measure 9.2b: If biologically unique or sensitive natural communities are present and would be disturbed, the project would not be authorized under the project unless the applicant or agency(s) responsible submits a plan to avoid or mitigate for any significant impacts on biologically unique or sensitive natural communities and agrees to implement the mitigation. This report must be forwarded to the appropriate regional office of the CDFG and/or the Endangered	Applicant	Submit biological site assessment report.	RWD Review
		CVRWQCB	Verify submittal of biological site assessment report to California Department of Fish and Game for review.	RWD Review
		CDFG/USFWS/ or	Review and approval of mitigation strategy,	RWD Review

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	Species Unit of the USFWS in Sacramento (as appropriate) for review and approval of the mitigation strategy. As described above, this portion of the report could be incorporated into the report prepared under Mitigation Measure 9.1a.	NMFS	as appropriate.	
Impact 9.3: The project could result in impacts on waters of the State and/or the U.S., including wetlands.	**Measure 9.3a:** The project applicant or agency(s) responsible shall submit a site assessment report prepared by a qualified biologist that evaluates if the project is likely to affect waters of the State and/or U.S., including wetlands. This information could be included in the report prepared under Mitigation Measure 9.1a. If there are no waters present, no further mitigation would be required.	Applicant	Submit preliminary wetlands assessment report.	RWD Review
	Measure 9.3b: If waters of the State and/or U.S. are present in the project area, the project applicant or agency(s) responsible shall either re-design the project to avoid affecting the waters, or obtain the appropriate permits to allow for the impact. For waters that cannot be avoided, the permit process shall start with the preparation of a jurisdictional wetland delineation, prepared by a qualified biologist that will be submitted to the Corps for verification. Following verification, if jurisdictional waters occur within the project site, the project applicant or agency(s) responsible shall obtain and comply with federal and State permit requirements. This could include obtaining a Clean Water Act Section 404 permit, Section 401 Water Quality Certification or Waiver, a Section 1602 Streambed Alteration Agreement, and any other applicable permits.	Applicant Corps of Engineers CVRWQCB CDFG	Submit report showing avoidance or obtain wetlands 404 permit from the Army Corps of Engineers. Process 404 Permit. Process 401 Permit. Process Section 1602 Streambed Alteration Agreement, if required.	RWD Review RWD Review After 404 Permit has been issued. RWD Review
Impact 9.6: Development of dairy digester and co-digester facilities could contribute to cumulative impacts to biological resources.	**Measure 9.6:** Implement Measures 9.1a, 9.1b, 9.2a, 9.2b, 9.3a, and 9.3b.	Applicant	Compliance with Mitigation Measures 9.1, 9.2 and 9.3.	RWD Review
10. Hazards and Hazardous Materials				
Impact 10.1: Construction of dairy digester and co-digester facilities could result in the potential exposure of construction workers, the public and the environment to preexisting soil and/or groundwater contamination.	**Measure 10.1:** Prior to final project design and any earth disturbing activities, the applicant or agency(s) responsible shall conduct a standard "Phase I Type" electronic record search. If no incidents are identified within a quarter mile of the construction area, standard construction practices can be implemented. If the record search identifies soil or water quality contamination open cases within a quarter mile of the construction area, a Phase I Environmental Site Assessment (ESA) shall be prepared by a Registered Environmental Assessor (REA) or other qualified professional to assess the potential for contaminated soil or groundwater conditions at the project site; specifically in the area proposed for construction of dairy digester or co-digester facilities. The	Applicant	Submit a standard "Phase I Type" electronic record search that identifies any active soil or groundwater contamination cases within a quarter mile of the dairy digester. Conduct site inspection determine appropriate mitigation measures prior to (which could include a Phase II Study) and/or during construction. If recommended in Phase I report, conduct follow-up sampling and report of construction	RWD Review Prior to and during construction Prior to construction

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	Phase I ESA shall include a review of appropriate federal and State hazardous materials databases, as well as relevant local hazardous material site databases for hazardous waste on-site and off-site locations within a one quarter mile radius of the project site. This Phase I ESA shall also include a review of existing or past land uses and areal photographs, summary of results of reconnaissance site visit(s), and review of other relevant existing information that could identify the potential existence of contaminated soil or groundwater.		recommendations. Implement recommended actions for construction phase. Contact CVRQQCB if contaminants are discovered during construction.	 Construction
	If no contaminated soil or groundwater is identified or if the Phase I ESA does not recommend any further investigation then the project applicant or agency(s) responsible shall proceed with final project design and construction. OR If existing soil or groundwater contamination is identified and if the Phase 1 ESA recommends further review, the applicant or agency(s) responsible shall retain a REA to conduct follow-up sampling to characterize the contamination and to identify any required remediation that shall be conducted consistent with applicable regulations prior to any earth disturbing activities. The environmental professional shall prepare a report that includes, but is not limited to, activities performed for the assessment, summary of anticipated contaminants and contaminant concentrations at the proposed construction site, and recommendations for appropriate handling of any contaminated materials during construction.	CVRWQCB	Review Phase I report and all site inspection and follow-up sampling reports. Coordinate with developer regarding appropriate actions if contaminants are discovered during construction.	RWD Review Construction
Impact 10.6: Installation of biogas pipelines in public rights-of-way could impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.	**Measure 10.6:** Implement Mitigation Measure 8.1.	CVRWQCB and agency issuing encroachment permit and other agencies have jurisdiction over roadways	Confirm compliance with Mitigation Measure 8.1.	RWD Review
11. Aesthetic Resources				
Impact 11.1: Implementation of the project, including operation of dairy digester and co-digestion facilities, could result in impacts to scenic highways and/or scenic vistas.	**Measure 11.1a:** Centralized biogas processing facilities shall be sited in locations that do not conflict with local polices for preservation of vistas or scenic views.	Applicant	Provide a Visual Assessment Report indicating project compliance with existing local regulations regarding scenic resources to the local CVRWQCB and local Planning Department.	RWD Review
		CVRWQCB / Third Party Consultant/ Local Planning and	Confirm individual project compliance with the local regulations.	RWD Review

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		Building Departments		
	Measure 11.1b: When feasible considering the scale of the facilities and the site specific topography, site specific landscape design, including berms and/or tree rows, shall be constructed in order to minimize potentially sensitive views of both digester facilities at dairies or off dairies at centralized facilities.	Applicant	Provide a Visual Assessment Report to determine the need for any site specific mitigations identified in Mitigation Measure 11.1b.	RWD Review
		CVRWQCB / Third Party Consultant/ Local Planning and Building Departments	Confirm project compliance with local regulation.	RWD Review
	Measure 11.1c: Centralized biogas processing facilities shall be designed similarly in massing and scale to other nearby agricultural buildings in agricultural areas, in order to retain the character of the surrounding visual landscape.	Applicant	Provide a Visual Assessment Report indicating project consistency with surrounding visual landscape.	RWD Review
		CVRWQCB / Third Party Consultant/Local Planning and Building Departments	Confirm project consistency with surrounding visual landscape.	RWD Review
Impact 11.2: Construction of the project could result in impacts to scenic highways and/or scenic vistas.	**Measure 11.2:** The project shall incorporate into all construction contracts for the proposed project and ensure implementation of the following measures: • Main construction staging areas and the storage of large equipment shall be situated on individual sites in such a manner to minimize visibility to nearby receptors. As feasible, staging areas and storage shall occur away from heavily traveled designated scenic roadways, in areas where it will be least visible from the surrounding roads. • Construction staging areas shall be onsite and remain clear of all trash, weeds and debris, etc. Construction staging areas shall be located in areas that limit visibility from scenic roadways and sensitive receptors to the extent feasible.	Applicant	Provide a Visual Assessment Report indicating project compliance with Mitigation Measure 11.2.	RWD Review
		CVRWQCB / Third Party Consultant/ Local Planning and Building Departments/Local Code Enforcement	Confirm project compliance with Mitigation Measure 11.2.	RWD Review

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Impact 11.3: Implementation of the project could result in substantial creation of or change in light or glare.	**Measure 11.3:** Whenever possible, flares shall be situated on individual sites in such a manner to minimize visibility to nearby receptors. Site specific design shall discourage placement of flares at higher elevations, or within the line of site of nearby residential buildings or scenic highways. In the event that site design does not provide adequate coverage, an enclosed flare design shall be used or landscaping, such as berms or tree rows, shall be constructed to minimize light impacts.	Applicant CVRWQCB / Third Party Consultant/Local Planning and Building Departments/Local Code Enforcement	Provide a Visual Assessment Report indicating project compliance with Mitigation Measure 11.3. Confirm project compliance with Mitigation Measure 11.3.	RWD Review RWD Review
Impact 11.4: Development of dairy digester and co-digester facilities could contribute to cumulative impacts to aesthetics.	**Measure 11.4:** Implement Mitigation Measures 11.1a, 11.1b, 11.1c, 11.2, and 11.3.	Applicant / CVRWQCB / Third Party Consultant/ Local Planning and Building Departments / Local Code Enforcement	See Mitigation Measures 11.1a, 11.1b, 11.1c, 11.2, and 11.3.	RWD Review
12. Cultural Resources				
Impact 12.1: Construction of dairy digester and co-digester facilities could result in the adverse change in the significance of a historical or archaeological resource, pursuant to §15064.5.	**Measure 12.1a:** In order to determine whether a project may cause a significant impact to cultural resources, and therefore, have an adverse effect on the environment, the Central Valley Water Board shall require each application submitted for a discharge permit for a digester or co-digester facility to identify the project's potential impacts to cultural resources. Prior to ground-disturbing activities, the project applicant shall retain a qualified archaeologist to (1) conduct a record search at the appropriate information center of the California Historical Resources Information System (CHRIS) to determine whether the project area has been previously surveyed and whether cultural resources were identified; and (2) request a sacred lands search from the NAHC. The results of the record search and sacred lands search shall be included in the Cultural Resources Inventory Report provided to the Central Valley Water Board. In the event the CHRIS records search indicates that no previous survey has been conducted, the qualified archaeologist shall recommend whether a survey is warranted to satisfy the requirements of CEQA based on the sensitivity of the project area for cultural resources. If, for example, the existing dairy or agricultural land proposed for establishment of a digester or co-	Applicant CVRWQCB / Third Party Consultant	Submit Cultural Resources Inventory Report Confirm compliance with local, State, and Federal regulation and confirm compliance with Mitigation Measures 12.1a and 12.1b.	RWD Review RWD Review

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	digester facility was constructed entirely on fill, as shown by original and final contour drawings, a surface survey for archaeological resources would not be warranted. Similarly, a surface survey may not be warranted if the project area has been extensively disturbed by dairy or agricultural use. For projects that constitute federal undertakings, as described in the Federal Agencies section of the Introduction (Chapter 2), the cultural resources study shall be prepared in accordance with Section 106 of the NHPA. The cultural resources study and inclusive mitigation measures shall form the basis for the cultural resources component of the project-level environmental documentation prepared for the project under Section 106. If the survey, CHRIS record search, or NAHC search indicate cultural resources are located within a project area, the Cultural Resources Inventory Report shall include an assessment of the significance of the resources according to applicable federal, state, and local significance criteria. If the cultural resources are determined significant historical resources, the Lead Agency (usually the Central Valley Water Board) must review and approve the applicant’s proposed treatment measures to ameliorate any “substantial adverse change” in the significance of each historical resource, in consultation with a qualified archaeologist or architectural historian, and other concerned parties. Treatment measures may include preservation through avoidance or project redesign, incorporation within open space or conservation easements, data recovery excavation of archaeological resources, formal documentation of built environment resources, public interpretation of the resource, or other appropriate treatment, and may be described in a project-level Cultural Resources Mitigation Plan included in the Cultural Resources Inventory Report to be approved by the Lead Agency. Should the project area contain standing, built environment resources now 50 years of age, a qualified architectural historian shall be retained to evaluate the integrity and significance of the resource(s) unless the building(s) or structure(s) were covered in the existing survey report and determined not significant according to applicable federal, state, and local criteria. The results of that evaluation shall be included in the Cultural Resources Inventory Report. If cultural resources identified within a project area are neither a historical resource nor unique archaeological resource, there would be no significant effect to the environment and no further treatment			

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	of those known resources would be required.			
	Measure 12.1b: Inadvertent discovery measures for cultural resources shall be implemented during all construction activities within the project area. Measures shall include procedures for discovery and protection of cultural resources, including human remains, during construction or earth-disturbing activities. Within project areas of identified archaeological sensitivity, discovery measures would include: (1) a worker education course for all construction personnel; (2) monitoring of all earth-disturbing activities by a qualified archeologist; and (3) procedures for discovery of cultural resources, including human remains, during construction or ground-disturbing activities if an archaeological monitor is not present. Monitoring by a Native American with knowledge in cultural resources may also be required, as appropriate. Monitoring within recent fill deposits or non-native soil would not be required. All construction or ground-disturbing activities shall be halted within 100 feet of a cultural resources discovery, including human remains, whether or not a monitor is present, until a qualified professional archaeologist can evaluate the find. If the find is determined to be a significant historical resource and cannot be avoided, then impacts on that resource will require mitigation. During evaluation or mitigative treatment, ground disturbance and construction work could continue on other parts of the project area. If known or suspected human remains are discovered, in addition to halting all construction or ground-disturbing activities within 100 feet, the following steps must be taken before construction activities may be resumed within the stop-work area: • The County Coroner has been immediately notified and has determined that no investigation of the cause of death is required; and • If the remains are of Native American origin, the following steps have been taken: o The applicant has 24 hours to notify the NAHC, who should, in turn, notify the person identified as the proper descendant of any human remains. Under existing law, the descendant then has 24 hours to make recommendations regarding the disposition of the remains following notification from the NAHC of the discovery.	CVRWQCB / Third Party Consultant	In the event of inadvertent discovery, perform site inspections to verify applicant/discharger compliance.	Construction

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	o If the NAHC is unable to identify a descendant or if the descendant does not make recommendations within 24 hours, the applicant shall, with appropriate dignity, reinter the remains in an area of the property secure from further disturbance. Should the applicant not accept the descendant's recommendations, the applicant or the descendant may, under existing law, request mediation by the NAHC.			
Impact 12.2: Construction of dairy digester and co-digester facilities could result in the disruption of human remains, including those interred outside formal cemeteries.	**Measure 12.2:** Implement inadvertent discovery measures for the protection of cultural resources, including human remains (Measure 12.1b).	CVRWQCB / Third Party Consultant	In the event of inadvertent discovery, perform site inspections to verify applicant/discharger compliance.	Construction
Impact 12.3: Construction of dairy digester and co-digester facilities could result in direct or indirect disturbance or destruction of a unique paleontological resource or site or unique geologic feature.	**Measure 12.3:** If paleontological resources, such as fossilized bone, teeth, shell, tracks, trails, casts, molds, or impressions are discovered during ground-disturbing activities, all ground disturbing activities within 50 feet of the find shall be halted until a qualified paleontologist can assess the significance of the find and, if necessary, develop appropriate salvage measures in consultation with the lead agency and in conformance with Society of Vertebrate Paleontology Guidelines (SVP, 1995; SVP, 1996). Additional guidance may be found in *Standard Guidelines for the Assessment and Mitigation of Adverse Impacts to Nonrenewable Paleontologic Resources* (SVP 2010).	CVRWQCB / Third Party Consultant	In the event of inadvertent discovery, perform site inspections to verify applicant/discharger compliance.	Construction
Impact 12.4: Development of dairy digester and co-digester facilities could contribute to cumulative impacts related to archaeological, historical, and/or paleontological resources.	**Measure 12.4:** Implement Measures 12.1a, 12.1b, 12.2, and 12.3.	Applicant	Submit Cultural Resources Inventory Report and will comply with inadvertent discovery measures for human remains, archaeological and paleontological resources**.**	RWD Review
		CVRWQCB / Third Party Consultant	Confirm compliance with local, State, and Federal regulation regarding treatment of cultural resources.	RWD Review
13. Geology				
Impact 13.1: The project could expose people to injury and structures to damage resulting from seismic activity.	**Measure 13.1:** Prior to construction, project applicants or agency(s) responsible shall ensure that dairy digester facilities are designed and construction techniques are used that comply with relevant local, State and federal regulations and building code requirements. Requirements could include, but might not be limited to: • Preparation of site-specific soil and geotechnical	Applicant	Submit of Construction Plans detailing project compliance with local, State, and Federal regulation regarding building code requirements.	RWD Review

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	engineering studies performed by a licensed professional including, but not limited to, a geologist, engineering geologist, certified soil scientist, certified agronomist, registered agricultural engineer, registered civil or structural engineer, and/or certified professional erosion and sediment control specialist with expertise in geotechnical engineering issues who is registered and/or certified in the State of California, to determine site specific impacts and to recommend site specific mitigations. The site specific soil and geotechnical engineering studies shall be submitted to the all appropriate State and local regulatory agencies including, but not limited to, the CVRWQCB and the city or county engineering department for review and approval. The project applicant or agency(s) responsible shall implement all feasible recommendations addressing potential seismic hazards and soil constraints; and • Implementation of CBC design requirements	CVRWQCB Local Building Department	Confirm submittal of Construction Plans Report to local building department. Confirm individual project compliance with local, State, and Federal regulation regarding building code requirements.	RWD Review Prior to Construction
Impact 13.2: The project could expose people to injury and structures to damage resulting from unstable soil conditions.	**Measure 13.2:** Implement Mitigation Measure 13.1.			
14. Noise				
Impact 14.1: Construction of dairy digester and co-digester facilities could temporarily increase noise levels at nearby sensitive receptor locations or result in noise levels in excess of standards in local general plans, noise ordinance, or other applicable standards.	**Measure 14.1a:** Construction activities shall be limited to daytime hours, between 7 a.m. and 6 p.m., Monday through Saturday, or an alternative schedule established by the local jurisdiction.	Applicant	Prepare Acoustic Report that addresses construction and operational compliance with Mitigation Measures 14.1 through 14.4 and indicating project compliance with existing local noise regulations**.**	RWD Review
	Measure 14.1b: Construction equipment noise shall be minimized by muffling and shielding intakes and exhaust on construction equipment to a level no less effective than the manufacture's specifications, and by shrouding or shielding impact tools.		Implement construction Mitigation Measures 14.1a – d. Maintain logs onsite verifying compliance with construction noise requirements in Acoustic Report.	Construction
	Measure 14.1c: Construction contractors within 750 feet of sensitive receptors shall locate fixed construction equipment, such as compressors and generators, and construction staging areas as far as possible from nearby sensitive receptors.	CVRWQCB / Third Party Consultant/Local Planning and Building Departments/Local Code Enforcement	Review Acoustic Report for completeness. Review construction noise logs.	RWD Review Construction
	Measure 14.1d: Construction contractors shall comply with all local			

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	noise ordinances and regulations.			
Impact 14.2: Noise from operation of dairy digester and co-digester facilities or centralized facilities could substantially increase ambient noise levels at nearby land uses or result in noise levels in excess of standards in local general plans, local noise ordinances, or other applicable standards.	**Measure 14.2:** Any continuous equipment operating at night within 1,000 feet of a sensitive receptor must be enclosed. Furthermore, an acoustic study and follow-up measurements must be performed (after construction) to prove that the noise from any continuous equipment operating at night would comply with all local noise regulations. If no local regulations are available, noise levels must be below 45 dBA at the nearest sensitive receptor. If the sound level exceeds local regulations, or 45 dBA if applicable, additional sound-proofing shall be installed to meet the required sound level.	Applicant	Prepare Acoustic Report that addresses construction and operational compliance with Mitigation Measures 14.1 through 14.4 and indicating project compliance with existing local regulations with regard to noise.	RWD Review
			Verify nighttime noise levels are in compliance with local regulations or below 45 dBA, if required.	Operations
			Forward noise complaints to the CVRWQCB.	Operations
		CVRWQCB / Third Party Consultant/ Local Planning and Building Departments/Local Code Enforcement	Review noise complaints and respond as appropriate.	
Impact 14.4: Development of dairy digester and co-digester facilities could result in a cumulative increase in noise levels.	**Measure 14.4a:** Implement Mitigation Measures 14.1a through Measure 14.1d and Measure 14.2, above.	Applicant	Implement Mitigation Measures 14.1a - d and Measure 14.2.	On-going
15. Public Services				
Impact 15.3: The project could result in significant environmental effects from the construction and operation of new water and wastewater treatment facilities or expansion of existing facilities.	**Measure 15.3a:** If the project proposes to obtain water from a water supplier (irrigation district, municipal system or other public water entity), the developer would enter into an agreement for service with the supplier.	Applicant	Provide documentation detailing the agreement for service for the project facility.	RWD Review
		CVRWQCB	Review documentation for completeness.	RWD Review
	Measure 15.3b: If the project proposes to obtain wastewater service from a wastewater treatment provider (municipal or other public entity), the developer would enter into an agreement for service with the provider.	Applicant	Provide documentation detailing the agreement for service for the project facility.	RWD Review
		CVRWQCB	Review documentation for completeness.	RWD Review
Impact 15.6: The project could result in exceeding the capacity of a wastewater treatment provider.	**Measure 15.6:** If the project proposes to obtain wastewater service from a wastewater treatment provider (municipal or other public entity), implement Mitigation Measure 15.3b.	Applicant	Provide documentation detailing the agreement for service for the project facility.	RWD Review
		CVRWQCB	Review documentation for completeness.	RWD Review
Impact 15.7: The project could result in the construction new energy supplies and	**Measure 15.7:** Implement Mitigation Measures for construction of energy infrastructure including Mitigation Measures 6.1b, 9.1a, 9.1b,	Applicant / CVRWQCB	See Mitigation Measures 6.1b, 9.1a, 9.1b, 9.2a, 9.2b, 9.3b, 12.1b, 12.2, 12.3, and	Prior to issuing permits /

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could require additional energy infrastructure.	9.2a, 9.2b, 9.3b, 12.1b, 12.2, 12.3, and 14.1a-c.		14.1a-c.	Operations

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DAIRY MANURE DIGESTER AND CO-DIGESTER FACILITIES

Draft Program Environmental Impact Report
SCH No. 2010031085

Prepared for
California Regional Water Quality
Control Board, Central Valley Region

July 2010

DAIRY MANURE DIGESTER AND CO-DIGESTER FACILITIES

Draft Program Environmental Impact Report
SCH No. 2010031085

Prepared for
California Regional Water Quality
Control Board, Central Valley Region

July 2010

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Arnold Schwarzenegger
Governor

NOTICE OF AVAILABILITY

Opportunity for Public Comment on Draft Program Environmental Impact Report for a Waste Discharge Regulatory Program for Dairy Manure Digester and Co-Digester Facilities within the Central Valley Region (Region 5)
(SCH #2010031085)

NOTICE IS HEREBY GIVEN that the California Regional Water Quality Control Board, Central Valley Region (Central Valley Water Board), as the lead agency, has released a draft Program Environmental Impact Report (EIR) for a waste discharge regulatory program for dairy manure digester and co-digester facilities within the Central Valley Region (Region 5). The 45-day public review and comment period for the draft EIR is from July 8, 2010 until August 23, 2010. During the review period, the Central Valley Water Board will hold two public meetings to receive comments on the draft EIR.

BACKGROUND

The Program EIR assesses the environmental impacts associated with the Central Valley Water Board's waste discharge regulatory program ("the project") for dairy digester and co-digester (i.e., that use manure plus other organic feedstocks) facilities in Region 5. The Program EIR provides a programmatic analysis of the environmental impacts of the development of dairy manure digester and co-digester facilities and is intended to provide California Environmental Quality Act (CEQA) compliance for the Central Valley Water Board's waste discharge regulatory program for these facilities. Additionally, other State and local permitting agencies may tier off the Program EIR to satisfy CEQA requirements for other permits related to dairy manure digester and co-digester projects.

The proposed Central Valley Water Board waste discharge regulatory program will involve the adoption of one or more Waste Discharge Requirements (WDRs) General Orders to regulate the discharge to land of liquid and solid digestate generated from dairy manure digesters and dairy manure co-digester facilities located at individual dairies or at centralized facilities on or off-site of dairies within Region 5. Under the program, the Central Valley Water Board may also adopt Individual WDRs when the General Orders would not be applicable, as well as Conditional Waivers of WDRs when a waste discharge is found to have such low threat to water quality that a waiver of WDRs is not against the public interest pursuant to California Water Code §13269.

Significant Environmental Effects

The draft EIR evaluates and describes the potential environmental impacts associated with the construction and operation of dairy digester and co-digester facilities, identifies those impacts that could be significant, and presents mitigation measures, which, if adopted by the Central Valley Water Board or other responsible agencies, could avoid or minimize these impacts. Significant unavoidable impacts are identified for water quality and criteria air pollutants.

DOCUMENT AVALIABILITY

The draft Program EIR will be available for public review at the Rancho Cordova, Fresno, and Redding offices of the Central Valley Water Board during the review period:

Central Valley Water Board
11020 Sun Center Drive, Suite 200
Rancho Cordova, CA 95670-6114
Phone: (916) 464-3291

Central Valley Water Board
1685 E Street
Fresno, CA 93706-2007
Phone: (559) 445-5116

Central Valley Water Board
415 Knollcrest Drive, Suite 100
Redding, CA 96002
Phone: (530) 224-4845

Electronic copies of the draft Program EIR can be downloaded in PDF format from the Central Valley Water Board website at:

http://www.waterboards.ca.gov/centralvalley/press_room/announcements

Copies may also be obtained by contacting Paul Miller of ESA, by phone at (916) 564-4500 or by e-mail (PMiller@esassoc.com); there will be a reasonable fee charged for a hardcopy or CD version of the draft Program EIR. Documents referenced in the draft EIR can be reviewed by appointment at the offices of ESA: 2600 Capitol Avenue, Suite 200; Sacramento, CA 95816.

PUBLIC MEETING AND SCHEDULE

Two public meetings will be held to provide participants with an opportunity to comment on the draft Program EIR.

Date:	Tuesday August 3, 2010	Wednesday August 4, 2010
Time:	6:30 PM – 8:00 PM	6:30 PM – 8:00 PM
Address:	Central Valley Water Board 1685 E Street Fresno, CA 93706	Central Valley Water Board 11020 Sun Center Drive, Suite 200 Rancho Cordova, CA 95670

Directions and location information to the Fresno and Rancho Cordova offices can be found on the Central Valley Water Board's website (next page):

http://www.waterboards.ca.gov/centralvalley/about_us/contact_us/

The facilities will be accessible to persons with disabilities. Individuals requiring special accommodations are requested to contact Stephen Klein at (559) 445-5558 at least five working days prior to the meeting. TTY users may contact the California Relay Service at (800) 735-2929 or voice line at (800) 735-2922.

Submission of Comments

The Central Valley Water Board will accept both written and oral comments regarding the adequacy of the draft Program EIR. Written comments should be submitted to Stephen Klein no later than **5:00 PM on August 23, 2010** (contact information below). Comments received after that date may not be used in staff's analysis and recommendation. Please indicate the project you are commenting upon in the subject line, "**Comment Letter – Dairy Digester and Co-Digester draft Program EIR.**" Please send your written comments regarding the draft Program EIR to:

Central Valley Water Board
Attn: Stephen Klein, Project Manager
1685 E Street
Fresno, CA 93706-2007

CONTACT INFORMATION

Additional information concerning the public review schedule for the draft Program EIR, or changes to the schedule, and information on the public meetings can be obtained by visiting the Central Valley Water Board website at:

http://www.waterboards.ca.gov/centralvalley/press_room/announcements

or by contacting Stephen Klein, by phone at (559) 445-5558 or by e-mail (sklein@waterboards.ca.gov). If you wish to receive ongoing information regarding the development of a dairy manure digester and co-digester waste discharge regulatory program, you may subscribe to the "Dairy Program" mailing list through our website at:

http://www.waterboards.ca.gov/resources/email_subscriptions/reg5_subscribe.shtml

or call Stephen Klein and request to be added to the mailing list. Please bring the above information to the attention of anyone you know who would be interested in this matter.

Clay L. Rodgers

Clay L. Rodgers, Assistant Executive Officer
8 July 2010

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CHAPTER 1
Executive Summary

1.1 Summary

The California Regional Water Quality Control Board, Central Valley Region (Central Valley Water Board) is the lead agency for this Program Environmental Impact Report (EIR) that assesses the environmental impacts associated with the Central Valley Water Board's waste discharge regulatory program ("the project") for dairy digester and co-digester (i.e., that use manure plus other organic feedstocks) facilities within the jurisdictional boundaries of the Central Valley Region (Region 5), see **Figure 1-1**. The Program EIR provides a programmatic analysis of the environmental impacts of the development of dairy manure digester and co-digester facilities and is intended to provide California Environmental Quality Act (CEQA) compliance for the Central Valley Water Board's waste discharge regulatory program for these facilities. Additionally, other State and local permitting agencies may tier off the Program EIR to satisfy CEQA requirements for other permits related to dairy manure digester and co-digester projects.

The Central Valley Water Board has proactively prepared this Program EIR to help support future development of dairy manure digester and co-digester projects in Region 5. Dairy manure digester and co-digester projects can provide benefits to the State by generating renewable energy and by reducing greenhouse gas (GHG) emissions. With these benefits as a driving force for preparing the Program EIR, the primary objectives for the waste discharge regulatory program include the following:

- Protect the beneficial uses of surface and groundwater[1] within the Central Valley Region from discharges to land associated with dairy manure digesters and co-digesters on or off-site of dairies.
- Provide a regulatory framework for the water quality aspects of anaerobic biological digestion facilities using dairy manure and dairy manure with other organic substrates (co-digestion) to produce biogas (a flexible renewable fuel source).
- Assist the State in meeting GHG reduction measures in support of the California Global Warming Solutions Act of 2006 (Assembly Bill [AB] 32) through the production of biogas from dairy manure.
- Provide a renewable green energy source to allow energy companies to help achieve the 2010 and 2020 California Renewables Portfolio Standard (RPS) through the production of biogas from dairy manure.

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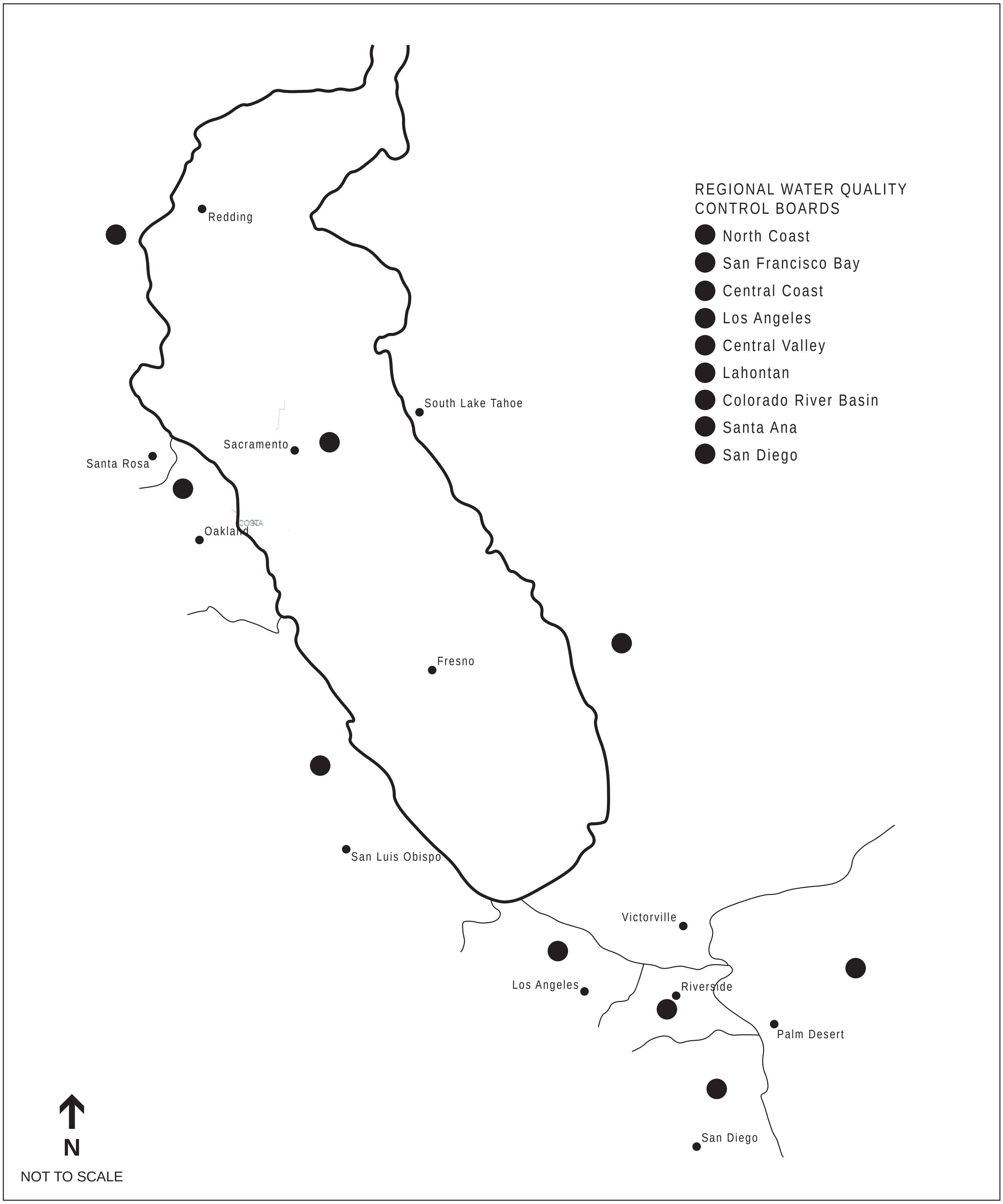
[1] Beneficial uses are described in *Water Quality Control Plan for the Tulare Lake Basin*, Second Edition, revised January 2004 (Tulare Lake Basin Plan) and *Water Quality Control Plan for the Sacramento River Basin and the San Joaquin River Basins*, Fourth Edition, revised September 2009 (Sacramento and San Joaquin Basin Plan).



SOURCE: Central Valley Water Board, 2009; and ESA, 2010

Central Valley Dairy Digester and Co-Digester Program EIR . 209481

Figure 1-1
California Regional Water Quality Control Boards

- Reduce the time required to develop and issue water quality permits for dairy manure digester and co-digester projects by more than 75 percent primarily through the issuance of one or more Waste Discharge Requirements (WDRs) General Orders (GOs) and secondarily through the issuance of Individual WDRs or Conditional Waivers of WDRs (CWs).
- Reduce the permitting time for other State and local agencies[2] with discretionary permit responsibilities by providing a Program EIR that can be relied upon or tiered from for regionwide environmental and regulatory settings, project alternatives analyses and cumulative impacts analyses

The waste discharge regulatory program will regulate the discharge of liquid and solid digestate for dairy digester and co-digester facilities in Region 5. The Central Valley Water Board maintains authority and responsibility for implementing and enforcing water quality laws regulations, policies and plans to protect the groundwater and surface waters within Region 5 under the Porter-Cologne Water Quality Control Act.

To meet the objectives, the Central Valley Water Board is proposing to adopt one or more GOs to regulate the discharge to land of liquid and solid digestate generated from dairy manure digesters and dairy manure co-digester facilities located at individual dairies or at centralized facilities on or off-site of dairies within Region 5. Under the program, the Central Valley Water Board may also adopt Individual WDRs when the GOs would not be applicable, as well as CWs when a waste discharge is found to have such low threat to water quality that a waiver of WDRs is not against the public interest pursuant to California Water Code §13269.

1.2 Description of Dairy Digester Facilities and Feedstocks

The adoption by the Central Valley Water Board, of orders under the waste discharge regulatory program (i.e., primarily GOs and secondarily Individual WDRs or CWs), would facilitate the development of new dairy digesters and co-digesters within Region 5. Therefore, this Program EIR evaluates the effects of development of these facilities, including construction and operation.

For the purpose of this Program EIR, dairy digester and co-digester development is expected to take place on individual dairies and at centralized facilities located on and off-site of dairies. **Figure 1-2** is an overview of the basic function and layout of a dairy manure digester or co-digester facility. Chapter 3 of the Program EIR provides more details on the various processes, including a description of the three basic types of dairy digesters (i.e., ambient-temperature covered lagoon digesters, plug-flow digesters, and complete mix digesters).

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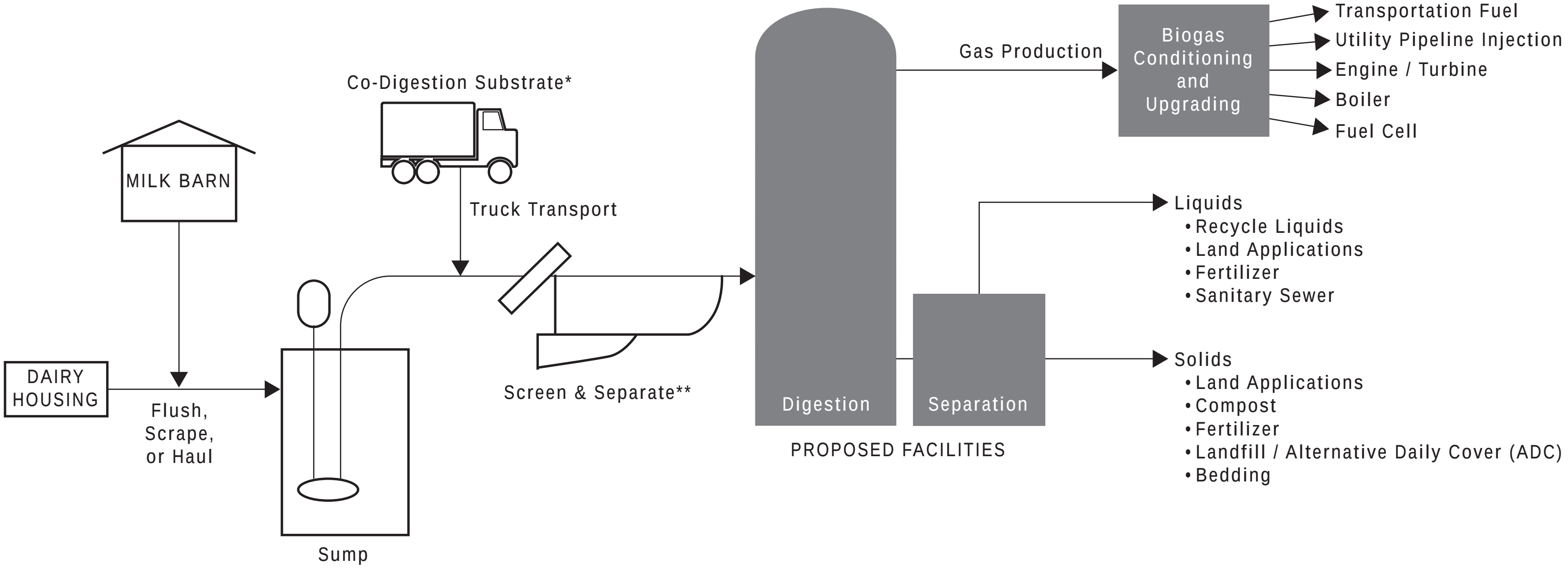
[2] San Joaquin Valley Air Pollution Control District staff have estimated that the certification of the Program EIR will reduce air quality permitting time 50 percent or more for certain digester projects.



* If co-digestion will be implemented at facility

** Screen & Separate – this step may be needed to remove straw, sand, and silt (Burke, 2001)

SOURCE: Burke, 2001; and ESA, 2010

Figure 1-2
Integration of Anaerobic Digestion in the Dairy Waste Stream

Individual Dairy Digesters

This facility type includes the addition of anaerobic digestion (AD) facilities, either dairy manure digester or co-digester facilities, onto an individual dairy. An individual dairy is an operation that houses dairy cows and collects and processes manure. Digester or co-digester facilities would be located within the footprint of the dairy operations.

Centralized Locations

There are two categories of centralized location facilities for dairies that will be assessed in this Program EIR: (1) Central AD Facility, whereby individual dairies would collect manure and transport the manure by pipeline or truck to a central facility; and (2) a Central Biogas Clean-Up Facility, whereby raw biogas from individual dairies (including dairies linked via underground gas pipelines) is piped to a central facility. These types of centralized facilities may be sited on or off-site of dairies. For both location options, the central facility would have the potential to receive manure, manure plus co-digestion substrate, and/or raw biogas.

Feedstock

The feedstock for dairy manure digesters would be either manure only, or the addition of other organic substrates to manure for dairy co-digesters. The feedstocks for co-digestion could include food processing residues, the organic fraction of municipal solid waste, fats, oils, grease, agricultural residues, and biomass energy crops. The addition of other organic substrates to the manure waste stream as part of co-digestion can dramatically increase the generation of biogas compared to a manure-only digester system. Co-digestion substrates can increase the electrical capacity of a proposed system by a magnitude five times or greater than that of dairy manure alone. Technically, digestion of dairy manure alone is straightforward; the difficulty is in the economics. The use of co-digestion substrates is generally considered by dairy digester project developers as an important element that can be used to help achieve project viability.

1.3 Environmental Impacts and Mitigation Measures

Potential environmental impacts of the project are summarized in **Table 1-1** at the end of this chapter. For each significant impact, the table indicates whether the impact would be mitigated to a less than significant level. Please refer to Chapters 5 through Chapter 15 in this draft Program EIR for a complete discussion of each impact. As discussed in Chapter 2, a Mitigation Monitoring and Reporting Program (MMRP) will be prepared at the time of the Final Program EIR for this project.

Development of dairy digesters could result in significant adverse environmental impacts. Suggested mitigation measures are identified in this Program EIR that would avoid or reduce all but two of the potentially significant impacts to a less than significant level.

The following significant adverse impact would be unavoidable, even with implementation of mitigation measures:

- Impact 5.6 – Development of dairy digester and co-digester facilities, together with anticipated cumulative development in the area, could contribute to cumulative water quality impacts.
- Impact 6.6 – The criteria air pollutant emissions from the cumulative development of dairy manure digester and co-digester facilities in Region 5 (200 total digesters at a rate of 20 digesters or co-digesters per year for 10 years) were compared to and exceeded the significance thresholds of the San Joaquin Valley Air Pollution Control District (SJVAPCD) for both annual construction emissions and operational emissions.

In the case where potentially significant impacts cannot be feasibly mitigated, a "Statement of Overriding Considerations" must be included in the record of project approval of the Program EIR by the Central Valley Water Board.

Notably, the development of dairy digesters would have substantial benefits in regards to reducing GHG emissions in comparison to existing manure management practices. Also, the draft EIR includes mitigations that could reduce the air quality impacts of individual dairy manure digester and co-digester projects to a less-than-significant level.

1.4 Areas of Controversy and Unresolved Issues

For the most part, comments received from dairy owners, dairy representatives, and the Technical Advisory Group (TAG) assembled for the project have been supportive of the goals of the Program EIR to reduce the time required to develop water quality permits and other discretionary permits for dairy manure digester and co-digester facilities and centralized facilities. The development of dairy manure digester facilities is capital intensive and getting a project started would benefit from any assistance in minimizing the cost of permitting facilities and/or identifying a more certain path to obtaining permits.

The areas of controversy identified included the following:

- Multiple concerns from one commenter about increased ammonia emissions that would result from the project. Literature reviews and discussions with the SJVAPCD staff did not support the concerns expressed about increased ammonia emissions.
- A general concern has been expressed by several parties about the addition of co-digestion substrates to the dairy manure digesters. The most common concern is that the addition of co-digestion substrates will add nutrients and salts to the digestate and that many dairies will not be able to land apply these "additional" nutrients and salts (i.e., added via the imported co-digestion substrates).
- Some stakeholders have expressed the concern that meeting the new stringent SJVAPCD nitrogen oxide (NOx) emission standards (9-11 parts per million [ppm]) is infeasible, but others indicate that existing systems can generate power and meet the standard. The SJVAPCD strongly disagrees that achieving 9-11 ppm is infeasible for new operations. The SJVAPCD reports that the two newest San Joaquin Valley dairy digester power-production operations are currently operating in compliance with this standard. The SJVAPCD contends that, while operations that can achieve this standard are more expensive to construct and operate than their more polluting counterparts, they are a

necessary part of controlling air pollution in the San Joaquin Valley, one of the most polluted air basins in the country.

1.5 Alternatives

The purpose of the alternatives analysis in an EIR is to describe a range of reasonable alternatives to the project that could feasibly attain the objectives of the project, and to evaluate the comparative merits of the alternatives (CEQA Guidelines §15126.6(a)).

Additionally, CEQA Guidelines §15126.6(b) requires consideration of alternatives that could avoid or substantially lessen any significant adverse environmental effects of the proposed project, including alternatives that may be more costly or could otherwise impede the project's objectives. The range of alternatives considered must include those that offer substantial environmental advantages over the proposed project and may be feasibly accomplished in a successful manner considering economic, environmental, social, technological, and legal factors.

The following alternatives are discussed in Chapter 17, "Alternatives:"

- Alternative 1 - "No Project" Alternative. The No Project Alternative is required by CEQA. According to the CEQA Guidelines, the No Project Alternative shall discuss the existing conditions, as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services.
- Alternative 2 - "Additional Co-Digester Substrate Restrictions" Alternative. This alterative would apply three additional restrictions to the use of co-digestion substrates in dairy manure digesters. First, it would prohibit the use of co-digestion substrates that originate from outside the regional aquifer. Second, it would prohibit the use of co-digestion substrates until dairies have identified and secured an appropriate destination or market for the additional digestate that would be generated by the additional co-digestion substrates. Finally, the alternative would regulate that volume of materials processed by dairy manure digester facilities.
- Alternative 3 - "Thermal Conversion" Alternative. The Thermal Conversion Alternative would replace anaerobic digesters with thermal conversion technologies. Under the Thermal Conversion Alternative, the regulatory program would apply to the construction and operation of thermal conversion facilities for the production of biogas from dairy manure.

- Alternative 4 - "The Reduced NOx Emissions Alternative" would limit the use of combustion engines in the generation of electricity by requiring or developing incentives for biogas uses from dairy digester facilities that minimize nitrogen oxide (NOx) emissions in the Central Valley (i.e., fuel cells, transportation fuels and injection into utility gas pipelines). NOx emissions are a precursor to the formation of ozone that are generated by internal combustion engines and microturbines. Combustion of biogas generates electricity but it also generates NOx emissions. This alternative involves the use of technologies or strategies that would reduce NOx emissions in the air basin. By limiting energy production to the use of fuel cells or for utility pipeline injection or for development of transportation fuel, significant unavoidable cumulative air quality impacts from the emission of NOx would be reduced.

CEQA requires that an EIR identify which among the alternatives is the "environmentally superior alternative". Table 17-1 in the Alternatives Chapter indicates that the Additional Co-digestion Substrate Restrictions Alternative, and the Reduced NOx Emissions Alternative each would have reduced impacts in some environmental resource areas when compared to the project and none of the potential impacts for these two alternatives are greater than impacts of the proposed project. The Additional Co-digestion Substrate Restrictions Alternative has restrictions on co-digestion substrates that could potentially provide additional protection for the water resources in Region 5. By reducing NOx emissions that would have an incremental beneficial effect to all Region 5 residents, the Reduced NOx Emissions Alternative provides the most potential benefit to the greatest number of residents of the Central Valley. To the extent that the technology required for the Reduced NOx Emissions Alternative becomes feasible and cost effective, this Alternative would constitute the environmentally superior alternative.

Regardless of their potential benefits, both the Additional Co-digestion Substrate Restrictions Alternative, and the Reduced NOx Emissions Alternative place restrictions on the development of dairy manure digester and co-digester projects that could further restrict future growth of digesters in Region 5. Dairy digester development would be restricted by the high costs and/or additional regulatory hurdles of the technologies associated with the Reduced NOx Emissions Alternative (i.e., fuel cells, transportation fuel, and utility pipeline injection). Dairy digester development would also be restricted by additional limitations contained in the Additional Co-digestion Substrate Restrictions Alternative. By likely restricting the development of dairy digesters in Region 5, both the Additional Co-digestion Substrate Restrictions Alternative, and the Reduced NOx Emissions Alternative would have a negative influence on two of the primary objectives of the project, which are the development of a renewable energy resource (biogas) and the reduction of GHG emissions from dairy operations. Accordingly, some environmental benefits would as a practical matter be lost under these alternatives. Given the existing technological and economic constraints, therefore, these alternatives cannot be said to be clearly environmentally superior to the proposed project.

TABLE 1-1
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance	
		Before Mitigation	After Mitigation
5. Hydrology and Water Quality			
Impact 5.1: Construction associated with installation of dairy digesters and co-digester facilities could generate loose, erodible soils that may impair water quality.	None required.	LS	LS
Impact 5.2: Digester and co-digester development could adversely affect surface waters.	**Measure 5.2:** WDRs for digester and co-digester facilities shall include design and operational requirements to manage all wastes and discharges to protect surface waters. Requirements shall include the following: • Prohibitions against any surface water discharges (unless covered by separate NPDES permit), • Prohibitions against any discharges that would cause exceedance of surface water quality objectives, • Setbacks from surface water bodies • Drainage requirements for co-digestion substrates/waste storage/receiving/handling areas to drain to on-site wastewater retention ponds, • Lining requirements for retention ponds in new facilities and operational dairies, • Monitoring requirements that include sampling data of soils, retention water, and waste streams to reconcile annually with Nutrient Management Plan (NMP), • Requirements for tailwater return systems to minimize offsite discharges; • Prohibitions against any unreasonable effects on beneficial uses of nearby surface waters.	S	LSM
Impact 5.3: Digester and co-digester development could adversely affect groundwater quality.	**Measure 5.3:** WDRs for the discharge to land from dairy digester and co-digester facilities shall include the following BPTC requirements or equivalent: • Prepare and implement site-specific Salt Minimization Plan (SMP) as approved by the Central Valley Water Board; • Prepare and implement a site-specific NMP that includes a soils and groundwater monitoring and reporting program that include a variety of waste constituents, as well as yearly reconciliation based on sampling results that measure agronomic rates; • Require all drainage be directed to a retention wastewater pond that has been designed to meet antidegradation provisions of Resolution 68-16 by an appropriately licensed professional; • Prohibit, decommission, or reduce use of regenerative water softeners on process water distribution networks or, alternatively, evaluate and install alternate technology that reduces or eliminates on-site brine disposal; • To the extent practicable, use crops that maximize salt uptake; • Apply liquid digestate consistently with crop water uptake rates; • Prohibit hazardous substances in co-digestion substrates processed by each facility as verified by laboratory analytical testing;	S	LSM

LS – Less than Significant LSM – Less than Significant with Mitigation NI – No Impact S – Significant SU – Significant and Unavoidable

TABLE 1-1
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance	
		Before Mitigation	After Mitigation
	• Apply digestate at an approved rate commensurate with agronomic rate; • Properly time application of digestate in accordance with crop requirements; • Avoid excess irrigation; • Maintain cover crops and vegetative buffer zones; • Develop co-substrate acceptance criteria; • Develop and implement a vector attraction reduction plan; • Monitor digestate, and groundwater for pathogen indicator organisms; • Require that solid wastes be stored on impermeable surfaces; • Maintain a neutral or alkaline pH for dairy digestate waste water applied to cropland • Prohibit hazardous waste, mammalian tissues, dead animals, and human waste from all discharges; and • Incorporate lined digester and co-digestion substrate storage facilities that meet the antidegradation provisions of Resolution 68-16, as relevant, into project design in order to prevent groundwater contamination with salts, nutrients, and other constituents. Each facility shall prepare a site-specific BPTC plan in accordance with the WDR requirements for review and approval to the Central Valley Water Board prior to commencement of operations. Annual monitoring reports shall be reviewed by the Central Valley Water Board and any revisions deemed necessary to the handling, storage, or land application of wastes shall be incorporated into facility operations.		
Impact 5.4: Development of dairy digester and co-digester facilities could be exposed to flooding hazards.	**Mitigation Measure 5.4:** WDRs for digester and co-digester facilities shall include design requirements for individual or centralized anaerobic digester or co-digester facilities, application croplands, and associated facilities to protect them from FEMA 100-year flood events. Design measures may include, but are not limited to: facility sitting, access placement, grading foundation soils above projected water elevation, and site protection.	S	LSM
Impact 5.5: Development of dairy digester and co-digester facilities could require additional water supplies resulting in depletion of groundwater.	None required.	LS	LS
Impact 5.6: Development of dairy digester and co-digester facilities could contribute to cumulative impacts to water quality.	**Mitigation Measure 5.6:** Implement Mitigation Measures 5.2, 5.3 and 5.4.	S	SU
6. Air Quality and Greenhouse Gas Emissions			
Impact 6.1: Construction of dairy digester and co-digester facilities within Region 5 would generate short-term emissions of criteria air pollutants: ROG, NOx, CO, SO_2, PM10, and PM2.5 that could contribute to existing nonattainment conditions and further degrade air quality.	**Measure 6.1a:** Applicants shall prepare and submit an Air Quality Technical Report as part of the environmental assessments for the development of future dairy digester or co-digester facilities on a specific project-by-project basis. The technical report shall include an analysis of potential air quality impacts (including a screening level analysis to determine if construction and operation related criteria air pollutant emissions would exceed applicable air district thresholds, as well as any health risk associated with TACs from all dairy digester or co-digester facility sources) and reduction measures as necessary	S	LSM

LS – Less than Significant   LSM – Less than Significant with Mitigation   NI – No Impact   S – Significant   SU – Significant and Unavoidable

TABLE 1-1
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance Before Mitigation	Impact Significance After Mitigation
	associated with digester developments through the environmental review process. Preparation of the technical report should be coordinated with the appropriate air district and shall identify compliance with all applicable New Source Review and Best Available Control Technology (BACT) requirements. The technical report shall identify all project emissions from permitted (stationary) and non-permitted (mobile and area) sources and mitigation measures (as appropriate) designed to reduce significant emissions to below the applicable air district thresholds of significance, and if these thresholds cannot be met with mitigation, then the individual digester project could require additional CEQA review or additional mitigation measures. **Measure 6.1b:** Applicants shall require construction contractors and system operators to implement the following Best Management Practices (BMPs) as applicable during construction and operations: • Facilities shall be required to comply with the rules and regulations from the applicable AQMD or APCD. For example, development of dairy digester and co-digester facilities in the SJVAPCD jurisdiction shall comply with the applicable requirements of Regulation VIII (Fugitive PM10 Prohibitions) and Rule 9510 (Indirect Source Review). • Use equipment meeting, at a minimum, Tier II emission standards, as set forth in §2423 of Title 13 of the California Code of Regulations, and Part 89 of Title 40 Code of Federal Regulations. • Minimize idling time either by shutting equipment off when not in use or reducing the time of idling to 5 minutes (as required by the state airborne toxics control measure [Title 13, §2485 of the California Code of Regulations]). Provide clear signage that posts this requirement for workers at the entrances to the site. • Comply with state regulations to minimize truck idling. • Maintain all equipment in proper working condition according to manufacturer's specifications. The equipment must be checked by a certified mechanic and determine to be running in proper condition before it is operated. • Use electric equipment when possible. • Payment into an AQMD or APCD operated Voluntary Emission Reduction Agreement (VERA). • Incorporate fuel cells where feasible as an alternative to internal combustion engines, which generate NOx emissions, to generate energy from the biogas produced at dairy digester and co-digester facilities. • Where feasible as an alternative to internal combustion engines, which generate NOx emissions, use biogas from dairy manure digester and co-digester projects as a transportation fuel (compressed biomethane) or inject biomethane into the utility gas pipeline system.		
Impact 6.2: Pre-processing, digestion, and post-processing operational activities of dairy digester and co-digester facilities in Region 5 would result in emissions of criteria air pollutants at levels that could substantially contribute to a potential violation of applicable air quality standards or to nonattainment conditions.	**Mitigation Measure 6.2:** Implement Mitigation Measures 6.1a and 6.1b.	S	LSM

LS – Less than Significant LSM – Less than Significant with Mitigation NI – No Impact S – Significant SU – Significant and Unavoidable

TABLE 1-1
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance	
		Before Mitigation	After Mitigation
Impact 6.3: Operation of dairy digester and co-digester facilities in Region 5 could create objectionable odors affecting a substantial number of people.	**Measure 6.3a:** Applicants for the development of digester facilities shall comply with appropriate local land use plans, policies, and regulations, including applicable setbacks and buffer areas from sensitive land uses for potentially odoriferous processes. **Measure 6.3b:** Applicants shall implement an Odor Management Plan (OMP) as part of each application submitted to establish digester and co-digester facilities. The OMP will specifically address odor control associated with digester operations and will include: • A list of potential odor sources. • Identification and description of the most likely sources of odor. • Identification of potential, intensity, and frequency of odor from likely sources. • A list of odor control technologies and management practices that could be implemented to minimize odor releases. These management practices shall include the establishment of the following criteria: - Establish time limit for on-site retention of undigested co-substrates (i.e., organic co-substrates must be put into the digester within 48 hours of receipt). - Provide negative pressure buildings for indoor unloading. Treat collected foul air in a biofilter or air scrubbing system. - Establish contingency plans for operating downtime (e.g., equipment malfunction, power outage). - Manage delivery schedule to facilitate prompt handling of odorous co-substrates. - Modification options for land application practices if land application of digestate results in unacceptable odor levels. - Protocol for monitoring and recording odor events. - Protocol for reporting and responding to odor events.	S	LSM
Impact 6.4: Construction and operation of dairy digester and co-digester facilities in Region 5 could lead to increases in chronic exposure of sensitive receptors in the vicinity to certain toxic air contaminants from stationary and mobile sources.	**Measure 6.4a:** Implement Mitigation Measures 6.1a and 6.1b. **Measure 6.4b:** Based on the Air Quality Technical Report (specified in Measure 6.1a), if the health risk is determined to be significant on a project-by-project basis with DPM as a major contributor, then the applicants shall either use new diesel engines that are designed to minimize DPM emissions (usually through the use of catalyzed particulate filters in the exhaust) or retrofit older engines with catalyzed particulate filters, which will reduce DPM emissions by 85%. **Measure 6.4c:** H_2S contained in the biogas shall be scrubbed.	S	LSM
Impact 6.5: Construction and operation of dairy digester and co-digester facilities in Region 5 would reduce GHG emissions.	None required.	NI	NI
Impact 6.6: Development of dairy digester and co-digester facilities in Region 5, together with anticipated cumulative development in the area, would contribute to regional criteria pollutants.	**Mitigation Measure 6.6:** Implement Mitigation Measures 6.1a and 6.1b.	S	SU

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TABLE 1-1
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance Before Mitigation	Impact Significance After Mitigation
7. Land Use and Agricultural Resources			
Impact 7.1: The project would not physically divide an established community.	None required.	LS	LS
Impact 7.2: The project would not result in dairy digester and co-digester facilities that could conflict with an applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect.	None required.	LS	LS
Impact 7.3: Implementation of the project would not conflict with an applicable habitat conservation plan or natural community conservation plan.	None required.	LS	LS
Impact 7.4: Implementation of the project could result in the permanent conversion of land designated by the Department of Conservation FMMP as Prime Farmland, Farmland of Statewide Importance or Unique Farmland.	**Measure 7.4:** Whenever feasible, off-site project related facilities should not be sited on Important Farmland as defined by the California Department of Conservation's Farmland Mapping and Monitoring Program.	LS	LS
Impact 7.5: The project would not result in conflicts with existing zoning for agricultural use or a Williamson Act contract.	None required.	LS	LS
Impact 7.6: Implementation of the project would not result in the conversion of farmland to non-agricultural uses.	None required.	LS	LS
Impact 7.7: Development of dairy digester and co-digester facilities would not result in cumulative land use impacts or cumulative impacts to agricultural resources.	None required.	LS	LS
8. Transportation and Traffic			
Impact 8.1: Construction of dairy digester and co-digester facilities would intermittently and temporarily increase traffic levels and traffic delays due to vehicle trips generated by construction workers and construction vehicles on area roadways.	**Measure 8.1:** The contractor(s) will obtain any necessary road encroachment permits prior to installation of pipelines within the existing roadway right-of-way. As part of the road encroachment permit process, the contractor(s) will submit a traffic safety / traffic management plan (for work in the public right-of-way) to the agencies having jurisdiction over the affected roads. Elements of the plan will likely include, but are not necessarily limited to, the following: • Develop circulation and detour plans to minimize impacts to local street circulation. Use haul routes minimizing truck traffic on local roadways to the extent possible. Use flaggers and/or signage to guide vehicles through and/or around the construction zone. • To the extent feasible, and as needed to avoid adverse impacts on traffic flow, schedule truck trips outside of peak morning and evening commute hours. • Limit lane closures during peak traffic hours to the extent possible. Restore roads and streets to normal operation by covering trenches with steel plates outside of allowed working hours	S	LSM

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TABLE 1-1
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance Before Mitigation	Impact Significance After Mitigation
	or when work is not in progress. • Limit, where possible, the pipeline construction work zone to a width that, at a minimum, maintains alternate one-way traffic flow past the construction zone. • Install traffic control devices as specified in Caltrans' Manual of Traffic Controls for Construction and Maintenance Work Zones where needed to maintain safe driving conditions. Use flaggers and/or signage to safely direct traffic through construction work zones. • Coordinate with facility owners or administrators of sensitive land uses such as police and fire stations, hospitals, and schools. Provide advance notification to the facility owner or operator of the timing, location, and duration of construction activities. • To the maximum extent feasible, maintain access to private driveways located within construction zones. • Coordinate with the local public transit providers so that bus routes or bus stops in work zones can be temporarily relocated as the service provider deems necessary.		
Impact 8.2: Operations of dairy digester and co-digester facilities would increase traffic volumes on roadways serving the facility sites.	None required.	LS	LS
Impact 8.3: Construction and operation of dairy digester and co-digester facilities could potentially cause traffic safety hazards for vehicles, bicyclists, and pedestrians on public roadways, and could increase traffic hazards due to possible road wear or to accident spills of manure, or co-digestion feedstocks or digestate.	**Measure 8.3a:** Implement Measure 8.1, which stipulates actions required of the contractor(s) to reduce potential traffic safety impacts to a less-than-significant level. **Measure 8.3b:** Prior to construction, the contractor(s), in cooperation with the agencies having jurisdiction over the affected roadways, will survey and describe the pre-construction roadway conditions on rural roadways and residential streets. Within 30 days after construction is completed, the affected agencies will survey these same roadways and residential streets in order to identify any damage that has occurred. Roads damaged by construction will be repaired to a structural condition equal to the condition that existed prior to construction activity.	S	LSM
Impact 8.4: Construction of dairy digester and co-digester facilities could intermittently and temporarily impede access to local streets or adjacent uses (including access for emergency vehicles), as well as disruption to bicycle/pedestrian access and circulation.	**Mitigation Measure 8.4:** Implement Measure 8.1, which stipulates actions required of the contractor(s) to reduce potential access impacts to a less-than-significant level.	S	LSM
Impact 8.5: Construction and operation of dairy digester and co-digester facilities could contribute to cumulative impacts to traffic and transportation (traffic congestion, traffic safety, and emergency vehicle access).	**Measure 8.5a:** Prior to construction, the project sponsor will coordinate with the appropriate local government departments, Caltrans, and utility districts and agencies regarding the timing of construction projects that would occur near project sites. Specific measures to mitigate potential significant impacts will be determined as part of the interagency coordination, and could include measures such as employing flaggers during key construction periods, designating alternate haul routes, and providing more outreach and community noticing. **Measure 8.5b:** Implement Mitigation Measures 8.1 and 8.3b.	S	LSM

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TABLE 1-1
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance	
		Before Mitigation	After Mitigation
9. Biological Resources			
Impact 9.1: The project could impact special-status plant or wildlife species or their habitats.	**Measure 9.1a:** The project applicant or agency(s) responsible shall submit, as part of the NOI, a site assessment report for dairy digester and co-digester facilities to be constructed (including the location of digestate application) in areas that contain undisturbed land and/or any agricultural fields that have been fallow for more than 1 year. This report shall be prepared by a qualified biologist. It shall evaluate the project site's potential to support special-status plant and wildlife species (including critical habitat) and whether special-status species could be affected by dairy digester and co-digester development, including construction and operations. If there are no special-status species or critical habitat present, no additional mitigation would be required. **Measure 9.1b:** If the site assessment determines that special-status species could be affected by facilities development, the project would not be eligible as part of the project (for the Central Valley Water Board discharge permit) unless the applicant submits a plan, prepared by a qualified biologist, to mitigate or avoid any significant impacts on special-status species. This plan must be forwarded to the appropriate regional office of the CDFG, the Endangered Species Unit of the USFWS in Sacramento, and/or NMFS for review and approval of the mitigation strategy, when appropriate. If the site assessment determines that a State or federally listed species would be affected by facilities development, the project applicant shall consult with CDFG, the Endangered Species Unit of the USFWS in Sacramento, and/or NMFS, as appropriate.	S	LSM
Impact 9.2: The project could result in impacts on biologically unique or sensitive natural communities.	**Measure 9.2a:** The project applicant or agency(s) responsible shall submit, with the NOI, a site assessment report prepared by a qualified biologist that determines if the project is likely to affect biologically unique or sensitive natural communities. This information could be included in the report prepared under Mitigation Measure 9.1a. If there are no biologically unique or sensitive natural communities present, no further mitigation is required. **Measure 9.2b:** If biologically unique or sensitive natural communities are present and would be disturbed, the project would not be authorized under the project unless the applicant or agency(s) responsible submits a plan to avoid or mitigate for any significant impacts on biologically unique or sensitive natural communities and agrees to implement the mitigation. This report must be forwarded to the appropriate regional office of the CDFG and/or the Endangered Species Unit of the USFWS in Sacramento (as appropriate) for review and approval of the mitigation strategy. As described above, this portion of the report could be incorporated into the report prepared under Mitigation Measure 9.1a.	S	LSM
Impact 9.3: The project could result in impacts on waters of the State and/or the U.S., including wetlands.	**Measure 9.3a:** The project applicant or agency(s) responsible shall submit, with the NOI, a site assessment report prepared by a qualified biologist that evaluates if the project is likely to affect waters of the State and/or U.S., including wetlands. This information could be included in the report prepared under Mitigation Measure 9.1a. If there are no waters present, no further mitigation would be required. **Measure 9.3b:** If waters of the State and/or U.S. are present in the project area, the project applicant or agency(s) responsible shall either re-design the project to avoid affecting the waters, or obtain the appropriate permits to allow for the impact. For waters that cannot be avoided, the permit process shall start with the preparation of a jurisdictional wetland delineation, prepared by a qualified biologist that will be submitted to the Corps for verification. Following verification, if jurisdictional waters occur within the project site, the project applicant or agency(s) responsible shall obtain and comply with federal and State permit requirements. This could include obtaining a Clean Water Act Section 404 permit, Section 401 Water	S	LSM

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TABLE 1-1
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance	
		Before Mitigation	After Mitigation
	Quality Certification or Waiver, a Section 1602 Streambed Alteration Agreement, and any other applicable permits.		
Impact 9.4: The project would not result in impacts on migratory corridors or native wildlife nursery sites.	None required		LS
Impact 9.5: Dairy digester and co-digester facilities would not conflict with local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.	None required.	LS LS	LS
Impact 9.6: Development of dairy digester and co-digester facilities could contribute to cumulative impacts to biological resources.	**Mitigation Measure 9.6:** Implement Measures 9.1a, 9.1b, 9.2a, 9.2b, 9.3a, and 9.3b.	S	LSM
10. Hazards and Hazardous Materials			
Impact 10.1: Construction of dairy digester and co-digester facilities could result in the potential exposure of construction workers, the public and the environment to preexisting soil and/or groundwater contamination.	**Mitigation Measure 10.1:** Prior to final project design and any earth disturbing activities, the applicant or agency(s) responsible shall conduct a Phase I Site Assessment. The Phase I Environmental Site Assessment (ESA) shall be prepared by a Registered Environmental Assessor (REA) or other qualified professional to assess the potential for contaminated soil or groundwater conditions at the project site; specifically in the area proposed for construction of dairy digester or co-digester facilities. The Phase I ESA shall include a review of appropriate federal and State hazardous materials databases, as well as relevant local hazardous material site databases for hazardous waste on-site and off-site locations within a one quarter mile radius of the project site. This Phase I ESA shall also include a review of existing or past land uses and areal photographs, summary of results of reconnaissance site visit(s), and review of other relevant existing information that could identify the potential existence of contaminated soil or groundwater. If no contaminated soil or groundwater is identified or if the Phase I ESA does not recommend any further investigation then the project applicant or agency(s) responsible shall proceed with final project design and construction. OR If existing soil or groundwater contamination is identified and if the Phase 1 ESA recommends further review, the applicant or agency(s) responsible shall retain a REA to conduct follow-up sampling to characterize the contamination and to identify any required remediation that shall be conducted consistent with applicable regulations prior to any earth disturbing activities. The environmental professional shall prepare a report that includes, but is not limited to, activities performed for the assessment, summary of anticipated contaminants and contaminant concentrations at the proposed construction site, and recommendations for appropriate handling of any contaminated materials during construction.	S	LSM
Impact 10.2: Transportation, use, disposal or accidental spill of hazardous materials during construction of dairy digester and co-digester facilities would not result in the potential exposure of construction workers, the public and the environment to hazardous materials.	None required.	LS	LS

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ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance	
		Before Mitigation	After Mitigation
Impact 10.3: Transportation, use, disposal or accidental spill of hazardous materials during the operation and maintenance of dairy digester and co-digester facilities would not result in the potential exposure of the public or the environment to hazardous materials.	None required.	LS	LS
Impact 10.4 Operation of dairy digester and co-digester facilities would not result in the release of biogas which could increase the risk of fire hazards.	None required.	LS	LS
Impact 10.5 Dairy digester and co-digester facilities could be located within a one quarter mile of a school resulting in potential hazards associated with accidental release of hazardous materials, including biogas.	**Mitigation Measure 10.5:** Dairy digester and co-digester facilities shall be sited at least one quarter mile from existing or proposed schools, daycare facilities, hospitals and other sensitive land uses.	LS	LS
Impact 10.6: Installation of biogas pipelines in public rights-of-way could impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.	**Mitigation Measure 10.6:** Implement Mitigation Measure 8.1.	S	LSM
Impact 10.7: Development of dairy digester and co-digester facilities could contribute to cumulative impacts related to hazardous materials.	**Mitigation Measure 10.7:** Implement Mitigation Measures 10.1 and 10.5.	LS	LS
11. Aesthetic Resources			
Impact 11.1: Implementation of the project, including operation of dairy digester and co-digestion facilities, could result in impacts to scenic highways and/or scenic vistas.	**Mitigation Measure 11.1a:** Centralized biogas processing facilities shall be sited in locations that do not conflict with local polices for preservation of vistas or scenic views. **Mitigation Measure 11.1b:** When feasible considering the scale of the facilities and the site specific topography, site specific landscape design, including berms and/or tree rows, shall be constructed in order to minimize potentially sensitive views of both digester facilities at dairies or off dairies at centralized facilities. **Mitigation Measure 11.1c:** Centralized biogas processing facilities shall be designed similarly in massing and scale to other nearby agricultural buildings in agricultural areas, in order to retain the character of the surrounding visual landscape.	S	LSM
Impact 11.2: Construction of the project could result in impacts to scenic highways and/or scenic vistas.	**Mitigation Measure 11.2:** The project shall incorporate into all construction contracts for the proposed project and ensure implementation of the following measures: • Main construction staging areas and the storage of large equipment shall be situated on individual sites in such a manner to minimize visibility to nearby receptors. As feasible, staging areas and storage shall occur away from heavily traveled designated scenic roadways, in areas where it will be least visible from the surrounding roads. • Construction staging areas shall be onsite and remain clear of all trash, weeds and debris, etc. Construction staging areas shall be located in areas that limit visibility from scenic roadways and sensitive receptors to the extent feasible.	S	LSM

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ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance Before Mitigation	Impact Significance After Mitigation
Impact 11.3: Implementation of the project could result in substantial creation of or change in light or glare.	**Mitigation Measure 11.3:** Whenever possible, flares shall be situated on individual sites in such a manner to minimize visibility to nearby receptors. Site specific design shall discourage placement of flares at higher elevations, or within the line of site of nearby residential buildings or scenic highways. In the event that site design does not provide adequate coverage, an enclosed flare design shall be used or landscaping, such as berms or tree rows, shall be constructed to minimize light impacts.	S	LSM
Impact 11.4: Development of dairy digester and co-digester facilities could contribute to cumulative impacts to aesthetics.	**Mitigation Measure 11.4:** Implement Mitigation Measures 11.1a, 11.1b, 11.1c, 11.2, and 11.3.	S	LSM
12. Cultural Resources			
Impact 12.1: Construction of dairy digester and co-digester facilities could result in the adverse change in the significance of a historical or archaeological resource, pursuant to §15064.5.	**Measure 12.1a:** In order to determine whether a project may cause a significant impact to cultural resources, and therefore, have an adverse effect on the environment, the Central Valley Water Board shall require a project-specific cultural resources inventory and evaluation with each application submitted to establish a digester or co-digester facility (COHP 2001).A project-level cultural resources inventory and evaluation shall be required prior to project implementation to provide a thorough assessment of the project's potential direct, indirect, and cumulative impacts on historical resources or significant archaeological resources during construction and installation, in adherence to established regulations, standards, and policies to avoid or minimize potential impacts. For projects that constitute federal undertakings, as described in the Federal Agencies section of the Introduction (Chapter 2), the cultural resources study shall be prepared in accordance with Section 106 of the NHPA. The cultural resources study and inclusive mitigation measures shall form the basis for the cultural resources component of the project-level environmental documentation prepared for the project under Section 106 (NPS 1991). Prior to ground-disturbing activities, the project applicant or agency(s) responsible shall retain a qualified professional archaeologist, who meets the Secretary of the Interior's professional qualifications standards for archaeology (36 CFR §61), to (1) conduct a research search at the appropriate information center of the California Historical Resources Information System (CHRIS) to determine whether the project area has been previously surveyed and whether cultural resources were identified within the project area, and if the project area is considered sensitive for the presence of cultural resources; (2) request a Sacred Lands search from the NAHC to determine whether known sacred sites or traditional cultural resources are situated within the project area; and (3) request a contact list from the NAHC of Native American tribes, groups or individuals who may have information about the project area, and contact the listed parties requesting information and any concerns about the project. In the event the CHRIS records search indicates that no previous survey has been conducted, the qualified archaeologist shall recommend whether a survey is warranted to satisfy the requirements of CEQA based on the sensitivity of the project area for cultural resources. As necessary, prior to the start of ground disturbance, the project applicant or agency(s) responsible shall retain a qualified archaeologist to conduct the recommended project-level survey in compliance with CEQA requirements (14 CCR §15064.5 and PRC §21083.2) and in accordance with the standards set by the Secretary of the Interior. After completion of the survey, the qualified archaeologist shall complete a technical report documenting the results of all work, and any cultural resources identified during the survey shall be formally recorded	S	LSM

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ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance	
		Before Mitigation	After Mitigation
	on Department of Parks and Recreation series 523 forms. The report shall follow the Office of Historic Preservation's ARMR guidelines (*Archaeological Resource Management Reports: Recommended Contents and Format*) (COHP 1990). The report shall include assessment of the significance of identified resources according to the applicable local, State and federal significance criteria, assessment of the sensitivity of the project area for cultural resources, and recommend appropriate procedures to either further investigate, or mitigate adverse impacts in conformance with the protocols set forth in 14 CCR §15126.4. The final technical report shall be approved by the lead agency prior to the initiation of any ground-disturbing activities. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum, and not be made available for public disclosure. The final written report should be submitted to the appropriate CHRIS information center(s) within three (3) months after the work has been completed. If cultural resources within a project area identified by the searches at the CHRIS or NAHC or during the survey are considered potentially significant, the project applicant or agency(s) responsible shall undertake additional studies to evaluate the resources' NRHP or CRHR eligibility and to recommend further mitigative treatment. Evaluations shall be based on surface remains, subsurface testing, archival and ethnographic resources, and in the framework of the historic context and important research questions of the project area. If cultural resources within a project area identified by the searches at the CHRIS or NAHC, during the survey, or by the evaluation process are determined significant historical resources, the lead agency must review and approve treatment measures devised by the project applicant or agency(s) responsible, in concert with a qualified archaeologist, or architectural historian for built environmental resources, and other concerned parties, to ameliorate any "substantial adverse change" in the significance of each historical resource resulting from project implementation. When a project may impact historical resources on State lands, consultation with California's Office of Historic Preservation (OHP) is required pursuant to PRC §5024. The SHPO may also be consulted regarding appropriate treatment measures for historical resources. Treatment measures for historical resources that are archaeological or ethnographic in nature may include preservation through avoidance or project redesign, incorporation within open space or conservation easements, covering with a layer of sterile soil, data recovery excavation, photodocumentation (including low-level aerial photography, video, and scale drawings), or similar measures. Treatment measures for historical resources that are architectural in nature may include Historic American Buildings Survey/Historic American Engineering Report (HABS/HAER) documentation to formally document historic resources through the use of large-format photography, measured drawings, written architectural descriptions, and historical narratives. Such documentation packages are entered into the Library of Congress, and a second copy is generally archived in the regional information centers of the CHRIS. In the event of building relocation, the Lead agency shall ensure that any alterations to significant buildings or structures conform to the *Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings* (Grimmer and Weeks 1992). All final documentation of mitigative treatment for historical resources of an archaeological or architectural nature to be impacted by the project will be approved by the Lead agency prior to the initiation of any project ground-disturbing activities. If cultural resources identified within a project area are neither a historical resource nor unique archaeological resource, there would be no significant effect to the environment and no further treatment of those		

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Impact	Mitigation Measure	Impact Significance	
		Before Mitigation	After Mitigation
	known resources would be required. **Measure 12.1b:** Inadvertent discovery measures for cultural resources shall be implemented during all construction activities within the project area. Measures shall include procedures for discovery and protection of cultural resources, including human remains, during construction or earth-disturbing activities. If human remains are discovered during construction or earth-disturbing activities, the applicant shall halt all activities and contact the appropriate authorities in compliance with PRC §5097.98. The project applicant or agency(s) responsible shall implement inadvertent discovery measures during all construction activities within the project area. Within project areas of identified archaeological sensitivity, measures would include: (1) a worker education course for all construction personnel; (2) monitoring of all earth-disturbing activities by a qualified archeologist; and (3) procedures for discovery of cultural resources, including human remains, during construction or ground-disturbing activities if an archaeological monitor is not present. If known traditional cultural resources are located within the project area or if the potential for discovery of buried traditional cultural resources is high, a culturally affiliated Native American, with knowledge in cultural resources, should also be retained to monitor all ground-disturbing activities. Monitoring within recent fill deposits would not be required. The worker education course for all construction personnel will be conducted immediately prior to initiation of ground-disturbing activities. The course will explain the importance of, and legal basis for, the protection of significant archaeological resources. Each worker will also learn the proper procedures to follow in the event cultural resources or human remains/burials are uncovered during construction activities, including work curtailment or redirection and to immediately contact their supervisor and the archaeological monitor. The worker education session will include visuals of artifacts (prehistoric and historic) that might be found in the project vicinity, and may include handouts. The project applicant or agency(s) responsible shall provide an on-site qualified archeological monitor during all earth-disturbing activities, including but not limited to grading, excavation, trenching, or removal of existing features of the subject property, within project areas considered sensitive for the discovery of buried archaeological resources. If an unknown cultural resource were discovered, the monitor(s) shall have the authority to halt all ground-disturbing activities within 100 feet of the find, and the resource should be immediately evaluated by the qualified archaeologist. If the find is determined to be a significant historical resource and the archaeological resource cannot be avoided, then applicable mitigation measures for significant resources will be completed (e.g., preservation in place, data recovery program pursuant to PRC §21083.2[i]). During evaluation or mitigative treatment, ground disturbance and construction work could continue on other parts of the project area. In the event an archaeological monitor is not present when cultural resources, including human remains, are discovered during construction or ground-disturbing activities, the project applicant or agency(s) responsible shall halt all activities within 100 feet of the find until a qualified professional archaeologist can evaluate it. The archaeologist will examine the findings, assess their significance, and recommend appropriate procedures to either further investigate or mitigate adverse impacts (e.g., adverse effect on a significant historical resource) to the resources encountered in conformance with the protocols set forth in PRC §5097.98. Any human remains encountered during construction will be treated in accordance with HSC §7050.5.		

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ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance Before Mitigation	Impact Significance After Mitigation
Impact 12.2: Construction of dairy digester and co-digester facilities could result in the disruption of human remains, including those interred outside formal cemeteries.	**Mitigation Measure 12.2:** Implement inadvertent discovery measures for the protection of cultural resources, including human remains (Measure 12.1b).	S	LSM
Impact 12.3: Construction of dairy digester and co-digester facilities could result in direct or indirect disturbance or destruction of a unique paleontological resource or site or unique geologic feature.	**Mitigation Measure 12.3:** If paleontological resources, such as fossilized bone, teeth, shell, tracks, trails, casts, molds, or impressions are discovered during ground-disturbing activities, all ground disturbing activities within 50 feet of the find shall be halted until a qualified paleontologist can assess the significance of the find and, if necessary, develop appropriate salvage measures in consultation with the lead agency and in conformance with Society of Vertebrate Paleontology Guidelines (SVP, 1995; SVP, 1996). Additional guidance may be found in *Standard Guidelines for the Assessment and Mitigation of Adverse Impacts to Nonrenewable Paleontologic Resources* (SVP 2010).	S	LSM
Impact 12.4: Development of dairy digester and co-digester facilities could contribute to cumulative impacts related to archaeological, historical, and/or paleontological resources.	**Mitigation Measure 12.4:** Implement Measures 12.1a, 12.1b, 12.2, and 12.3.	S	LSM
13. Geology			
Impact 13.1: The project could expose people to injury and structures to damage resulting from seismic activity.	**Measure 13.1:** Prior to construction, project applicants or agency(s) responsible shall ensure that dairy digester facilities are designed and construction techniques are used that comply with relevant local, State and federal regulations and building code requirements. Requirements could include, but might not be limited to: • Preparation of site-specific soil and geotechnical engineering studies performed by a licensed professional including, but not limited to, a geologist, engineering geologist, certified soil scientist, certified agronomist, registered agricultural engineer, registered civil or structural engineer, and/or certified professional erosion and sediment control specialist with expertise in geotechnical engineering issues who is registered and/or certified in the State of California, to determine site specific impacts and to recommend site specific mitigations. The site specific soil and geotechnical engineering studies shall be submitted to the all appropriate State and local regulatory agencies including, but not limited to, the CVRWQCB and the city or county engineering department for review and approval. The project applicant or agency(s) responsible shall implement all feasible recommendations addressing potential seismic hazards and soil constraints; and • Implementation of CBC design requirements	S	LSM
Impact 13.2: The project could expose people to injury and structures to damage resulting from unstable soil conditions.	**Mitigation Measure 13.2:** Implement Mitigation Measure 13.1.	S	LSM
Impact 13.3: Construction of project facilities would not result in an increase in the erosion of soils which could result in a loss of top soil.	None required	LS	LS
Impact 13.4: Development of dairy digester and co-digester facilities would not contribute to cumulative impacts related to geology, soils and seismicity.	None required	LS	LS

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Impact	Mitigation Measure	Impact Significance	
		Before Mitigation	After Mitigation
14. Noise			
Impact 14.1: Construction of dairy digester and co-digester facilities could temporarily increase noise levels at nearby sensitive receptor locations or result in noise levels in excess of standards in local general plans, noise ordinance, or other applicable standards.	**Measure 14.1a:** Construction activities shall be limited to daytime hours, between 7 a.m. and 6 p.m., Monday through Saturday, or an alternative schedule established by the local jurisdiction. **Measure 14.1b:** Construction equipment noise shall be minimized by muffling and shielding intakes and exhaust on construction equipment to a level no less effective than the manufacture's specifications, and by shrouding or shielding impact tools. **Measure 14.1c:** Construction contractors within 750 feet of sensitive receptors shall locate fixed construction equipment, such as compressors and generators, and construction staging areas as far as possible from nearby sensitive receptors. **Measure 14.1d**: Construction contractors shall comply with all local noise ordinances and regulations.	S	LSM
Impact 14.2: Noise from operation of dairy digester and co-digester facilities or centralized facilities could substantially increase ambient noise levels at nearby land uses or result in noise levels in excess of standards in local general plans, local noise ordinances, or other applicable standards.	**Mitigation Measure 14.2:** Any continuous equipment operating at night within 1,000 feet of a sensitive receptor must be enclosed. Furthermore, an acoustic study and follow-up measurements must be performed (after construction) to prove that the noise from any continuous equipment operating at night would comply with all local noise regulations. If no local regulations are available, noise levels must be below 45 dBA at the nearest sensitive receptor. If the sound level exceeds local regulations, or 45 dBA if applicable, additional sound-proofing shall be installed to meet the required sound level.	S	LSM
Impact 14.3: Project operational activities associated with transportation would not increase ambient noise levels at nearby land uses.	None required.	LS	LS
Impact 14.4: Development of dairy digester and co-digester facilities could result in a cumulative increase in noise levels.	**Mitigation Measure 14.4a:** Implement Mitigation Measures 14.1a through Measure 14.1d and Measure 14.2, above.	S	LSM
15. Public Services			
Impact 15.1: The project would not substantially increase demands on fire protection services.	None required.	LS	LS
Impact 15.2: The project would not conflict with wastewater treatment requirements of the Central Valley Water Board.	None required.	LS	LS
Impact 15.3: The project could result in significant environmental effects from the construction and operation of new water and wastewater treatment facilities or expansion of existing facilities.	**Measure 15.3a:** If the project proposes to obtain water from a water supplier (irrigation district, municipal system or other public water entity), the developer would enter into an agreement for service with the supplier. **Measure 15.3b**: If the project proposes to obtain wastewater service from a wastewater treatment provider (municipal or other public entity), the developer would enter into an agreement for service with the provider.	S	LSM
Impact 15.4: The project would not result in significant environmental effects from the construction of new stormwater treatment facilities or expansion of existing facilities.	None required.	LS	LS
Impact 15.5: The project would not require significant levels of new or expanded water supply resources or entitlements.	None required.	LS	LS

LS – Less than Significant LSM – Less than Significant with Mitigation NI – No Impact S – Significant SU – Significant and Unavoidable

TABLE 1-1
ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measure	Impact Significance	
		Before Mitigation	After Mitigation
Impact 15.6: The project could result in exceeding the capacity of a wastewater treatment provider.	**Measure 15.6:** If the project proposes to obtain wastewater service from a wastewater treatment provider (municipal or other public entity), implement Mitigation Measure 15.3b.	S	LSM
Impact 15.7: The project could result in the construction new energy supplies and could require additional energy infrastructure.	**Mitigation Measure 15.7:** Implement Mitigation Measures for construction of energy infrastructure including Mitigation Measures 6.1b, 9.1a, 9.1b, 9.2a, 9.2b, 9.3b, 12.1b, 12.2, 12.3, and 14.1a-c.	S	LSM
Impact 15.8: The project would not conflict with existing energy policies or standards.	None required.	NI	NI
Impact 15.9: Development of dairy digester and co-digester facilities would not contribute to cumulative impacts to public services and utilities.	None required.	LS	LS

LS – Less than Significant LSM – Less than Significant with Mitigation NI – No Impact S – Significant SU – Significant and Unavoidable

CHAPTER 2
Introduction

The California Regional Water Quality Control Board, Central Valley Region (Central Valley Water Board) is proposing a waste discharge regulatory program which will involve the adoption of one or more Waste Discharge Requirements (WDRs) General Orders (GOs) to regulate the discharge of liquid and solid digestate generated from dairy manure digesters and dairy manure co-digester projects (i.e., that use manure plus other organic feedstocks) within the jurisdictional boundaries of the Central Valley Region (Region 5). This Program Environmental Impact Report (EIR) will serve to meet California Environmental Quality Act (CEQA) requirements for the Central Valley Water Board's consideration of orders issued under this waste discharge regulatory program. Once adopted, these orders would permit the discharge to land from dairy manure digester and co-digester projects located on or off-site of dairies and would specify the terms and conditions of such discharges.

The Program EIR is intended to provide a comprehensive analysis of the environmental impacts of the development of dairy manure digester and co-digester facilities, including construction and operation. As such, it is expected to facilitate and enhance the CEQA process for individual dairy manure digester and co-digester facilities throughout Region 5. Further, the GOs would establish a notification and permit review process for the owners and operators of both the digester and the dairy (i.e., when located at a dairy) who intend to apply liquid and solid digestate generated from dairy manure digesters and co-digester projects to land. The GOs will contain discharge prohibitions, discharge and applicable specifications, transportation and storage requirements, and general procedures to protect surface and groundwater quality.

In addition to one or more GOs, under this waste discharge regulatory program, the Central Valley Water Board may also develop and adopt Individual WDRs to provide permit coverage for dairy digester and co-digester facilities for which the GOs would not be applicable. Further, the Central Valley Water Board may develop and adopt Conditional Waivers of WDRs (CWs) under this waste discharge regulatory program in instances where a waste discharge is found to have such low threat to water quality that the Central Valley Water Board finds that a waiver of WDRs is not against the public interest pursuant to California Water Code §13269. Such waivers are conditional, may not exceed five years in duration, and may be terminated by the Central Valley Water Board at any time.

This chapter briefly describes the background of the development of the regulatory program for digesters using manure and other organic feedstocks in Region 5. In addition, the chapter describes the purpose of the Program EIR that is being prepared in accordance with CEQA and the State CEQA Guidelines, the scope of issues to be addressed, and the organization of the draft Program EIR.

2.1 Project Background

Several statewide actions require the increased future use of renewable energy in California and provide impetus for the Central Valley Water Board to move forward in the development of a waste discharge regulatory program for dairy digesters.

On August 23, 2005, Governor Schwarzenegger asked the Bioenergy Interagency Working Group (Working Group), composed of state agencies with jurisdictional or mandate interests, to continue work on the California Biomass Collaborative. The California Biomass Collaborative looked to develop an integrated and comprehensive state policy on biomass, which includes electricity, natural gas, and petroleum substitution potential. Reducing municipal solid waste, which a wide range of conversion technologies can capture, was also a policy component. The Working Group developed recommendations for a Bioenergy Action Plan for California (Bioenergy Action Plan) and sent the Governor its final Working Group Report in April 2006. The Governor's Office responded with publication of the Bioenergy Action Plan on July 13, 2006 (California Energy Commission, 2006).

On November 17, 2008, Governor Schwarzenegger issued Executive Order S-14-08 to streamline California's renewable energy project approval process and increase the State's Renewable Portfolio Standard renewable energy load target to 33 percent by 2020. This order directs all State regulatory agencies to give priority to renewable energy projects to meet the Governor's directives. The order affects projects such as the one proposed in this Program EIR and the anticipated Program EIR being prepared by the Department of Resources Recycling and Recovery (CalRecycle) for anaerobic digester facilities that would use food waste, green material, and mixed solid waste as feedstocks; thus diverting these materials from landfills.

To implement the Bioenergy Action Plan, the State Water Resources Control Board (State Water Board) adopted Resolution No. 2007-0059 (September 18, 2009) which renewed the State Water Board's commitment to identify clear and consistent procedures for permitting biomass facilities, and to conduct prompt reviews of planning documents, CEQA documents, and monitoring proposals for biomass facilities. The Bioenergy Action Plan recommended that California "consider ways to simplify siting and permitting" of bioenergy products in order to overcome "complex and time-consuming permitting process(es)." Development of a Central Valley Water Board regulatory program for digesters using manure and other organic feedstocks is one of several initiatives by the State of California in response to Governor Schwarzenegger's call for a consistent and coordinated state policy on bioenergy.

Once certified, the Program EIR may be used by other state and local agencies with discretionary permit responsibilities to expedite the review process by providing the first tier review of a project. Specifically, staff at the Air Resources Board with concurrence of the San Joaquin Valley Air Pollution Control District have identified that the Program EIR will help to reduce air quality permitting time for certain digester projects.

2.2 Purpose of Program EIR

The primary purpose of this draft Program EIR is to inform public agency decision makers and the public generally of any significant environmental effects associated with the project (i.e., development of waste discharge regulatory program) which would facilitate the development of new dairy manure digesters and co-digesters in Region 5. Additionally, the draft Program EIR identifies ways to minimize significant effects of the project, and describes reasonable alternatives to the program that would avoid or reduce the project's significant effects (CEQA Guidelines §15121[a]). CEQA requires that all state and local government agencies consider the environmental consequences of programs and projects over which they have discretionary authority before taking action on them.

This draft Program EIR assesses the broad range of environmental impacts associated with the construction and operations of dairy digester and co-digester facilities in Region 5. The Program EIR is intended to provide CEQA compliance for the water quality GOs, Individual WDRs, or CWs issued by the Central Valley Water Board to the owners and operators of those facilities. The Program EIR should also allow other State, and local permitting agencies that issue discretionary permits to tier off the Program EIR to satisfy CEQA requirements (CEQA Guidelines §15168[c])(see Chapter 3, Program Description).

The Program EIR analyzes the environmental impacts of digester and co-digester facilities sited both on and off dairies. The Program EIR is not intended to consider the environmental impacts of the dairy operations unrelated to the digester facilities. Where a digester or co-digester is to be located on a dairy, in permitting of the full facility under the waste discharge regulatory program, the Central Valley Water Board may rely on or tier off of the Program EIR but must additionally establish CEQA compliance for the non-digester related dairy operations.

2.2.1 Central Valley Water Board

The Central Valley Water Board is the CEQA lead agency for this Program EIR. As the CEQA lead agency, the Central Valley Water Board is responsible for considering the effects, both individual and collective, of all activities involved in the project before certifying the Program EIR and subsequently approving the project. For the project, the Central Valley Water Board will develop a regulatory program involving water quality GOs, Individual WDRs, and CWs which will, subsequent to certification of this Program EIR, be issued by the Central Valley Water Board to the owners and operators of dairy digester facilities that meet the Central Valley Water Board standards and requirements.

GOs, Individual WDRs, and CWs under this program would contain terms and conditions to implement the requirements of the Porter-Cologne Act, Title 27 of the California Code of Regulations, Division 2, Subdivision 1, Chapter 7, Subchapter 2, Article 1 (Title 27); the Water Quality Control Plan for the Tulare Lake Basin, Second Edition, 1995 (Tulare Lake Basin Plan); the Water Quality Control Plan for the Sacramento and the San Joaquin River Basins, Fourth Edition, 1998 (Sacramento and San Joaquin Basin Plan); and the State Water Board Resolution No. 68-16

(Antidegradation Policy); and other applicable Central Valley Water Board or State Water Board plans and policies.

The GOs, Individual WDRs, and CWs under this program would be applicable to the following types of digester projects:

- New co-digestion facilities to be constructed on an existing General Order Dairy[1] without an expansion of dairy operations;
- New manure only digester or co-digester facilities to be constructed on an existing General Order Dairy with an expansion of dairy operations;
- New manure only digester or co-digester facilities proposed to be constructed at new dairies;
- Centralized manure digester or co-digester facilities on a General Order Dairy, with or without an expansion; and
- Centralized, stand-alone manure digester or co-digester facilities not located on a dairy.
- General Order Dairies with manure only digesters using only manure generated by onsite animals will remain under the Dairy General Order but may, if required, submit a Notice of Intent seeking coverage under a dairy digester General Order.

This Program EIR evaluates the effects of proposed discharges as well as the physical dairy manure digester facilities within the above categories. The Central Valley Water Board permitting process will require future dairy manure digester permit applicants to submit specific information to address environmental issues and mitigation measures identified though this Program EIR process prior to obtaining coverage under a GO, Individual WDR, or CWs.

As stated previously, where a digester or co-digester is to be located on a dairy, in permitting of the full facility under the waste discharge regulatory program, the Central Valley Water Board may rely on or tier off of the Program EIR but must additionally establish CEQA compliance for the non-digester related dairy operations.

2.2.2 Other Agencies

As described above, other federal, state and local agencies may also use some or all of the analysis presented in the Program EIR document for purposes of project review and permitting to regulate manure digester and co-digester facilities. This includes agencies that are responsible for permits and/or approvals related to the construction and operation of dairy digester and co-digester facilities. These entities could tier off or rely on this Program EIR to meet the requirements of CEQA, and may also require agency-specific requirements be met. Regulatory requirements for other agencies are presented in the Program EIR (see Section 3.7 Other Agency Approvals).

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[1] Dairies that are currently regulated under Order No. R5-2007-0035, Waste Discharge Requirements General Order for Existing Milk Cow Dairies (General Order Dairy).

State and Local Agencies

It is anticipated that future individual dairy digester projects will require permits or other discretionary actions from state and local agencies other than the Central Valley Water Board. These agencies, acting as responsible agencies, could rely on or tier off this Program EIR in order to comply with CEQA. Future specific projects must be examined on a project specific basis, in light of the Program EIR, to determine whether additional environmental documentation is necessary. If a responsible agency determines that, in compliance with CEQA Guidelines §15162, no new effects would occur and no new mitigation would be required, the agency can rely on this existing Program EIR to comply with CEQA. In the event that it is determined that a future dairy digester project would result in new or substantially greater impacts, including site-specific impacts, the agency may require the preparation of a subsequent environmental document which can be tiered from this Program EIR (as described below).

Federal Agencies

It is anticipated that some dairy digestion and co-digestion facilities may use federal funding or require federal authorizations for development and construction. Examples of federal agencies that may fund, permit, or otherwise authorize the construction of these facilities include the U.S. Department of Agriculture, U.S. Department of Energy, Environmental Protection Agency, U.S. Army Corps of Engineers, and U.S. Fish and Wildlife Service. Federal agencies may use the analysis within this Program EIR when preparing documents to comply with the National Environmental Policy Act (NEPA) of 1969 (42 United States Code (USC) §4321, et seq.) as well as other federal regulatory compliance documents.

NEPA requires federal agencies to consider potential environmental impacts of projects with federal involvement and to consider appropriate mitigation measures. NEPA is applicable to projects that are federal undertakings, which may include projects with involvement by a United States government agency. As defined in 36 Code of Federal Regulations (CFR) §800.16(y), a federal undertaking means a "project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency, including those carried out by or on behalf of a Federal agency; those carried out with Federal financial assistance; and those requiring a Federal permit, license or approval." Undertakings are determined based on the type of action proposed as described above. Further, when federal and state laws, regulations and standards are applicable to a project, joint planning processes, environmental research, public hearings, and environmental documents are encouraged (40 CFR §1506.2). It is anticipated that most federal actions associated with individual dairy digester and co-digester development would be evaluated under an Environmental Assessment when not categorically excluded from NEPA.

2.3 CEQA Process

This section summarizes the steps of the CEQA process relevant to this Program EIR. As described below, the key steps in this process are:

- Notice of Preparation (NOP)

- Draft Program EIR
- Public Review and Comments on the Draft Program EIR
- Final Program EIR and Certification of the Program EIR

2.3.1 Type of EIR

This draft Program EIR has been prepared pursuant to CEQA Guidelines §15168. CEQA defines a Program EIR as one "which may be prepared on a series of actions that can be characterized as one large project and are related either:

- Geographically;
- As logical parts in the chain of contemplated actions;
- In connection with issuance of rules, regulations, plans, or other general criteria to govern the conduct of a continuing program; or
- As individual activities carried out under the same authorizing statutory or regulatory authority and having generally similar environmental effects which can be mitigated in similar ways."

Under CEQA, a Program EIR assesses and documents the broad environmental impacts of a program with the understanding that a more detailed site-specific review may be required to assess future projects implemented under the program.

Subsequent projects would be examined in the light of the Program EIR to determine whether an additional environmental document must be prepared (CEQA Guidelines §15168). A subsequent environmental document may be "tiered" from the Program EIR, pursuant to CEQA Guidelines §15152 and 15168. "Tiering" refers to the use of analysis from a broader EIR, with later EIRs and negative declarations prepared for subsequent narrower projects, concentrating on issues specific to the later projects.

2.3.2 Notice of Preparation

In accordance with §15082(a), 15103, and 15375 of the CEQA Guidelines, Central Valley Water Board prepared and circulated a NOP of a draft Program EIR for the proposed project for a 30-day comment period, between March 18, 2010 and April 23, 2010. Public scoping meetings were held to provide the public with an opportunity to comment on the appropriate scope and content of the draft Program EIR. Three meetings were held during the 30-day comment period, each from 5:30 p.m. to 7:00 p.m. at Central Valley Water Board offices as follows: March 24 (Rancho Cordova); March 30 (Fresno); and April 7 (Rancho Cordova). Appendix NOP contains a copy of the NOP and the Initial Study Checklist that was issued with the NOP.

2.3.3 Draft Program EIR

This document constitutes the draft Program EIR. The draft Program EIR contains a description of the project, environmental setting, potential project impacts, and measures that would mitigate impacts found to be potentially significant. The document also describes and evaluates alternatives to the project.

It should be noted that within the Initial Study checklist, various impacts were determined to be potentially significant. Following subsequent additional analysis during the draft Program EIR, many of these impacts were determined to be less than significant.

As required by CEQA, this draft Program EIR focuses on significant or potentially significant environmental effects (CEQA Guidelines §15143). As discussed above, the NOP was prepared to identify issues to be evaluated in this draft Program EIR. Comments received on the NOP helped to further refine the list of environmental issues to be evaluated. All of the impacts evaluated in this document, including those considered to be less-than-significant, are summarized in **Table 1-1** in **Chapter 1, Executive Summary**.

2.3.4 Public Review

The draft Program EIR will be distributed directly to numerous agencies, organizations, and interested groups and persons for comment during the 45-day public review period. The document will also be available for public review at the Rancho Cordova, Fresno, and Redding offices of the Central Valley Water Board during the review period:

California Regional Water Quality Control Board
Central Valley Region
11020 Sun Center Drive, Suite 200
Rancho Cordova, CA 95670-6114
Phone: (916) 464-3291

California Regional Water Quality Control Board
Central Valley Region
1685 "E" Street, Suite 100
Fresno, CA 93706-2007
Phone: (559) 445-5116

California Regional Water Quality Control Board
Central Valley Region
415 Knollcrest Drive, Suite 100
Redding, CA 96002
Phone: (530) 224-4845

Electronic copies of the draft Program EIR can be downloaded in PDF format for no charge from the Central Valley Water Board website at:

http://www.waterboards.ca.gov/centralvalley/press_room/announcements

Copies may also be obtained by contacting Paul Miller, by phone at (916) 564-4500 x1277or by e-mail (pmiller@esassoc.com); there will be a reasonable fee charged for a hardcopy or CD version of the draft Program EIR.

Written comments or questions concerning the draft Program EIR must be directed to the name and address listed below by no later than 5:00 p.m. on Monday, August 23, 2010.

Central Valley Water Board
Attn: Stephen Klein, Project Manager
1685 E Street
Fresno, California 93706
Telephone (559) 445-5558

Central Valley Water Board will also receive public input on the draft Program EIR at two meetings before making a decision on the project. The dates, times, and locations for the public meetings on the draft Program EIR are provided in the Notice of Availability included at the beginning of this draft Program EIR. Public comment is encouraged during the 45-day public review period. Additional information concerning the public review schedule for the draft Program EIR, or changes to the schedule, and information on the public hearings can be obtained by visiting the Central Valley Water Board website at:

http://www.waterboards.ca.gov/centralvalley/press_room/announcements

or by contacting Jennifer Tencati, by phone at (916) 658-0180 x131 or by e-mail (j.tencati@circlepoint.com).

2.3.5 Final Program EIR and Certification

Written and oral comments received in response to the draft Program EIR will be addressed in a response to comments document, which, together with the draft Program EIR, will constitute the final Program EIR. The Central Valley Water Board will then review the final Program EIR, staff recommendations, and public testimony and decide whether to certify the Program EIR and whether to approve, approve with changes, or deny the project.

If the Central Valley Water Board approves the project, even though significant impacts identified by the Program EIR cannot be mitigated, the Central Valley Water Board must state in writing the reasons for its actions. A statement of overriding considerations must be included in the record of the project approval and mentioned in the notice of determination (Public Resources Code §21081; CEQA Guidelines, §15093[c]).

2.3.6 Mitigation Monitoring and Reporting Program

CEQA Statutes (§21081.6(a)(1) of the Public Resources Code) require public agencies, as part of the certification of an EIR, to prepare and approve a mitigation monitoring or reporting program. A Mitigation Monitoring and Reporting Program (MMRP) will be prepared at the time of the Final Program EIR for this project and will identify the specific timing and roles and responsibilities for implementing mitigation measures. This MMRP will be structured to ensure that changes to the project that the lead agency has adopted to mitigate or avoid significant environmental impacts are carried out during project implementation.

Throughout this draft Program EIR, mitigation measures have been clearly identified and presented in language that will facilitate establishment of the MMRP. Mitigation measures are listed in **Table 1-1** in **Chapter 1, Executive Summary**.

2.4 References

California Energy Commission, 2006. Bioenergy Action Plan for California, California Energy Commission Publication number CEC-600-2006-010. July 13 2006.

State of California, 2010a. State of California, *California Environmental Quality Act,* Public Resources Code, Division 13, Sections 21000 through 21177, as amended January 1, 2010.

State of California, 2010b. State of California, Guidelines for California Environmental Quality Act, California Code of Regulations, Title 14, Chapter 3, Sections 15000 through 15387, as amended January 1, 2010.

CHAPTER 3
Program Description

3.1 Introduction

This draft Program Environmental Impact Report (EIR) has been prepared for the Central Valley Water Board to evaluate the environmental effects of a waste discharge regulatory program to permit the waste discharge to land from dairy manure digester and co-digester projects located on or off-site of dairies within the jurisdictional boundaries of the Central Valley Water Board (Region 5). The Central Valley Water Board is responsible for implementing and enforcing water quality laws regulations, policies and plans to protect the groundwater and surface waters within Region 5 under the Porter-Cologne Water Quality Control Act. Throughout the Program EIR the development of the program will be referred to as the “project”.

As identified in the Chapter 2, Introduction, the Central Valley Water Board is proposing as part of a waste discharge regulatory program to adopt one or more Waste Discharge Requirements (WDRs) General Orders (GOs) to regulate the discharge of liquid and solid digestate generated from dairy manure digesters and dairy manure co-digester projects. Dairy manure digesters process only manure and dairy manure co-digester projects process manure plus a broad variety other organic substrates. This Program EIR will serve to meet CEQA requirements for orders issued under this waste discharge regulatory program. Once adopted by the Central Valley Water Board, these orders would permit discharge by multiple dairy manure digester and co-digester projects and specify the terms and conditions of such discharges.

The Program EIR is intended to provide a programmatic analysis of the environmental impacts of the development of dairy manure digester and co-digester facilities and is expected to reduce permitting time for future dairy manure digester and co-digester projects throughout Region 5. The GOs, which are the primary focus of proposed waste discharge regulatory program (i.e., one of the goals of the waste discharge regulatory program is maximize the number of dairy digester facilities covered under the GOs), would establish a notification and permit review process for the owners and operators of both the digester and the dairy (i.e., when the digester is located at a dairy) [1] who intend to apply liquid and solid digestate generated from dairy manure digesters and co-digester projects to land.

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[1] As explained in chapter, this draft Program EIR does not analyze the impacts from the dairy itself, independent of the digester facility, except where cumulative impacts are implicated. Where a digester or co-digester is to be located on a dairy, in permitting of the full facility under the waste discharge regulatory program, the Central Valley Water Board will establish CEQA compliance for the non digester-related dairy operations by showing existing CEQA compliance or preparing a tiered CEQA analysis.

Liquid and solid digestate application to land is considered to be a “discharge” to waters of the State, as defined in the Porter-Cologne Water Quality Act. The GOs issued under this waste discharge regulatory program will contain discharge prohibitions, discharge and applicable specifications, transportation and storage requirements, and general procedures to protect surface and groundwater quality. More specifically, with regard to the waste discharge regulatory program, **Table 3-1** summarizes the discharges that are likely to result from a dairy digester operation and how those discharges will be potentially regulated under the program.

TABLE 3-1
WASTE DISCHARGE REGULATORY PROGRAM

What are likely discharges that the Central Valley Water Board will regulate under the waste discharge regulatory program?	How might the Central Valley Water Board potentially regulate under the waste discharge regulatory program?
Co-digestion Feedstock Waste Storage / Receiving / Handling Area	• Solid must be on impermeable surface • Comply with Local Enforcement Agency (LEA) requirements • In ground liquid waste storage must comply with Anti-Degradation Policy • Drain to Wastewater Pond • Comply with site-specific Salt Minimization Plan (SMP) • No Hazardous Waste • Flood protection that complies with local, State, and federal laws and regulations • No mammalian tissues or dead animals • No human waste (e.g. biosolids, septage, domestic and municipal wastewater) • No nuisance or vector
Digester - Above Ground Tank	• Comply with LEA requirements • No nuisance or vector • Drain to pond
Digester - In Ground	• No nuisance or vector • Flood protection that complies with local, State, and federal laws and regulations • Liner to protect groundwater (likely required for compliance with the State Board’s Antidegradation Policy, Resolution 68-16
Liquid Waste	• Comply with site-specific Nutrient Management Plan (NMP) • Comply with site-specific SMP • No off-site discharge • Surface water protection • Well-head protection
Solid Waste	• Classify as soil amendment • Use on-site in compliance with NMP and SMP • Properly dispose of at a permitted facility • Surface water protection • Well-head protection
Sulfur Biogas Scrubber Waste	• Classify as a soil amendment

In addition to one or more GOs, under this waste discharge regulatory program, the Central Valley Water Board may also develop and adopt Individual WDRs to provide permit coverage for dairy digester and co-digester facilities for which the GOs would not be applicable. Further, the Central Valley Water Board may develop and adopt Conditional Waivers of WDRs (CWs) under this waste discharge regulatory program in instances where a waste discharge is found to have such low threat to water quality that the Central Valley Water Board finds that a waiver of WDRs is not against the public interest pursuant to California Water Code §13269. Such waivers are conditional, may not exceed five years in duration, and may be terminated by a Central Valley Water Board at any time.

Any GOs, Individual WDRs, and CWs issued under this program will contain terms and conditions to implement applicable requirements contained in the following laws, regulations, and guidance:

- Porter-Cologne Water Quality Control Act (California Water Code §13000 *et seq*.);
- California Code of Regulations;
- *Water Quality Control Plan for the Tulare Lake Basin*, Second Edition, revised January 2004 (Tulare Lake Basin Plan);
- Water Quality Control Plan for the Sacramento River Basin and the San Joaquin River Basins, Fourth Edition, revised September 2009 (Sacramento and San Joaquin Basin Plan);
- State Water Resource Control Board Resolution No. 68-16, *Statement of Policy with Respect to Maintaining High Quality of Waters in California* (Antidegradation Policy); and
- all other applicable Central Valley Water Board or State Water Resources Control Board plans and policies.

3.2 Project Location and Dairy Overview

There are nine regional water quality boards statewide with jurisdiction over separate regions of the state based on watershed boundaries. The Central Valley Water Board is proposing a waste discharge regulatory program to regulate the discharge of liquid and solid digestate generated from dairy digester and co-digester projects located on or off-site of dairies within Region 5 (shown on **Figure 3-1**).

Approximately 1.6 million cows are housed in approximately 1,400 dairies located throughout Region 5, extending from and including Kern County to the south, to the California-Oregon state line to the north. The distribution of dairies throughout the Region 5 is shown in **Figure 3-2**.

An estimated 180 million pounds of manure generated per day within Region 5 based on 1.6 million cows producing approximately 112 pounds of manure per day. It has been estimated that the estimates dairies in Region 5 could generate approximately 14 billion cubic feet of methane per year through manure only anaerobic digestion, which would correspond to 140 megawatts of annual electrical capacity (Krich, et al., 2005)[2]. This estimate of potential methane and energy production would increase through the addition of other organic substrates to the manure digestion process (co-digestion). Co-digestion of organic material can help to mitigate the greenhouse gas (GHG) emissions emanating from California's multiple organic waste streams. Co-digesting multiple biodegradable waste streams such as municipal waste sludge, food processor waste, restaurant leftovers, and dairy manure can add as much as 450 MW to the combined heat and power (CHP) potential in California (CEC, 2009).

Herd populations at dairies within the region range from the smallest herds with less than 100 cows, to herds which include more than 11,000 cows. Facilities housing fewer than 1,000 cows constitute approximately 60 percent of the region's dairies. Another roughly 25 percent of the region's dairies house herds of between 1,000 and 2,000 cows while approximately 15 percent of the region's dairies house herds more than 2,000 cows.

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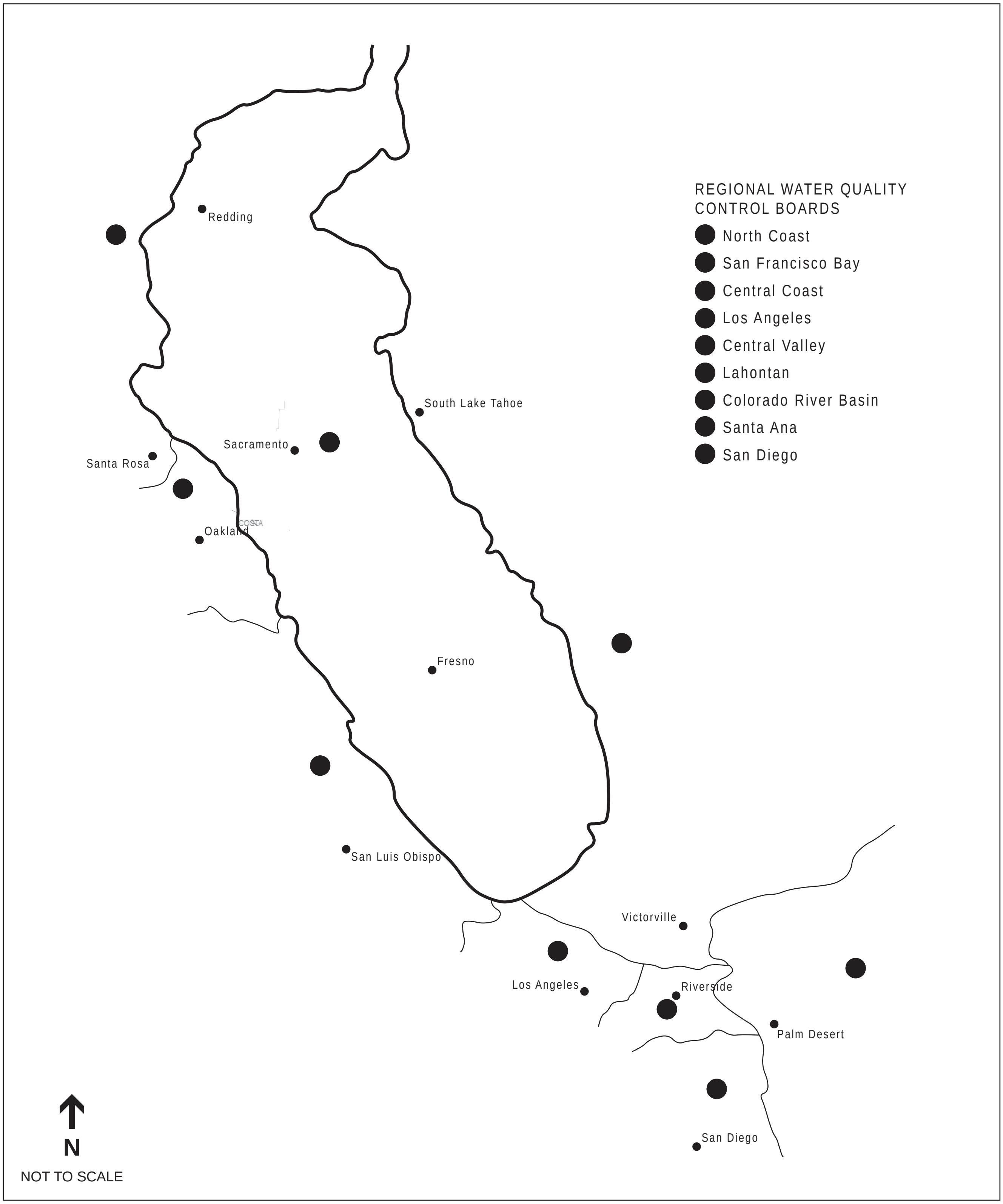
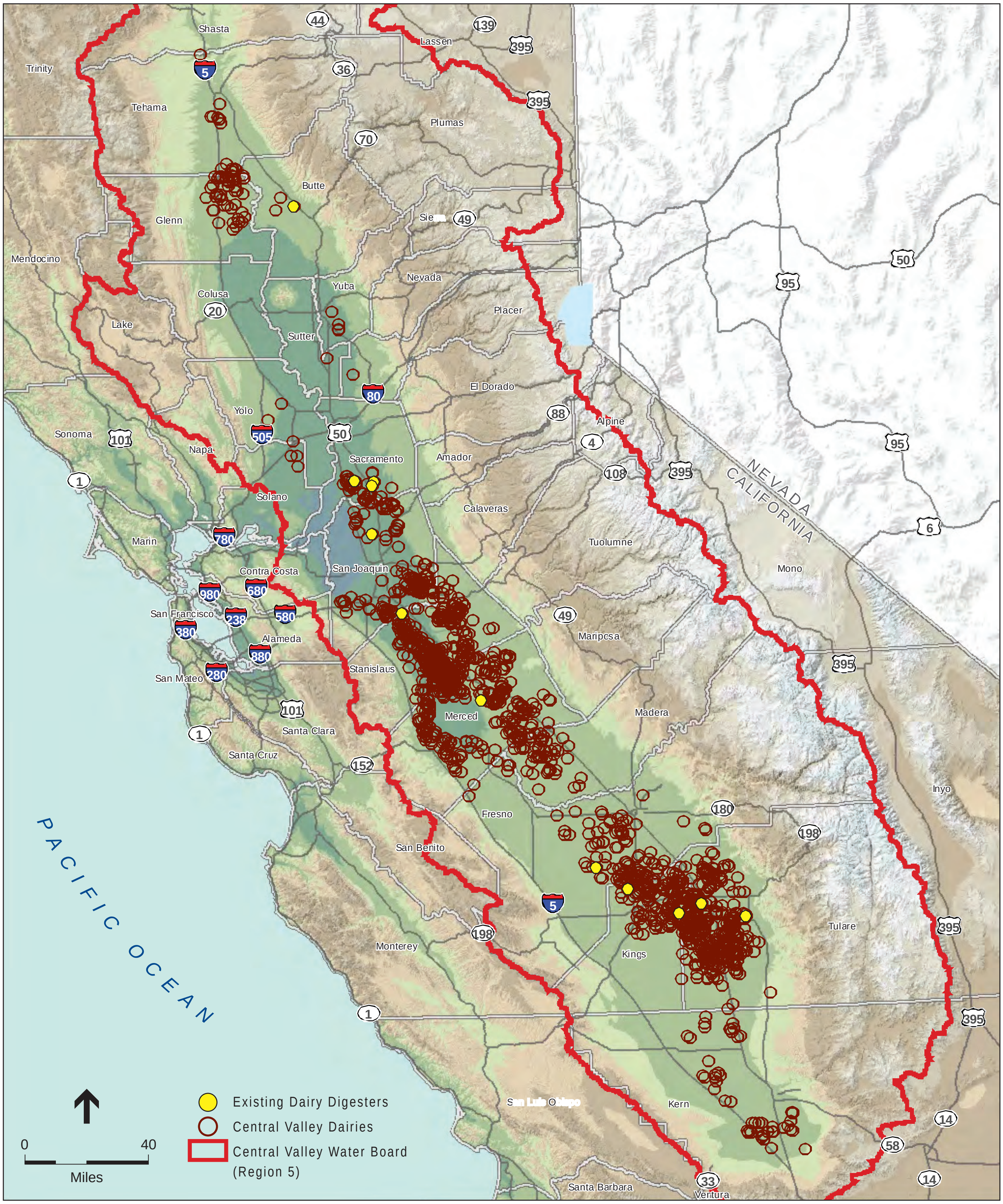
[2] This is a peak estimate for manure only digestion that does not reflect the practicalities of manure collection and storage.



SOURCE: Central Valley Water Board, 2009; and ESA, 2010

Central Valley Dairy Digester and Co-Digester Program EIR . 209481

Figure 3-1
California Regional Water Quality Control Boards



SOURCE: Central Valley Water Board, 2007-2009; U.S. EPA, 2010; ESRI, 2010; and ESA, 2010

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Figure 3-2
Location of Region 5 Dairies and Dairy Digesters

The top five milk producing counties in California are located in the central and southern portions of Region 5, and include: Tulare County with 315 dairies producing 27 percent of the milk produced in California; Merced County with 310 dairies producing 14 percent of the state's milk; Kings County with 139 dairies producing 10 percent of the state's milk; Stanislaus County with 288 dairies producing 10 percent of the state's milk; and Kern County with 50 dairies producing 9 percent of the state's milk (CDFA, 2009).

Dairies in Region 5 employ manure handling practices as a matter of manure management and general animal husbandry. Manure handling practices include: dry scrape, flush, and some combination of the two. Dry scrape operations occur at dairies where stock are housed in open corrals and manure is scraped from the corrals several times during the year. Stormwater runoff and process wastewater generated within the milk barn at these facilities are piped directly to the wastewater retention system.

Flush operations occur at dairies that house their stock in flushed free stalls and allow only intermittent access to open loafing pens. At flush dairies, most of the animal waste is deposited on concrete flush lanes, which are flushed with process wastewater from the milk barn and recycled wastewater from the wastewater retention system. Stormwater is routed through the flush system into the wastewater retention system. Flush manure management practices tend to occur at newer larger dairies.

Dairies that employ both dry scrap and flush are dairies that house their herds in open corrals with flushed concrete lanes designed to capture manure deposited while the cows are eating. At these facilities, the corrals are scraped several times a year while the lanes are flushed daily with process wastewater from the milk barn and recycled wastewater from the wastewater retention system. Stormwater is routed through the flush system or piped directly to the wastewater retention system.

3.3 Program Objectives

The primary objectives for the waste discharge regulatory program include the following:

- Protect the beneficial uses of surface and groundwater[3] within the Central Valley Region from discharges to land associated with dairy manure digesters and co-digesters on or off-site of dairies.
- Provide a regulatory framework for the water quality aspects of anaerobic biological digestion facilities using dairy manure and dairy manure with other organic substrates (co-digestion) to produce biogas (a flexible renewable fuel source).
- Assist the State in meeting GHG reduction measures in support of the California Global Warming Solutions Act of 2006 (Assembly Bill [AB] 32) through the production of biogas from dairy manure.
- Provide a renewable green energy source to allow energy companies to help achieve the 2010 and 2020 California Renewables Portfolio Standard (RPS) through the production of biogas from dairy manure.
- Reduce the time required to develop and issue water quality permits for dairy manure digester and co-digester projects by more than 75 percent primarily through the issuance

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[3] Beneficial uses are described in *Water Quality Control Plan for the Tulare Lake Basin*, Second Edition, revised January 2004 (Tulare Lake Basin Plan) and *Water Quality Control Plan for the Sacramento River Basin and the San Joaquin River Basins*, Fourth Edition, revised September 2009 (Sacramento and San Joaquin Basin Plan).

of one or more Waste Discharge Requirements (WDRs) General Orders (GOs) and secondarily through the issuance of Individual WDRs or Conditional Waivers of WDRs (CWs).

- Reduce the permitting time for other State and local agencies[4] with discretionary permit responsibilities by providing a Program EIR that can be relied upon or tiered from for region wide environmental and regulatory settings, project alternatives analyses and cumulative impacts analyses

3.4 Background on Dairy Manure Digesters and Co-Digesters

Anaerobic digestion is the biological decomposition of organic matter in the absence of molecular oxygen. This project encompasses both manure digestion and co-digestion processes, which can differ according to the feedstock used. The anaerobic digestion process results in the production of biogas and digestate. The biogas consists primarily of methane (CH_4), which can be used for energy, and carbon dioxide (CO_2), with small amounts of hydrogen sulfide (H_2S), and ammonia (NH_3). Typically biogas is saturated with water vapor and may have trace amounts of hydrogen (H_2), nitrogen (N_2), oxygen (O_2), dust and siloxane (Greer, 2010). Digestate is the liquid and solids slurry residual of the dairy digesters. A common first process after the digester is to separate the solids from the slurry, resulting in liquid digestate and solid digestate. The anaerobic digestion process occurs naturally in marshes, wetlands and is the principal decomposition process in landfills. There are a variety of controlled systems where anaerobic digestion (AD) technology is utilized including:

- Wastewater Treatment Facilities
- Controlled Reactors
- Dairy/Animal Feeding Operations
- Digesters for Biogas Production

AD facilities at dairies follow a typical process as shown in **Figure 3-3**, although the actual digester type can vary. As seen in Figure 3-3 there are several potential uses for the biogas produced by the AD facilities. As described below, organic materials may be pre-processed (screening and gravity sedimentation) prior to loading into the digester, although for manure only digestion, this step can be by-passed based on conditions of the waste stream. Within the digester, decomposition occurs in a four phase process as shown in **Figure 3-4**: hydroloysis, acidogenesis, acetogenesis, and methanogenesis resulting primarily in methane, carbon dioxide, water and digestate/residuals. Post-processing of gas, liquid and/or solids from the digester is necessary. After completion of post-processing, solid digestate and liquid digestate (effluent) require disposal in compliance with the applicable NMP.

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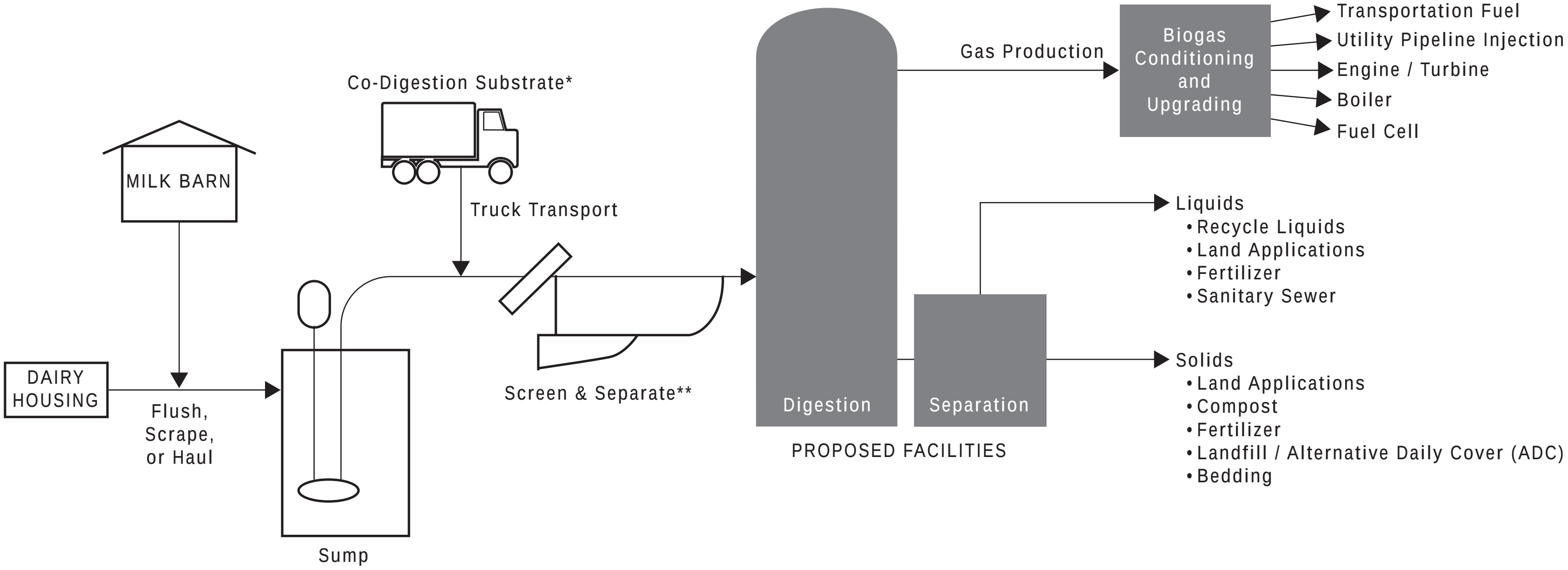
[4] San Joaquin Valley Air Pollution Control District staff have estimated that the certification of the Program EIR will reduce air quality permitting time 50 percent or more for certain digester projects.

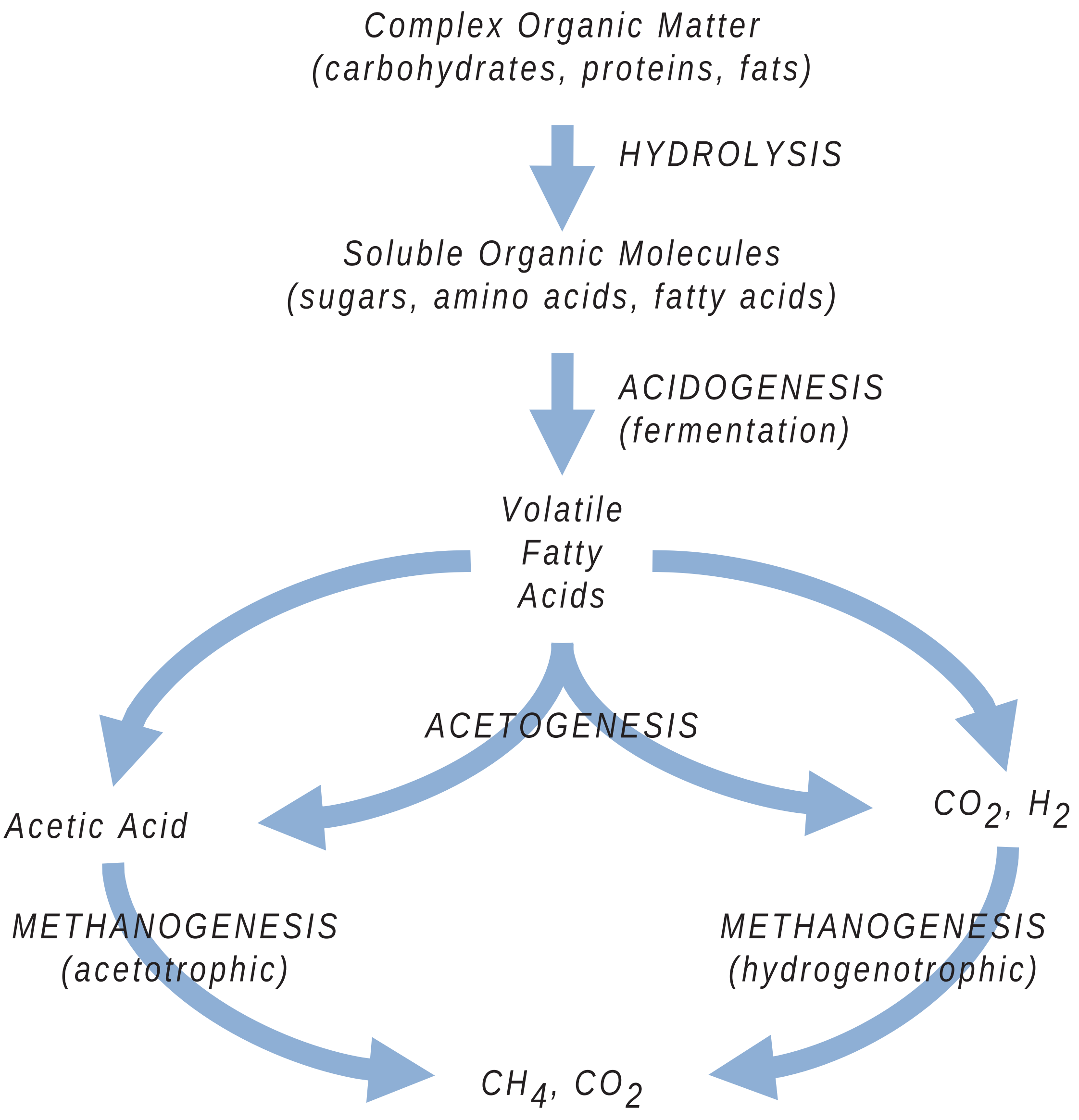


* If co-digestion will be implemented at facility

** Screen & Separate – this step may be needed to remove straw, sand, and silt (Burke, 2001)

SOURCE: Burke, 2001; and ESA, 2010

Figure 3-3
Integration of Anaerobic Digestion in the Dairy Waste Stream



SOURCE: CIWMB, 2009; and ESA, 2010

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Figure 3-4
Anaerobic Digestion Phases

AD facilities at dairies provide a number of potentially environmental and economic benefits (Burke, 2001), which are summarized below. Environmental benefits include, but are not limited to:

- Reduction in the mass of solid wastes;
- Generation of clean liquid effluent for irrigation or recycled water;
- Concentration of nutrients in condensed solid for export or storage;
- Reduction of pathogens in the solid and liquid waste;
- Reduction in GHG emissions;
- Generation of renewable energy from the biogas;
- Reduction or elimination of odors associated with waste products; and
- Reduction in flies.

The economic benefits of AD facilities at dairies include, but are not limited to:

- Time needed to move, handle, and process manure is reduced;
- Biogas can be used for energy recovery;
- Waste heat can be used to meet the heating and cooling requirements of the dairy;
- Concentration of nutrients generates a high nutrients soil amendment, which can be sold to the public, nurseries, or other agricultural facilities;
- Reduction in the mass of solid waste also reduces the amount of export needed;
- Income can be obtained from the processing of imported food or agricultural wastes for co-digestion (tipping fees), the sale of organic fertilizer, potential GHG credits, and the sale of energy generated by biogas processing;
- Energy tax credits may be available for power produced;
- Greenhouse gas tax credits may be available for each ton of carbon reduction; and
- Other federal and State incentives available now or in the future related to generation of renewable energy and reduction of GHG emissions.

3.4.1 Description of Dairy Digester Facilities

Individual Dairy Digesters

This facility type includes the addition of AD facilities, either dairy manure digester or co-digester facilities, onto an individual dairy. An individual dairy is an operation that houses dairy cows and collects and processes manure. Facilities would be located within the current footprint of the dairy operations. A dairy under the Existing Dairy General Order may add a manure only digester without any additional permits required by the Central Valley Water Board, provided the manure is from the dairy and there is no expansion of the dairy[5]. Other permits could be required depending on the complexity of the project's scope of work and project location. A new or expanding dairy will no

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[5] As described in Section 4.3 "General Order Dairies with manure only digesters using only manure generated by onsite animals will remain under the Dairy General Order but may, if required, submit a Notice of Intent seeking coverage under a dairy digester GO."

longer be covered under the Dairy General Order and must be covered by individual WDRs or a Dairy Digester General Order.

Centralized Locations

There are two categories of centralized location facilities for dairies that will be assessed in this Program EIR: (1) Central AD Facility, whereby individual dairies would collect manure and transport the manure by pipeline or truck to a centralized facility; and a (2) Central Biogas Clean-Up Facility, whereby raw biogas from individual dairies (including dairies linked via underground gas pipelines) is piped to a central facility. These types of centralized facilities may be sited on or off-site of dairies. For both location options, the central facility would have the potential to receive manure, manure plus co-digestion substrate, and/or raw biogas.

3.4.2 Dairy Operations that Affect the AD Process

In addition to the total number of cows at a dairy, specific dairy operations affect the amount and quality of manure that are processed at a dairy digester. Operational variables include, but are not limited to, animal housing, transport, manure pre-processing, animal bedding, and stormwater management (Burke, 2001). In regards to animal housing, free stall barns provide greater manure collection and quality compared to corral or open lot facilities. A flush system for manure transport, which affects the dilution of waste, would require larger AD facilities than if the manure were collected using a scrape or vacuum system. For manure pre-processing, the removal of organic solids through screening and sedimentation would reduce the amount of biomass available to undergo biogas conversion through AD. Animal bedding typically consists of compost, straw, wood chips, or sand and silt, may alter the composition of the waste stream and could affect the efficacy of AD. Sands and silts are inorganic and cannot degrade in the AD process. Therefore, sands and silts may need to be separated from the waste stream if they are present in high concentrations. However, if low or moderate quantities of these materials are present in the waste stream, then the pre-processing (screen and gravity separation) may be avoided, which would allow the maximum amount of organic solids to undergo AD (Burke, 2001). Stormwater management is also an operational variable affecting dairies. Stormwater runoff from impermeable surfaces can be directed to storm drains or collected and sent to waste water ponds to be used in AD.

3.4.3 Feedstock

The feedstock for dairy manure digesters would be either manure only, or the addition of other organic substrates to manure for dairy co-digesters. The feedstocks for co-digestion could include food processing residues, the organic fraction of municipal solid waste, fats, oils, grease, agricultural residues, and biomass energy crops. The addition of other organic substrates to the manure waste stream as part of co-digestion can dramatically increase the generation of biogas compared to a manure-only digester system. Co-digestion substrates can increase the electrical capacity of a proposed system by a magnitude five times or greater than that of dairy manure alone. Technically, digestion of dairy manure alone is straightforward; the difficulty is in the economics. Co-digestion is considered to be essential for dairy digester project viability (ECOregon, 2010).

3.4.4 Pre-Processing

Pre-processing would be minimal for a manure-only digester system, potentially including screening and gravity separation depending on the solids composition. In addition, for centralized facilities, there may be increased truck trips associated with the transport of manure.

Pre-processing activities for co-digestion substrate would include receiving, processing steps such as screening and grinding, and delivery into the digester. These co-digestion pre-processing activities would occur at either individual dairies or at centralized facilities. The handling of residual waste generated from pre-processing will vary depending on the co-digestion substrate being used. This process could result in some additional municipal solid waste.

3.4.5 Digestion

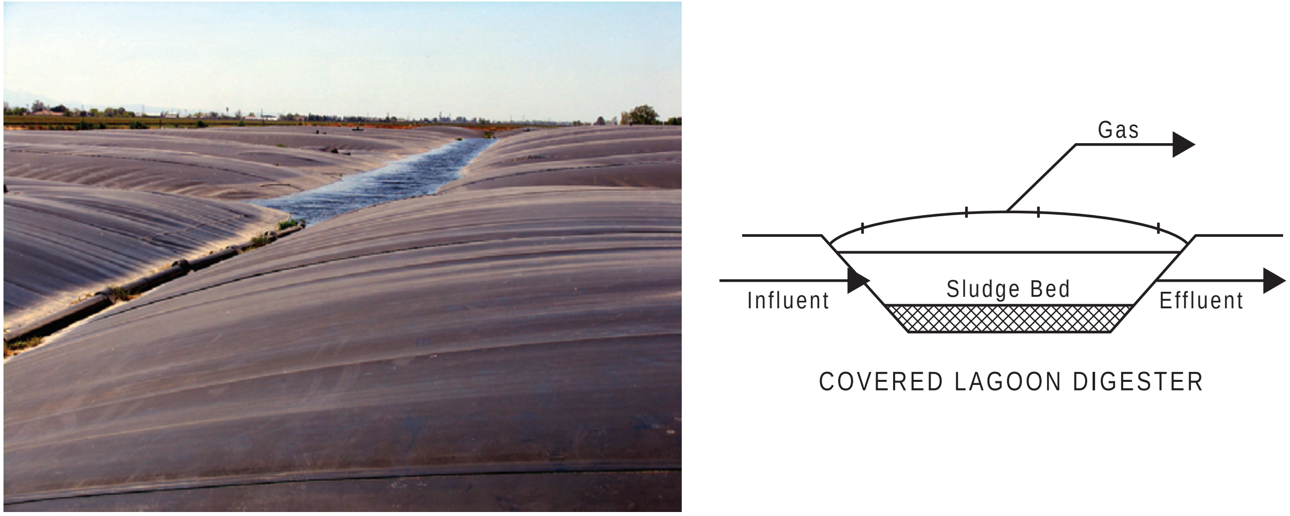
The three types of basic AD systems that are the most suitable for California dairies at this time include ambient-temperature anaerobic covered lagoons, plug-flow digesters, and complete mix systems (Krich, et al., 2005; Anders, 2007). An example of each type of digester is depicted in **Figure 3-5.** There are many variations and gradations between these basic types of AD systems, however, the basic digestion processes covered by these three types are likely to be used in any digester design. The three basic digester types are described below.

Ambient-Temperature Covered Lagoons

Ambient-temperature covered lagoons are covered earthen or concrete lined ponds, where the manure waste stream enters one end (influent) and the digested effluent is removed at the other end. The lagoons are covered by a floating, impermeable cover that captures the biogas generated by AD. The covered lagoons are not heated and operate at ambient ground temperatures and therefore the AD reaction and biogas production rates are affected by seasonal temperature variations. Therefore, covered lagoons for energy recovery are more compatible with flush manure systems in warm climates. Covered lagoons are used to treat and produce biogas from liquid manure with less than 3 percent solids (Roos et al., 2004). Generally, large lagoon volumes are required, preferably with depths greater than 12 feet (Roos et al., 2004). This type of AD system would typically be installed at self-contained individual dairies. In addition, covered lagoons could be used at individual dairies that pump raw biogas to a centralized facility.

Plug-Flow Digesters

Plug-flow digesters consist of unmixed, long rectangular tanks that are normally heated by a hot water piping system to mesophilic temperatures (80º to 100º F) within the reactor. The rate of bacterial growth and AD is faster with higher temperatures than at ambient conditions. This AD system is typically used to treat scraped dairy manure with a range of 11 to 13 percent total solids (Roos et al., 2004). Similar to covered lagoons, plug-flow digesters would typically be installed at self-contained individual dairies. In addition, plug-flow digesters could also be used at individual dairies that pump raw biogas to a centralized facility.



COVERED LAGOON DIGESTER

PLUG FLOW DIGESTER

COMPLETE MIXED DIGESTER

SOURCE: ESA, 2010

Figure 3-5
Basic Digester Types

Complete Mix Digesters

Complete mix anaerobic digesters, which are typically used at sewage and other industrial treatment plants, and dairies, consist of aboveground tanks whereby the organic waste stream is heated to mesophilic or thermophilic (110º to 140º F) temperatures and continuously or intermittently mixed by mechanical, gas, or liquid circulation mixers. Complete mix digester systems treat slurry manure with a solids concentration in the range of approximately 3 to 10 percent (Roos et al., 2004). However, these systems require higher costs for installation and energy associated with the mixing process. Complete mix digesters would typically be installed at larger self-contained individual dairies, or as the AD system at centralized facility.

3.4.6 Post-Processing

The byproducts of the AD process are biogas and digestate. The biogas consists primarily of methane (CH_4), which can be used for energy, and carbon dioxide (CO_2), with small amounts of hydrogen sulfide (H_2S), and ammonia (NH_3). Digestate is the liquid and solids slurry residual of the dairy digesters. A common first process after the digester is to separate the solids from the slurry, resulting in liquid digestate and solid digestate.

Biogas

There are many opportunities in California to produce more biogas. About 50 percent of sewage sludge, 2 percent of dairy manure, and less than 1 percent of food processing wastes and wastewater generated in the state are used to produce biogas. Biogas generated through the AD process is captured and can be combusted in a flare, used directly in internal combustion engines to produce electricity and heat (see electrical generation facilities at dairies **Figure 3-6**), or the biogas can be upgraded to biomethane through the removal of hydrogen sulfide, carbon dioxide (CO_2), and moisture. Biomethane is a product equivalent to natural gas, which typically contains more than 95 percent of methane (CH_4). Biomethane can be used in place of natural gas for various processes, including use by utility companies. Biomethane can be upgraded to utility standards and pumped into a natural gas supply pipeline, as well as for electrical generation, heating, cooling, and for natural gas-fueled vehicles. Hilarides Dairy in Lindsay, California, is using compressed biomethane for use as a vehicle fuel for dairy trucks. Hilarides initially used the compressed biomethane in two semitrucks, three pickup trucks and four boilers (CaliforniaFarmer.com, 2009).

Biomethane can also be use to power microturbines and fuel cells. For each biogas use alternative, specific gas conditioning measures would be required. Although there are methodological variations in how the biogas can be conditioned, the diagrams below depict the general processes considered during the development of this Program EIR.

PHOTOGRAPH 1. Electrical Generator at Castelanelli Brothers Dairy.

PHOTOGRAPH 2. Enclosure for Electrical Generator at Castelanelli Brothers Dairy.

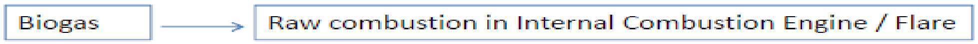
PHOTOGRAPH 3. Enclosure for Electrical Generator at Fiscallini Dairy.

SOURCE: ESA, 2010

Figure 3-6
Electrical Generation Components at Dairies

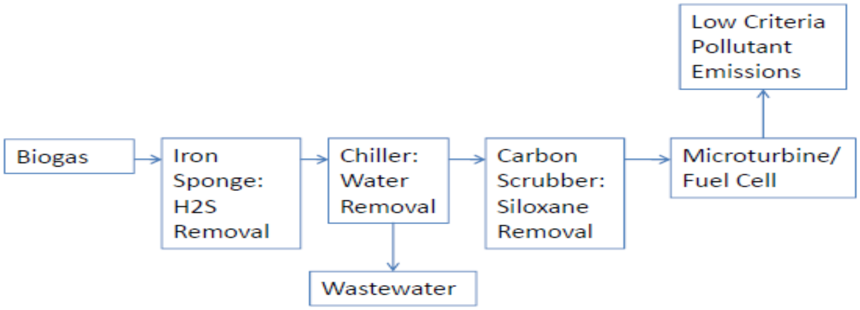
Alternative 1: Raw Combustion in Internal Combustion (IC) Engine or Flare

Below is a schematic showing the biogas utilization in a flare or IC engine. All AD facilities should have a flare to combust biogas in the event of equipment failure or excess biogas.



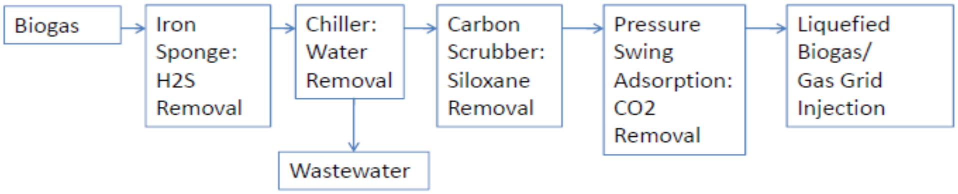
Alternative 2: Biogas Conditioning for Use in a Fuel Cell/Microturbine

Below is a schematic showing a potential biogas conditioning method for use in a fuel cell or microtubine.



Alternative 3: Biogas Conditioning for Liquefied Biomethane/Gas Grid Injection

Below is a potential process schematic showing gas conditioning requirements for the production of liquefied biomethane or biomethane that could be injected into a gas grid or for use as transportation fuel.



Liquids/Solids

Through the AD process, biomass in the waste stream is reduced through conversion to biogas and the nutrients are concentrated in the remaining effluent. The effluent from the AD process consists of liquids, remaining biomass, and inorganic solids. The post-treatment options to separate the liquids from the solids in the effluent include screening and presses. The separated solids and liquids would then be applied pursuant to the applicable nutrient management plan. As an example, the solids could be used for land application, compost, fertilizer, or potentially landfill alternative daily cover and the liquid portion of the effluent could be recycled for flush water, used for land application, or at a centralized facility it could potentially be sent to a sanitary sewer.

3.5 Construction

3.5.1 Site Preparation and Earthwork

Digester installation at individual dairies or at centralized facilities would require site preparation and earthwork, consisting of stripping the area of vegetation and either removing or storing the materials for later use in the finished grading phase. Rough earthwork would consist of cutting or filling the site to produce site overall site gradients as specified by each project. In general, surfaces would be graded to drain to on-site retention/detention facilities. Excavation may occur for onsite utility infrastructure. Road paving may be required for entrance and on-site access roads.

If gas or manure transport pipelines are proposed for a project, construction activities could include surface preparation, excavation, trench shoring, pipeline installation, trench backfilling, and surface restoration, which may include paving if the pipelines are constructed within roadway rights-of-way. Jack and bore drilling may also be required for some areas of pipeline installation. Pipeline construction would occur both on and off-site of dairies.

3.5.2 Structures

Digester structures would vary depending on the type of facility, digester to be operated, substrate, and the biogas post-processing. These are listed below:

- Central facilities may need administrative buildings, which would be typical for industrial operations and would likely be prefabricated metal buildings.
- Complete mix digesters would require the digester tank structures and may need an operating control room.
- Co-digestion substrate would potentially need a storage tank or storage area if the materials are not added directly into the digester.
- A structure may be needed to house the biogas post-processing equipment, such as an IC engine, or microturbine to generate electricity from the biogas.

3.5.3 Ancillary Components

Development of AD facilities will require the construction of various supporting infrastructure including, but not limited to, lined waste storage ponds and/or upgrades to existing dairy ponds, pipelines for transporting effluent to disposal fields, bypass valves, and processes for stormwater management.

3.5.4 Off-Site Improvements

In addition to the on-site improvements, some off-site improvements could also be needed such as signage, utility or traffic improvements. As discussed above, transport pipelines, if proposed, would be developed on and off-site of dairies.

3.6 Required Approvals

The Central Valley Water Board would approve the final waste discharge regulatory program for dairy digesters. The approval process would include:

- Certification of a Final Program EIR, under the CEQA requirements;
- Adoption of a Mitigation Monitoring and Reporting Plan (MMRP), Findings of Fact, and Statement of Overriding Considerations (if necessary);
- Adoption of the waste discharge regulatory program.

3.7 Other Agency Approvals

Additional subsequent approvals and permits that may be required from other agencies for the development of site-specific dairy digester projects are identified below.

TABLE 3-2
PERMITS AND APPROVALS POTENTIALLY NEEDED FOR PROGRAM IMPLEMENTATION OF MANURE DIGESTER AND CO-DIGESTION FACILITIES

Permit	Permitting Authority	Potentially Affected Resources
Federal Permits/Approvals		
Clean Water Act Section 404/ Rivers and Harbor Act Section 10 Dredge and Fill Permit (Clean Water Act, 33 USC 1344)	U.S. Army Corps of Engineers	Project facilities involving the discharge of dredge for fill material into waters of the U.S, including wetlands, or construction in navigable waters or activities within a floodplain.
Federal Endangered Species Act compliance (Sections 7 and 9, 16 USC 1536)	U.S. Fish and Wildlife Service	Project facilities affecting species listed as endangered and threatened and critical habitat
Federal Endangered Species Act compliance (Sections 7 and 9, 16 USC 1536)	National Marine Fisheries Service	Project facilities affecting anadromous fish and marine mammals listed as endangered or threatened and critical habitat
Magnuson Stevens Fisheries Conservation and Management Act	National Marine Fisheries Service	Project facilities affecting Essential Fish Habitat
State Permits/Approvals		
Composting Permit or, Transfer Processing Permit	California Department of Resources Recycling and Recovery (CalRecycle)	Incoming co-digestion substrates
Rendering Permit	California Department of Food and Agriculture	Incoming co-digestion substrates (specific meat and poultry substrates)
California Endangered Species Act compliance (California Fish and Game Code, §2081 and 2090)	California Department of Fish and Game	Project facilities affecting State listed endangered and threatened species
Section 1601 *et seq.* Streambed Alteration Agreement (California Fish and Game Code, §1600-1616)	California Department of Fish and Game	Project facilities that may alter the bed, bank, or riparian habitat of a stream or lake.
Williamson Act contract	Department of Conservation	Agricultural land when portions of project facilities require public acquisition of land under a Williamson Act contract
Encroachment Permit	California Department of Transportation	Portions of project facilities (pipelines, etc.) within rights-of-way or easements managed by Caltrans

TABLE 3-2
PERMITS AND APPROVALS POTENTIALLY NEEDED FOR PROGRAM IMPLEMENTATION OF MANURE DIGESTER AND CO-DIGESTION FACILITIES

Permit	Permitting Authority	Potentially Affected Resources
Porter-Cologne Water Quality Control Act, GOs, Individual WDRs, or CWs for Manure Digester and Co-Digester Facilities (Division 7, California Water Code)	Central Valley Water Board	Protect the beneficial uses of surface and groundwater within the Central Valley Region from discharges to land associated with dairy manure digesters and co-digesters on or off-site of dairies.
Porter-Cologne Water Quality Control Act, GOs, Individual WDRs or CWs for filling waters of the State (Division 7, California Water Code)	Central Valley Water Board	Project facilities affecting waters of the State (where those waters are determined not to be waters of the U.S.)
Water Quality Certification (Clean Water Act, Section 401, 33 USC 1341)	Central Valley Water Board	Water quality certification for projects that affect wetlands and other waters of the U.S.
NPDES Construction Stormwater Permit (Clean Water Act, Section 402, 33 USC 1342)	Central Valley Water Board	Water quality permit when portions of project activities or facilities may result in pollutant discharges to waters of the U.S.
General Order for Dewatering and Other Low Threat Discharge to Surface Waters	Central Valley Water Board	Water quality permit when portions of project construction may require local groundwater dewatering, resulting in discharges to surface waters
National Historic Preservation Act Section 106 Compliance	State Historic Preservation Office	For activities in portions of project that could affect cultural and historic resources considered eligible for inclusion in the National Register of Historic Places
Regional/Local Permit/Approvals		
Authority to Construct	Air District with jurisdiction	Combustion sources. Air quality Authority to Construct (ATC), in compliance with the local air district rules and regulations.
Permit To Operate	Air District with jurisdiction	Combustion sources. Air quality Permit to Operate (PTO), upon completion of facility construction in compliance with the local air district rules and regulations.
Rezoning, Conditional Use Permit or similar land use approval	Counties and cities	Facilities or activities modifying land uses regulated under county or city land use codes
Environmental Health Permit	County Department of Environmental Health (the Local Enforcement Agency or LEA)	Facilities or activities affecting food and water resources regulated under county environmental health codes
Site plan review and approval	Counties and cities	Facilities or activities affecting land regulated under county or city site planning regulations
Local grading and erosion control Permit	Counties and cities	Earthmoving conducted as part of project
Building Permit	Counties and cities	Building(s) constructed as part of project
Encroachment Permit	Counties or cities or other local jurisdictions such as special districts	Pipelines or other facilities in portions of project area on or affecting rights-of-way or easements

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CHAPTER 4
Approach to Environmental Analysis

4.1 Introduction

This chapter presents the general approach to analysis that was used in this draft Program EIR to evaluate the impacts of the project.

Developing the approach to the environmental analysis involves:

- Identifying the types of discharges the program would regulate and permit,
- Identifying the types of facilities that the program would cover and thereby facilitate development,
- Projecting the extent of dairy digester facilities development that may occur as a result of the program, and
- Assessing the environmental changes resulting from authorizing the proposed discharges as well as the construction and operation of digester facilities that could be developed as a result of the program.

This chapter expands upon each of these items.

4.2 Proposed Discharges

The Program EIR will serve to meet California Environmental Quality Act (CEQA) requirements for the Central Valley Water Board's decision to adopt as part of a waste discharge regulatory program one or more Waste Discharge Requirements (WDRs) General Orders (GOs) to regulate the discharge of liquid and solid digestate generated from dairy manure digesters and dairy manure co-digester projects located on or off-site of dairies within the jurisdictional boundaries of the Central Valley Water Board (Region 5). The GOs, Individual WDRs, or Conditional Waivers of WDRs (CWs) would regulate facility discharges that have the potential to affect the waters of the State. Major waste generation and storage processes at a digester facility that will need to be regulated under the program for their potential to affect the waters of the State include:

- Waste storage/receiving/handling areas of co-digestion feedstock,
- Storage of digestate in an above ground tank,
- Storage of digestate in an in ground vessel (e.g., lagoon, pond, tank, etc.), and
- Generation of solid and liquid digestate from dairy digesters and co-digesters.

4.3 Dairy Manure Digestion and Co-Digestion Facilities

The adoption by the Central Valley Water Board, of orders under the waste discharge regulatory program (i.e., primarily GOs and secondarily Individual WDRs or CWs), would facilitate the development of new dairy digesters and co-digesters within Region 5. Therefore, this Program EIR evaluates the effects of development of these facilities, including construction and operation.

For the purpose of this Program EIR, dairy digester and co-digester facility development is expected to take place on dairies and at centralized facilities located on and off-site of dairies. Application of digestate would take place on dairies and surrounding agricultural lands. Under CEQA, a Program EIR may evaluate “individual activities carried out under the same authorizing statutory or regulatory authority and having generally similar environmental effects which can be mitigated in similar ways.” (CEQA Guidelines §15168(a)(4)). Because these actions would be directly facilitated by the proposed waste discharge regulatory program, this document programmatically evaluates the environmental impacts of the development of dairy digesters and co-digesters as actions that could result from program implementation.

As identified in Chapter 2, Introduction, the GOs, Individual WDRs, and CWs under this program would be applicable to the following types of digester projects:

- New co-digestion facilities to be constructed on an existing General Order Dairy[1] without an expansion of dairy operations;
- New manure only digester or co-digester facilities to be constructed on an existing General Order Dairy with an expansion of dairy operations;
- New manure only digester or co-digester facilities proposed to be constructed at new dairies;
- Centralized manure digester or co-digester facilities on a General Order Dairy, with or without an expansion; and
- Centralized, stand-alone manure digester or co-digester facilities not located on a dairy.
- General Order Dairies with manure only digesters using only manure generated by onsite animals will remain under the Dairy General Order but may, if required, submit a Notice of Intent seeking coverage under a dairy digester GO.

This Program EIR evaluates the effects of the proposed discharges listed previously as well as the physical effects to the environment from construction and operation of dairy manure digester and co-digester projects within the above categories. Each of the resource chapters in the Program EIR considers the various phases of digester projects (construction, pre-processing, the digestion phase, and post-processing uses of the gases, liquids and solids) and analyzes those phases that could affect the physical environment.

This Program EIR does not evaluate the impacts of a dairy which are independent of the digester or co-digester facility. Where a digester or co-digester is to be located on a dairy, in permitting of the full facility under the waste discharge regulatory program, the Central Valley

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[1] Dairies that are currently regulated under Order No. R5-2007-0035, Waste Discharge Requirements General Order for Existing Milk Cow Dairies (General Order Dairy).

Water Board may rely on or tier off of the Program EIR but must additionally establish CEQA compliance for the non-digester related dairy operations.

Because of the programmatic review, specific equipment brands or vendors are not analyzed and the analysis is more general. Furthermore, the various phases of digester projects are analyzed as individual components rather than a complete system, as there are a variety of different options available to develop dairy manure digesters, co-digester systems, or centralized facilities.

4.4 Impacts and Mitigation Measures

Types of Impacts

The environmental setting is the physical environmental conditions in the vicinity of the project, as they exist at the time the Notice of Preparation (NOP) was published, March 18, 2010 (CEQA Guidelines §15125(a)).

This Program EIR evaluates the potential adverse environmental effects of the Central Valley Water Board's adoption and implementation of the project. The environmental resources analyzed in this Program EIR (see Chapters 5 – 15) are those identified as being potentially affected by dairy manure digester and co-digester projects. Each resource chapter includes a discussion of existing environmental and regulatory settings. The analysis first determines the extent to which each of the studied resources could be affected if the project is approved as proposed. In general, this is a determination of how the proposed discharges, as well as the development of additional dairy digesters, co-digesters, or centralized facilities, would affect the given resource. The analysis then applies a set of specific significance criteria (Thresholds of Significance) to categorize the severity of the potential environmental effects. These standards of significance are defined at the beginning of each impact analysis in Chapters 5 - 15, following a discussion of environmental and regulatory settings. Once the potential environmental changes are identified in this analysis, they are compared to the standards of significance. The impacts are then divided into the following categories:

- **Less-Than-Significant Impact.** A project impact is considered less-than-significant when it does not reach the standard of significance and would therefore cause no substantial change in the environmental. No mitigation is required for less-than-significant impacts.
- **Significant Impact.** Significant impacts are identified by the evaluation of project effects against the significance criteria identified in the Program EIR. A project impact is considered significant if it reaches or could potentially reach the level of significance identified in the Program EIR. Mitigation measures are identified to reduce these effects to the environment.
- **No Impact.** There are not impacts because the project is not anticipated to create change or the project would result in a beneficial impact.
- **Cumulative Significant Impact.** A cumulative impact can result when a change in the environment results from the incremental impact of a project when added to other related past, present or reasonably foreseeable future projects. Significant cumulative impacts may result from individually minor but collectively significant projects.

For all ***significant*** impacts, the EIR is required to include a description of feasible measures that could be implemented to avoid the adverse impacts entirely or to mitigate (reduce in magnitude) the impacts to a level that is below the defined standard of significance. Where available, mitigation measures are presented for all impacts determined to be significant. Where implementation of the mitigation measures would reduce the magnitude of the impact to below the defined standard of significance, the impact is determined to be less than significant after mitigation. Where implementation of the mitigation measures would not reduce the magnitude of the impact below the defined standard of significance, the impact is determined to be ***significant and unavoidable***.

Mitigation Measures

Where significant adverse impacts are identified, the EIR must "describe feasible measures which could minimize" those impacts to a less-than-significant level (CEQA Guidelines §15126.4). For each significant impact, mitigation measures are identified. In some cases, the Program EIR includes a list of alternative mitigation measures, any of which may be selected by the Central Valley Water Board and which could reduce the impact to a less-than-significant level, or contribute to doing so. Where multiple measures are required to reduce an impact to a less-than-significant level, the discussion clearly identifies which combination or permutation of measures would be necessary to achieve the appropriate level of mitigation.

Where measures are available that can reduce the magnitude of an impact, but not to a less-than-significant level, these are also identified. The Program EIR strives not to include measures that are clearly infeasible. Under CEQA, "feasible means capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors" (CEQA Guidelines §15364).

If, even with imposition of mitigation measures, the project will generate unavoidable significant effects, the Central Valley Water Board can only approve the project if it makes a statement of overriding considerations and finds that the benefits of the project outweigh the occurrence of those unavoidable effects (CEQA Guidelines §15092 and §15093).

For any mitigation measures imposed by the Central Valley Water Board, CEQA requires that the Central Valley Water Board adopt a Mitigation Monitoring and Reporting Program (MMRP) specifying how it will ensure compliance with the mitigation measures. The MMRP would be developed prior to action on the project. (Public Resources Code §21081.6(a)(1))

4.5 Environmental Setting and Baseline

The environmental setting is the physical environmental conditions in the vicinity of the project, as they exist at the time the NOP was published, March 18, 2010 (CEQA Guidelines §15125). As with any Program EIR, the existing environmental setting for certain topics will include a reasonable amount of historical data in order to accurately and meaningfully portray existing conditions. This environmental setting will normally constitute the baseline physical conditions by which a Lead Agency determines whether an impact is significant. The description of the environmental setting needs to be no longer than is necessary to understand the significant effects of the project and its alternatives (CEQA Guidelines §15125).

The environmental baseline is that condition against which the future “with-project” condition is compared to determine the amount of impact. Normally, the environmental baseline is the same as existing conditions, as is the case for this Program EIR.

4.6 Cumulative Impacts

Cumulative impacts are defined in the State CEQA Guidelines (§15355) as “two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts.” A cumulative impact is “the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor, but collectively significant, projects taking place over a period of time.” In a manner consistent with state CEQA Guidelines §15130[a], the discussion of cumulative impacts in this EIR focuses on potentially significant cumulative impacts.

Cumulative impacts associated with each of the environmental resources (e.g., Geology and Soils, Cultural Resources, etc.) are discussed within their respective chapters. The appropriate geographic scope for cumulative impacts analysis associated with resource areas ranges from site-specific to regional, encompassing primarily Region 5, but also potentially including areas adjacent to Region 5.

The project does not directly propose the construction of any new dairy manure digesters or co-digester facilities or central facilities, but the Program EIR does analyze the impacts from these facilities because the Program EIR and the project will help reduce permitting time for dairy digester water quality permits and other regulatory permits; thus directly facilitating their development. While the Program EIR resource sections analyze the impacts or dairy digester development on and off-site of dairies, the cumulative analysis also considers the impacts from other closely related past, present, and reasonably foreseeable probable future projects throughout the region.

Existing Dairy Digesters and Probable Future Projects

Forecasting future development involves estimating and projection. Invariably projecting a precise level of future development for dairy manure digesters in the project area under a new regulatory program is extremely challenging. Notwithstanding, the Program EIR must provide information about physical environmental effects that could occur as a result of implementing the dairy digester waste regulatory program. To ensure that potential errors that are part of any projection do not downplay or minimize the potential for environmental impacts, this Program EIR has made assumptions that lead to projections of a high level of future dairy digester development so that the cumulative impact analysis does not understate the development of dairy digester facilities (and potential impacts) that could occur.

For the purpose of projecting potential dairy digester, co-digester, and central facility development, a primary consideration is the existing systems that are operational throughout California and the United States.

The AgSTAR Program is a voluntary effort jointly sponsored by the U.S. Environmental Protection Agency (EPA), the U.S. Department of Agriculture, and the U.S. Department of Energy. The program encourages the use of methane recovery (biogas) technologies at the confined animal feeding operations that manage manure as liquids or slurries. The AgSTAR Program has an on-line database that provides valuable information regarding the status of dairy digesters in the United States and also in California. The AgSTAR database identifies 151 systems (including 13 central facilities) across the United States, with 15 dairy digesters in California[2]. This number includes all confined animal facilities but most of them (122 of 151) are dairy digesters. The states with the most digesters are Wisconsin (25), New York (22), and California and Pennsylvania (15).

The AgSTAR website notes positive trends in the developments of the systems.

> “ The development of anaerobic digesters for livestock manure treatment and energy production has accelerated at a very fast pace over the past few years. Factors influencing this market demand include: increased technical reliability of anaerobic digesters through the deployment of successful operating systems over the past five years; growing concern of farm owners about environmental quality; an increasing number of State and federal programs designed to cost share in the development of these systems; increasing energy costs and the desire for energy security; and the emergence of new State energy policies (such as net metering legislation) designed to expand growth in reliable renewable energy and green power markets.
>
> Financial incentives have increased the deployment rate of manure digester systems. For example, grants and loans awarded by USDA Rural Development through the Farm Bill have been one of the primary methods for farms to partially fund installation of commercially proven livestock waste digestion technologies. Since 2003, USDA Rural Development has awarded more than $37 million for anaerobic digestion systems.”

Other recent evidence of the potential growth of dairy manure digesters is provided in a review of dairy digesters in the state of Wisconsin (Kramer and Krom, 2010). While the growth of digesters in Wisconsin has been steady (an average of 3.75 new digesters per year), the 2009 *Wisconsin Biogas Casebook* indicates that at least 8 digesters were added in 2009. The authors indicate the continued growth of anaerobic digesters can be attributed to improved overall performance. Overall performance has improved because the dairy digesters and co-digesters have become more fine-tuned; system providers continue to improve their designs, and owners and day-to-day operators discover innovative operational changes. Nine of the digesters in Wisconsin add up to 20 percent co-digestion substrates (chopped straw, waste corn silage, moldy or unused feed and off-farm wastes from food or beverage processing industries) to the manure to increase biogas production. Co-digestion is encouraged and generally supported by interests in developing renewable energy sources and keeping compostable organics out of landfills. Dairies in California and other states can benefit from the fine-tuning that has

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[2] Note that more recent information (May, 2010) from the Western Dairymen identifies only 14 dairy digesters that are currently operations. A list on the CARB website (dated January 20, 2009) identified 12 dairy digesters in operation at that time (see http://www.arb.ca.gov/ag/manuremgmt/operating-manure-digester-site-list.pdf) accessed June 2, 2010.

occurred in Wisconsin and other states. Such synergies could further boost the potential for dairy digester and co-digester development in California.

Another example of the growth of anaerobic disgester systems is the growth of digestion capacity for biowaste or MSW in Europe. Plants installed per year increased from 3 per year in the early 1990s (in the first years of the adoption of the technology) to 14.6 plants per year between 2006 and 2010 (Du Baere, 2010).

The cumulative analysis in this Program EIR analyzes the potential development of approximately 20 dairy digesters built per year in Region 5, which equates to approximately 200 dairy digesters over a 10-year period. This would change the number of dairies with dairy digester facilities in Region 5 from only about one percent of the dairies now to the equivalent of approximately 15 percent in 10 years. Under this development scenario, it is likely that multiple dairy digesters would be built on large dairies. As noted in Chapter 3, Program Description, approximately 1.6 million cows are housed in approximately 1,400 dairies located throughout Region 5.

It is acknowledged that currently, dairy digester facilities in California face difficult economic conditions; capital requirements are high and the financial return from the systems do not justify the cost. Most, if not all, of the systems have used government grants to help with initial development costs. Several factors would need to be necessary to develop up to 20 dairy digesters per year in Region 5. Key factors would include:

- Increased demand for new energy sources;
- Increased demand for local renewable energy sources;
- Increased incentives for co-digester facilities;
- Improvements in dairy digester technologies; and
- Public financial support or the development of profitable business models; or
- Regulations that require the development of energy-producing dairy digester facilities for specified dairies.

There have been a variety of factors that have caused the price of fossil-fuels to spike over the past 50 years and there are no sources of energy that can be developed without environmental consequences. Changes in public opinion could dramatically change the types of energy projects that are supported or required in the future. Dairy digesters and co-digester facilities could benefit from increased incentives for local, renewable energy sources. Potentially, dairies in Region 5 could generate approximately 14.6 billion cubic feet of methane per year through manure only anaerobic digestion, which would correspond to 140 megawatts[3] of annual electrical capacity (Krich, et al., 2005). California efforts to achieve the greenhouse gases (GHG) reductions identified in AB 32 could also provide support for dairy digester and co-digester projects.

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[3] This was based on an estimate of 1.7 million cows.

For the purpose of cumulative impact analyses in the various resource chapters in this Program EIR, development of the digesters can be assumed to be concentrated geographically (within reasonable limits), to the extent that such assumptions will help to identify potentially significant cumulative impacts. The potential for central facilities to be connected to dairies by biogas pipelines would be one of the factors that would concentrate several dairy digester or co-digesters in a localized geographic area.

Operating Parameters of Future Dairy Digester Facilities

Based on the existing dairy digester data for California where 19 of the 21 digesters (operational and non-operational) used biogas for electricity or co-generation, this analysis projects that the majority of the dairy digesters to be developed will use the biogas for electricity or co-generation, which typically occurs on individual dairies. Of the 200 digesters, the analyses assumes that about 180 of the facilities would combust the biogas on-site through a generator and that 20 of these would be at centralized facilities. The analysis assumes there would be 5 centralized facilities that would process biogas piped from digesters at individual dairies and 5 centralized facilities that would have multiple digesters each to process manure that would be piped or trucked from dairies and co-digestion organic substrates that would be trucked to the central facilities.

TABLE 4-1
EXISTING DAIRY DIGESTERS IN CALIFORNIA

Facility	Digester Type	Biogas End Use(s)	Operational Status
Blakes Landing Dairy	Covered Lagoon	Electricity	Operational
Bob Giacomini Dairy	Covered Lagoon	Cogeneration	Operational
Bullfrog Dairy	Covered Lagoon	Electricity	Operational
Cal Poly Dairy	Covered Lagoon	Electricity	Not Operating
CAL-Denier Dairy	Covered Lagoon	Electricity	Operational
Castelanelli Bros. Dairy	Covered Lagoon	Electricity	Operational
CottonWood Dairy	Covered Lagoon	Cogeneration; Boiler/Furnace Fuel	Operational
Edenvale Dairy	Horizontal Plug Flow	Electricity	Not Operating
Fiscalini Farms	Complete Mix	Cogeneration	Operational
Hilarides Dairy	Covered Lagoon	Electricity; Vehicle Fuel	Operational
Inland Empire Utilities Agency - Reg Plant 5	Horizontal Plug Flow; Complete Mix	Electricity	Not Operating
Koetser Dairy	Horizontal Plug Flow	Electricity	Not Operating
Langerwerf Dairy	Horizontal Plug Flow	Cogeneration	Operational
Lourenco Dairy	Covered Lagoon	Flared Full Time	Not Operating
Meadowbrook Dairy	Horizontal Plug Flow	Electricity	Operational
St. Anthony Dairy	Covered Lagoon	Cogeneration	Not Operating
Strauss Family Dairy	Covered Lagoon	Cogeneration	Operational
Tollenaar Holsteins Dairy	Complete Mix	Cogeneration; Boiler/Furnace Fuel	Operational
Van Ommering Dairy	Horizontal Plug Flow	Electricity	Operational
Van Warmerdam Dairy	Unknown	Electricity	Operational
Vintage Dairy	Covered Lagoon	Pipeline Gas	Not Operating

SOURCE: Western United Dairymen, 2010

Several of the environmental resource chapters analyze vehicles trips directly (Chapter 8, Transportation and Traffic) or indirectly (Chapter 6, Air Quality and GHG Emissions, and Chapter 14, Noise). In regards to truck and employee trips the analyses in this Program EIR have relied upon estimates detailed in recent information provided to Fresno County on the details of two dairy co-digester projects in the County (Munzen, 2010) and the *Microgy Pipeline Project for Cloverdale, Hollandia, and Wreden Dairies* IS/MND (SJVAPCD, March 2008), which analyzed anaerobic digester development on three dairies in order to centrally collect the biogas and pipe it into the gas network of the Southern California Gas Company. On average these projects assumed that approximately 2 trucks per day per digester would haul co-digestion substrates to the dairies, and that two employees would routinely monitor the central gas conditioning facility and the dairy digesters. Thus, the analyses in this Program EIR assumes that 400 trucks per day would haul anaerobic digester substrate for the cumulative development (i.e., 2 trucks per day for each of the 200 dairy digesters). In addition, it was assumed that 2 employees would be needed for the operation of each of the centralized facilities, or 20 employees total. These relatively low estimates of daily vehicle trips and employees necessary to operate the facilities are consistent with observations and discussions with dairy digester facility operators during the site tour of three dairy digester facilities on April 6, 2010 (ESA, 2010).

Finally, based on the US EPA AgSTAR Anaerobic Digester Database[4], the average electrical generation capacity per digester facility in California is 261 kW. In addition, the average methane emission reduction per digester facility in California is 296 metric tons CH_4 per year and 6,223 metric tons CO_2e per year. These averages are used in the analysis in this Program EIR.

4.7 References

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[4] http://www.epa.gov/agstar/operational.html; last updated April 2010

CHAPTER 5

Hydrology and Water Quality

5.1 Setting

The Central Valley, also referred to as the Great Valley, is a very large, flat alluvial valley that dominates the central portion of California. Land use in this region includes a majority of the state's most productive agricultural operations. The valley stretches approximately 500 miles from north to south, from the about 100 miles south of the Oregon border to the boundary between Kern and Los Angeles counties. The Central Valley is divided into three hydrologic regions or surface water basins including the Sacramento River Basin in the north (**Figure 5-1**), the San Joaquin River Basin (**Figure 5-2**), and the Tulare Lake Basin (**Figure 5-3**) to the very south.[1] Together the Sacramento and San Joaquin River Basins cover about one fourth of the total areas of the State and over 30 percent of the irrigable land. The two main drainages for these valleys, the Sacramento River and the San Joaquin River, empty into the San Francisco Bay estuary system through a large expanse of interconnected canals, streambeds, sloughs, marshes and peat islands known as the Sacramento-San Joaquin Delta (Delta).

The Tulare Lake Basin comprises the drainage area south of the San Joaquin River. The basin is essentially enclosed with no natural drainage to the ocean although surface waters of the basin will drain into the San Joaquin River during years of extreme rainfall and some engineering improvements such as the Cross Valley Canal and some Fresno Irrigation District canals allow flows to exit the Tulare Lake Basin. The Tulare Lake Basin is an agricultural center although the surface water supplies are insufficient to support the current level of agriculture and therefore groundwater resources are also used to meet the total demand.

The Sacramento River Basin receives about 20 inches of rain annually, with some of the northern areas receiving more precipitation. Both the San Joaquin River Basin and the Tulare Lake Basin are very dry, often semi-arid desert in many places. The northern Central Valley is considered a hot Mediterranean climate, whereas the more southerly parts are located in a rainshadow zones are dry enough to be considered low-latitude desert. Summers are typically hot and dry and the winter is cool and damp, with frequent ground fog known regionally as tule fog. Summer daytime temperatures commonly reach 90 °F, and occasional heat waves that might bring temperatures exceeding 115 °F. Frost occurs at times during the winter months, but snow is extremely rare.

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[1] A more detailed description of the three hydrologic regions and subwatersheds can be found in the Irrigated Lands Existing Conditions report, December 2008, which can be accessed at http://www.swrcb.ca.gov/rwqcb5/water_issues/irrigated_lands/long_term_program_development/rev_existing_conditions_report/index.shtml.

Surface Water Hydrology

Sacramento River

Flows within the Sacramento River are highly regulated and are influenced by the following factors: runoff from precipitation and snowmelt; natural variation; upstream water storage facilities; water diversions for agricultural, municipal, and industrial purposes; agricultural and municipal discharges; and a flood control system that includes levees, bypasses (e.g., the Yolo, Sutter, and Colusa bypasses), and weirs.

Sacramento River flows vary substantially on a seasonal and year-to-year basis. Seasonally, flows in the river may vary as a result of runoff from local tributaries and releases from the major water storage reservoirs, as well as diversions by agricultural, municipal, and other users. Interannually, river flows vary according to precipitation, the volume of carryover storage in reservoirs, and releases to downstream water users. The Sacramento River enters the Delta (as defined by California Water Code Section 12220) at Freeport, where the average annual flow is about 16 million acre-feet (MAF).

The Sacramento River Basin is further divided into eight subwatersheds (See Figure 5-1) including:

- Pit River Watershed
- Shasta-Tehama Watershed
- Upper Feather River–Upper Yuba River Watershed
- Colusa Basin Watershed
- Butte-Sutter-Yuba Watershed
- Lake-Napa Watershed
- Solano-Yolo Watershed
- American River Watershed

The Sacramento River Basin encompasses approximately 12.2 million acres. Of this amount, 2.4 million acres are classified as agricultural lands. The majority of these irrigated acres occur on the Valley floor, in the Solano-Yolo, Colusa Basin, and Butte-Sutter-Yuba Watersheds. Rice is the primary crop in the Sacramento River Basin, particularly in the Colusa and Butte-Sutter-Yuba Watersheds where poorly drained soils provide ideal conditions. Other predominant crop types include field crops, orchards, pasture, and grains (Jones and Stokes, 2008).

San Joaquin River

Flows within the San Joaquin River are highly regulated and influenced by the following factors: runoff from precipitation and snowmelt; natural variation; upstream water storage facilities; water diversions for agricultural, municipal, and industrial purposes; agricultural and municipal discharges; and a flood damage reduction system. The average annual flow of the San Joaquin River as it enters the Delta at Vernalis is about 2.6 MAF, or 3,600 cubic feet per second (cfs).

SOURCE: ICF Jones & Stokes, 2006; and ESA, 2010

Figure 5-1
Sacramento Valley Basin

SOURCE: ICF Jones & Stokes, 2006; and ESA, 2010

Figure 5-2
San Joaquin Valley Basin

SOURCE: ICF Jones & Stokes, 2006; and ESA, 2010

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Figure 5-3
Tulare Lake Basin

Typically, during summer months, flows within the lower San Joaquin River are composed primarily of agricultural and wildlife refuge return flows and municipal discharges. Portions of the middle/lower San Joaquin River below Friant Dam typically run dry during the dry season, resulting in a temporary hydrologic disconnect between the lower and upper watersheds though the area has been undergoing changes in water management.

The San Joaquin River Basin is further divided into 12 subwatersheds (See Figure 5-2) including:

- Cosumnes River Watershed
- Delta-Mendota Canal Watershed
- San Joaquin River Watershed
- San Joaquin Valley Floor Watershed
- Delta-Carbona Watershed
- Ahwahnee Watershed
- Mariposa Watershed
- Upper Mokelumne River–Upper Calaveras River Watershed
- Merced River Watershed
- North Valley Floor Watershed
- Stanislaus River Watershed
- Tuolumne River Watershed

The San Joaquin River Basin encompasses approximately 9.8 million acres. The primary tributaries in the basin are the Stanislaus River, Tuolumne River, and Merced River, which meet with the San Joaquin River in the Valley floor at the basin’s southern end. The basin is dominated by agriculture at the confluence of the San Joaquin and these various rivers. Multiple canals in the Delta Mendota Canal Watershed deliver water to agricultural operations and then back to the natural drainages (Jones and Stokes, 2008). Many tributaries in the watershed that would otherwise be dry during the summer irrigation season flow year-round due to agricultural return flows. The San Joaquin River receives the majority of its flow from snow melt and runoff in the Sierra Nevada Mountains. However, groundwater flows from the upper aquifer in the valley may also contribute to the total surface water flow in the San Joaquin River as well as to surface water flows in a variety of San Joaquin River Basin streams (Grismer and Rashmawi, 1993, Domagalski, et al, 2008, Wildman et al, 2009). This groundwater influx has been demonstrated to induce a variety of contaminants, primarily nutrients and salts into surface waters (Domagalski, et al, 2008, Wildman et al, 2009 and Lee, G.F., and Jones-Lee, A., 2007).

Approximately 2 million acres within the basin are classified as agricultural. The primary crops that are produced in the San Joaquin River Basin include field crops, pasture, deciduous fruits and nut orchards, vineyards, and grain and hay. Agricultural land uses in the basin are concentrated in the Valley floor—specifically in the Delta-Mendota Canal, San Joaquin Valley Floor, Delta-Carbona, and North Valley Floor Watersheds. There is very little agriculture in the remaining watersheds.

Sacramento–San Joaquin Delta

The Sacramento-San Joaquin Delta, to the east of San Francisco Bay, represents the point of discharge for the Sacramento-San Joaquin River system. Water flows out of the Delta, into San Francisco Bay, and through the Golden Gate to the Pacific Ocean, creating an extensive estuary where salty ocean water and fresh river water commingle. In sum, water from over 40 percent of the state's land area is discharged into the Delta (Heim, et al., 2009).

The Delta supports several beneficial uses, including water supply to local and south of Delta municipalities and agricultural uses, ecological support for fisheries including wetlands and important habitat, in-Delta agriculture, flood management, water quality management, and a major conveyance for transporting fresh water from northern to southern portions of the state. In addition, many other water projects also divert Delta waters including export pumps for the State Water Project, diversions for Delta-area and San Francisco Bay Area municipalities, and regional agricultural users. An extensive network of drainage ditches prevents islands in the Delta from flooding internally and maintains groundwater levels deep enough for agricultural crops to grow. The accumulated agricultural drainage is then discharged through or over the levees into stream channels. Without this drainage, the islands would become flooded.

Tulare Lake Basin

The majority of surface water supply in the basin is provided by the Kings, Kaweah, Tule and Kern Rivers which drain the west face of the Sierra Nevada Mountains. Imported surface water supplies enter the basin through the San Luis Canal/California Aqueduct System, Friant-Kern Canal, and Delta-Mendota Canal. Imported surface water supplies represent the introduction of half the salts that are found in the basin (discussed further below). The former Buena Vista Lake and Tulare Lake are natural depressions on the valley floor which once received flood waters from the major drainages during times of heavy runoff. Currently though, Buena Vista and Tulare Lake are now developed into agricultural fields. Heavy flows from the Kings River can reach the San Joaquin River through the Fresno Slough.

The Tulare Lake Basin is further divided into 10 subwatersheds (See Figure 5-3) including:

- Kings River Watershed
- Kaweah River Watershed
- Kern River Watershed
- South Valley Floor Watershed
- Grapevine Watershed
- Coast Range Watershed
- Fellows Watershed
- Temblor Watershed
- Sunflower Valley Watershed
- Southern Sierra Watershed

The Tulare Lake Basin encompasses approximately 10.7 million acres of which 3.6 million acres are classified as agricultural (Jones and Stokes, 2008). The vast majority of this agricultural land is located in the South Valley Floor Watershed (3.5 million acres). In comparison with other watersheds in the Tulare Lake Basin, the South Valley Floor Watershed is relatively flat. Consequently, the bulk of water quality concerns related to the Tulare Lake Basin involve agricultural operations and agricultural return flows in the South Valley Floor Watershed (Jones and Stokes, 2008).

In the upper watershed areas, irrigated agriculture accounts for less than 2 percent of land uses in the Kings River, Kaweah River, Kern River, Grapevine, Coast Range, Sunflower Valley, and Southern Sierra Watersheds—with just slightly more in the Temblor Watershed (3.3 percent). There is no agriculture in the Fellows Watershed. The primary crop types within the Tulare Lake Basin as a whole are grain and hay crops, pasture, and deciduous fruits and nuts. The primary crop types within the South Valley Floor Watershed are field crops, followed by deciduous fruits and nuts, vineyards, pasture, and grain and hay.

Surface Water Quality

Water Quality Constituents

A variety of water quality problems exist within the surface waters of the Central Valley, and contribute to impairments of the beneficial uses of surface water in portions of the region. In general, surface water quality is dependent on a number of factors including seasonal hydrologic patterns, mineral composition of watershed soils, topography, land use, and sources of contamination. During low-flow conditions of the summer months, the surface water quality characteristics of most importance to aquatic life are temperature, dissolved oxygen, turbidity, nutrients such as nitrogen and phosphorous, algae growth, and other toxic constituents including ammonia, pesticides, and residual chlorine (all beneficial uses of surfaces waters in the Central Valley are presented below in the Regulatory Framework section). Higher flow conditions in the winter are influenced more by stormwater runoff and associated pollutants such as sediment (turbidity), petroleum hydrocarbons, nutrients and bacteria from livestock areas and agricultural fields, heavy metals, pesticides, and various other pollutants.

Historical and ongoing point source and nonpoint source discharges have been found to contribute to impairments of surface waters.[2] Significant portions of major drainages within the Central Valley have been impaired by discharges from agriculture, mining, urban areas, and industrial activities (RWQCB, 2004 and 2009). Studies of the San Joaquin River's water quality, have indicated that groundwater flow entering the river along a 60-mile reach from Merced County to Vernalis in Stanislaus County, though relatively small compared with the total river flows, could nonetheless represent significant contributions of salt, boron, and other trace elements found in the groundwater (Grismer and Rashmawi, 1993). Constituents of concern for dairies and associated animal wastes include excess amounts of nutrients, salts, organics rich in biochemical oxygen-demanding material, microbial pathogens, antibiotics, and natural and synthetic hormones (Bradford, 2008)

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[2] Discharges are often described as either point source or nonpoint source. A point source discharge usually refers to waste emanating from a single, identifiable place. A nonpoint source discharge usually refers to waste emanating from diffuse locations.

Salinity is a problem that has been identified in both surface and groundwater within portions of the Central Valley, particularly in the Tulare Lake Basin. Salinity refers to the concentration of salts or ions present in water, including sodium, magnesium, calcium, phosphates, nitrates, potassium, chloride, bromide, and sulphate. Salinity is commonly measured by total dissolved solids (TDS) concentrations. Salinity is both an aesthetic (taste) and a health issue for drinking water quality. High salinity adversely affects drinking water taste, landscape irrigation, and industrial and manufacturing processes. Salinity is particularly problematic because it cannot be removed via conventional drinking water treatment processes.

Section 303(d) List of Impaired Water Bodies and TMDLs

In accordance with Section 303(d) of the Clean Water Act (discussed further below), state governments must present the US Environmental Protection Agency (USEPA) with a list of "impaired water bodies," defined as those water bodies that do not meet water quality standards, even after point sources of pollution have installed the minimum required levels of pollution control technology.

Placement of a water body on the Section 303(d) List of Impaired Water Bodies acts as the trigger for developing a Total Maximum Daily Load (TMDL) pollution control plan for each water body and associated pollutant/stressor on the list. The TMDL is the quantity of a pollutant that can be safely assimilated by a water body without violating water quality standards. The TMDL serves as the means to attain and maintain water quality standards for the impaired water body to support designated and potential beneficial uses identified in the Basin Plan. During each Section 303(d) listing cycle, the water bodies on the list are prioritized, and a schedule is established for completing the TMDLs.

There are numerous surface water bodies listed in the 303(d) list for the Central Valley Region for a variety of pollutant/stressors, however three of them specifically name dairies as potential sources of the impairment (SWRCB, 2009 and CVRWQCB, 2009). Little Johns Creek, located in the San Joaquin River Basin, is a small drainage that connects to French Camp Slough and the Delta. Little Johns Creek is not considered to have significant water quality problems, but some of its tributaries have water quality issues that are associated with their proximity to dairies. These small tributaries are:

- Lone Tree Creek—Lone Tree Creek runs along the southern edge of the North Valley Floor Watershed, with some small sections falling in the San Joaquin Valley Floor Watershed. Lone Tree Creek is a direct tributary to Little Johns Creek. Lone Tree Creek is listed as impaired from ammonia, biochemical oxygen demand (BOD), chlorpyrifos, Diuron escherichia coli (E. coli), sediment toxicity, and unknown toxicity. Dairies have been identified as a potential source for the ammonia and BOD (SWRCB, 2009).
- Temple Creek—Temple Creek is north of Lone Tree Creek and is a small tributary to Lone Tree Creek. According to the 303(d) list, Temple Creek is impaired with ammonia and electrical conductivity with dairies listed as the potential source for both (SWRCB, 2009).
- Avena Drain—Avena Drain is also a tributary to Lone Tree Creek and is located between Lone Tree Creek and Temple Creek. Its main source of inflow is agricultural drainage and storm runoff. Ammonia and pathogens are the listed pollutant/stressors for Avena Drain with dairies identified as the potential source.

Groundwater

Similar to the surface water regions, the Central Valley region lies within three groundwater basins: the Sacramento River Hydrologic Region (HR) (**Figure 5-4**), the San Joaquin River HR (**Figure 5-5**), and the Tulare Lake HR (**Figure 5-6**).

Sacramento River HR

The Sacramento River HR covers approximately 17.4 million acres that extend from the Modoc Plateau and Cascade Range at the Oregon border to the Delta in the south (DWR, 2003a). On the east side, the region is bounded by the Sierra Nevada and on the west by the Coast Range and Klamath mountains. The Sacramento River HR has been divided into 88 groundwater basins, some of which have been further divided into subbasins. The Sacramento Valley basin, the largest in the HR, generally consists of a large trough filled with thick alluvial sediments of varying permeability. However, in general the well yields or amount of water that can be extracted from a single well are very good. Groundwater is used as supplemental agricultural water supply sources to surface water supplies throughout the Sacramento Valley. Domestic use of groundwater varies but in general, rural areas rely solely on groundwater as well as some cities and towns including Red Bluff, Corning, Woodland, Davis, and Dixon.

San Joaquin River HR

The San Joaquin River HR covers approximately 9.7 million acres, representing the central portion of the Central Valley. The region is bound on the north by the Delta, the east by the Sierra Nevada, the west by the Diablo Range and the south by the Tehachapi Mountains. The HR includes two groundwater basins (Yosemite Valley and Los Banos Creek Valley) and part of the San Joaquin Valley basin including 9 subbasins. In general, this HR is heavily reliant on groundwater supplies and accounts for approximately 18 percent of statewide groundwater use for both agricultural and urban needs (DWR, 2003b).

The aquifers or water bearing zones within the San Joaquin River HR are generally very thick, accommodating wells as deep as 800 feet below ground surface (DWR, 2003b). Aquifers include unconsolidated alluvium as well as consolidated rocks with unconfined and confined groundwater conditions. Since the beginning of agricultural development in the region, groundwater has been used in conjunction with surface water to meet water supply needs (DWR, 2003b). Historical groundwater use and over pumping in areas has resulted in significant land subsidence especially in the southwest portion of the region.

Tulare Lake HR

The southernmost HR of the Central Valley has 13 groundwater basins including the southern portion of San Joaquin Valley basin (south of San Joaquin River) with 7 identified subbasins. The Tulare Lake HR covers approximately 5.33 million acres. Groundwater has historically been used as an important source of urban and agricultural uses providing 41 percent of the region’s total annual supply (DWR, 2003c). The San Joaquin River basin is characterized by relatively thick aquifers with groundwater wells that commonly exceed 1,000 feet in depth. Freshwater bearing deposits can be found as much as 4,400 feet thick at the southern end of the San Joaquin Valley. In the central and west-side portions of the valley a confining layer of tight clays known as the

Corcoran Clay restricts vertical groundwater flow between the overlying unconfined aquifer and the underlying confined aquifer. Well yields are generally quite good in the valley with lower yields found in the smaller basins of the mountains surrounding the valley (DWR, 2003c).

Groundwater Quality

Groundwater Quality Constituents

Groundwater monitoring data indicates that many dairies in the Central Valley region have impacted groundwater quality. The main constituents of concern for waste discharge from dairies are nitrogen in the form of both ammonium and nitrate, phosphorus, salinity or salts, chloride, boron, pathogens, and organic matter. These constituents of concern are also present in various forms and concentrations in both the liquid and solid streams of the anaerobic digestion process for dairy cow manure. Following is a discussion of the environmental and health implications for each constituent of concern.

Salinity and Total Dissolved Solids

Salt is a general term used to describe a combination of cations and anions that are common to groundwater. The concentration of salts in groundwater can increase through what is known as evaporative enrichment. Evaporation rates are highest during the summer months when irrigation water is typically applied to crops. As the water molecules evaporate, the salts remain behind to percolate into the underlying groundwater. When this water is later pumped for additional irrigation, the evaporation cycle is repeated and salinity levels continue to increase. In addition, the application of synthetic fertilizers, manures, and wastewater treatment facilities can all contribute salt to groundwater. Co-digestion substrates that might be used for a co-digestion process typically vary in their constituents but can include high salt concentrations.

TDS is a measure of the total amount of inorganic and organic substances dissolved in water and is, therefore, a very useful parameter in the overall evaluation of groundwater quality. TDS concentrations provide a qualitative measure of the amount of dissolved ions, but it does not explain the nature or ion relationships. High TDS concentration does not by itself identify a specific water quality issue, such as: elevated hardness[3], salinity, or corrosiveness. Instead, TDS is used as an indicator test to determine the general quality of the water. Common cations include sodium, calcium and magnesium and common anions include chloride, sulfate, and nitrate. Electrical conductivity (EC) is also used to measure the ions dissolved in water: the higher the EC the more mineralized the water. The presence of salts in soil and root zone water may adversely affect the viability of crops.

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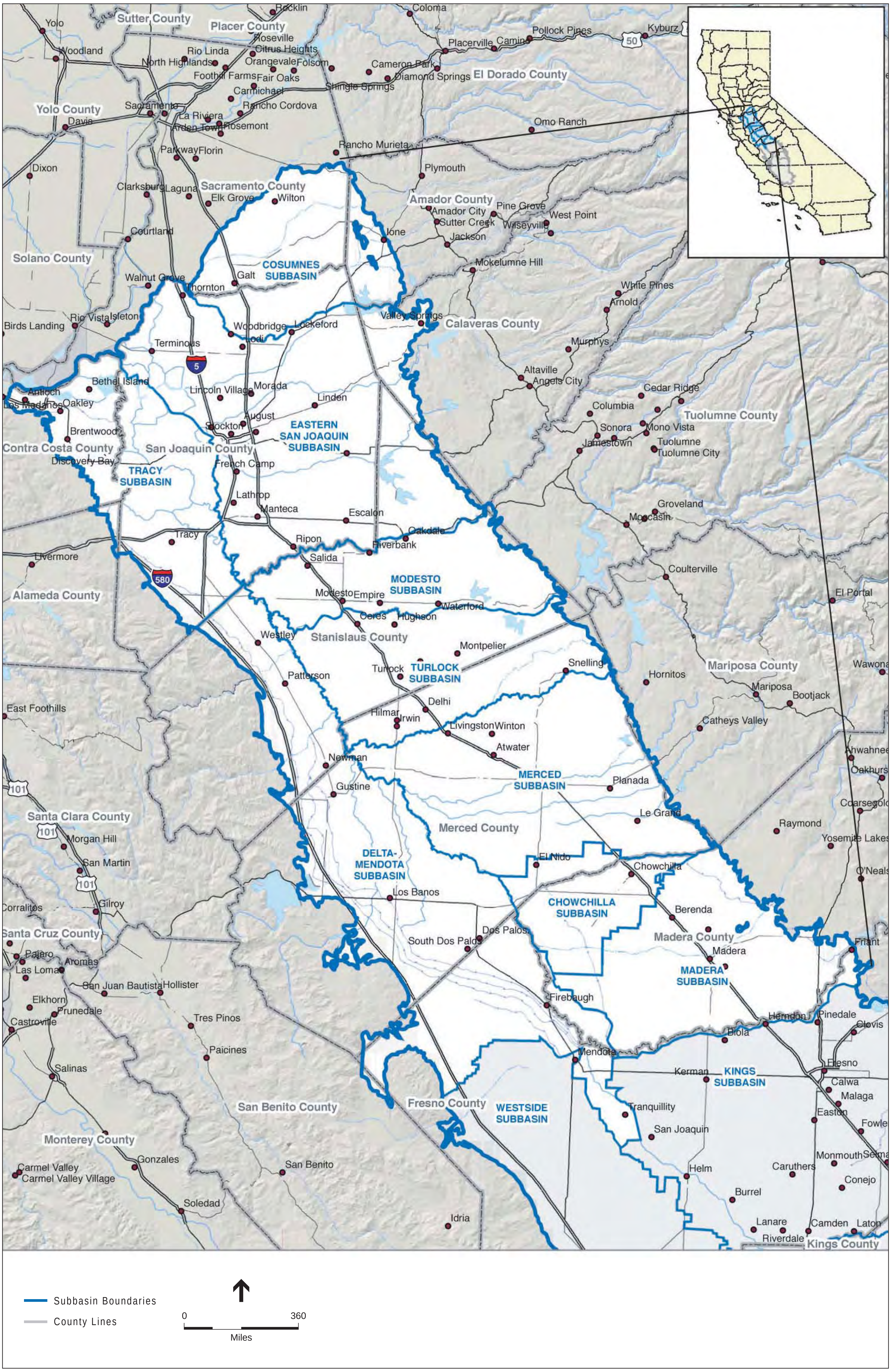
[3] Hardness is the measure of the amount of calcium, magnesium, and iron dissolved in the water. Hardness of about 60 mg/l or less is considered soft water, and more than about 120 mg/l is generally considered hard water.

SOURCE: HydroFocus, 2005; and ESA, 2010

Figure 5-4
Sacramento River Groundwater Subbasins



SOURCE: ESRI, 2008; DWR, 2008; and ESA, 2010

Figure 5-5
San Joaquin Valley Groundwater Subbasins

SOURCE: ICF Jones & Stokes, 2006; and ESA, 2010

Figure 5-6
Tulare Lake Groundwater Subbasins

An elevated TDS concentration is not necessarily a health hazard. The TDS concentration is a secondary drinking water standard and therefore is regulated because it is more of an aesthetic rather than a health hazard. However, it can also damage crops, affect plant growth and damage industrial equipment. An elevated TDS indicates the following:

1. The concentration of the dissolved ions may cause the water to be corrosive, salty or brackish taste, result in scale formation, and interfere and decrease efficiency of hot water heaters; and
2. Many contain elevated levels of ions that are above the Primary or Secondary Drinking Water Standards, such as: an elevated level of nitrate, arsenic, aluminum, copper, lead, etc.

Nitrogen Cycle

The nitrogen cycle is the process by which nitrogen is converted between its various chemical forms. This transformation can be carried out through both biological and non-biological processes. Important processes in the nitrogen cycle include fixation (the natural process by which nitrogen in the atmosphere is converted into ammonia), mineralization (the decomposition of chemical compounds in organic matter by oxidation into plant-accessible forms), nitrification (the biological oxidation of ammonia with oxygen into nitrite followed by the oxidation of these nitrites into nitrates), and denitrification (the microbially facilitated process of reducing nitrate to produce molecular nitrogen (N_2) through a series of intermediate gaseous nitrogen oxide products). The nitrogen cycle is of particular concern to the environment because nitrogen availability can affect the rate of key ecosystem processes, including primary production and decomposition. Human activities such as fossil fuel combustion, use of artificial nitrogen fertilizers, and release of nitrogen in wastewater have dramatically altered the global nitrogen cycle.

Ammonia

Ammonia, a compound of nitrogen and hydrogen with the formula NH_3, is a colorless gas with a strong pungent odor. It is easily liquefied and solidified and is very soluble in water. Ammonia will react with water to form a weak base. About three-fourths of the ammonia produced in the United States is used in fertilizers either as the compound itself or as ammonium salts such as sulfate and nitrate. Large quantities of ammonia are used in the production of nitric acid, urea and nitrogen compounds. It is used in the production of ice and in refrigerating plants. Household ammonia is an aqueous solution of ammonia used to remove carbonate from hard water. Since ammonia is a decomposition product from urea and protein, it is found in domestic wastewater and can be formed as a result of dairy waste degradation. Aquatic life and fish also contribute to ammonia levels in surface waters.

Ammonia is un-ionized, and has the formula NH_3. Ammonium is ionized, and has the formula NH_4^+. The major factor that determines the proportion of ammonia or ammonium in water is the pH of the water. This is important as the unionized NH_3 is the form that can be toxic to aquatic organisms. The ionized NH_4 is basically harmless to aquatic organisms. The activity of ammonia is also influenced by temperature and ionic strength.

The chemical equation that drives the relationship between ammonia and ammonium is:

$$NH_3 + H_2O \leftrightarrow NH_4^+ + OH^-$$

When the pH is low, the reaction is driven to the right, and when the pH is high, the reaction is driven to the left

Ammonia has been reported toxic to fresh water organisms at concentrations ranging from 0.53 to 22.8 mg/L. Toxic levels are both pH and temperature dependent. Toxicity increases as pH decreases and as temperature decreases. Plants are more tolerant of ammonia than animals, and invertebrates are more tolerant than fish. Hatching and growth rates of fishes may be affected.

The California Department of Health Services (CDHS) has established a draft Suggested No Adverse Response Level (SNARL) for ammonia of 30 mg/L. Although not applicable to groundwater, the RWQCB has established pH- and temperature-dependant surface water quality goals for freshwater aquatic life.

Ammonia is broken down by bacteria (*Nitrosomonas*) to form nitrite (NO_2), which is then broken down by another type of bacteria (*Nitrobacter*) to form nitrate (NO_3). This conversion of ammonia to nitrite and nitrate is called nitrification. Nitrates are essential nutrients for plants or crops to grow. Commercial fertilizers are typically applied either as ammonia or nitrate, but ammonia is rapidly converted to nitrate in the soil. Animal manure is also commonly used as a nitrogen fertilizer. Organic nitrogen and urea in the manure are converted to ammonia and, ultimately, to nitrate in the soil. Ammonia is easily transformed to nitrate in waters that contain oxygen and can be transformed to nitrogen gas in waters that are low in oxygen under a process known as denitrification. Fertilizer is a major influence on nitrogen concentrations in the environment. Excess nitrate that is not used by plants can wash from farmlands and residential and commercial lawns into storm drains and nearby surface waters, or seep into groundwater.

Nitrate

Nitrogen is present in groundwater primarily in the nitrate form which is highly soluble in water. Nitrogen can also be present in groundwater as ammonium or nitrite. Nitrates can easily move through the soil profile to groundwater. The sources of nitrate include human and animal waste and large scale use of nitrogen-based fertilizers. The presence of nitrates in groundwater can be affected by soil characteristics, crop type, irrigation practices, timing and application of nitrogen, geology, climate, and hydrologic conditions. It can also be difficult to determine whether the presence of nitrates in groundwater is due to historical or current practices or whether from agricultural, animal waste, septic, or wastewater sources. Coarse grained sandy soils transmit water containing dissolved nitrates downward more rapidly than tighter grained soils. In addition, the coarse grained soils are less likely to provide the reducing conditions that allow nitrates to turn into a gas and escape the soil (denitrification). The CDHS has established a Maximum Contaminant Level (MCL) for nitrate (as NO_3) of 45 mg/L. This is equivalent to the state and federal drinking water standard of nitrate as nitrogen MCL of 10 mg/L. The CDHS has established a MCL for nitrite (as Nitrogen) of 1 mg/L. Like nitrate, nitrite is anionic and can move through the soil profile to groundwater.

Under typical environmental conditions, nitrite is readily oxidized to nitrate. Nitrates in drinking water have been associated with methemoglobinemia (MHB), often referred to as "blue-baby" syndrome. MHB affects infants under 6 months of age with symptoms that include an ashen, bluish (cyanotic) hue to the skin and nails.

Nitrate contamination of ground water in California is an issue of concern, in part, because nitrate concentrations have increased over time (Burow, 1998, Burow, et al, 2008, and Burow and Green, 2008). This increase could be due in part to the increased use of nitrogen fertilizers since the 1950's. Low levels of nitrate occur naturally in ground water; however, in agricultural areas, elevated concentrations of nitrate occur as the result of farming operations where nitrogen fertilizers are applied. However, other sources of nitrogen, such as animal waste and sewage effluent, have also been linked to the elevated concentrations (Burow, 1998).

Total Kjeldahl Nitrogen (TKN) represents the combination of ammonia and organic nitrogen in water. Dairy waste contains organic nitrogen in the form of proteins or various forms of degraded protein. No MCL or regulatory limit exists for TKN; however the degradation of TKN eventually produces ammonia and nitrate.

Phosphorus

Phosphorous is a nonmetal element that is an essential plant nutrient. Due to its high reactivity it is never found in its elemental form. Phosphorus exists as both organic and inorganic forms in dairy manure. Inorganic phosphorus in manure is easily adsorbed to soil particles, and is less subject to leaching or dissolution in runoff. Although phosphorous does not present a health risk in surface water or groundwater, it does have environmental impacts in surface water. Similar to ammonia, phosphorous can cause eutrophication of surface water bodies, thereby depleting the dissolved oxygen concentrations which can cause fish and other aquatic organisms to die. Inorganic phosphate is the form that is available as a nutrient and thus, is the major contributor to eutrophication.

Although phosphorus tends to bind to soil, phosphorus leaching to groundwater has been documented to occur in the Central Valley (Bennett, et al, 2005 and 2006; Dawson, et al, 2008; Shelton, et al, 2008;), especially in soils that are low in clay, organic carbon, iron and aluminum; and in soils where downward flow occurs through preferential pathways (root holes, worm burrows and desiccation cracks).

Pathogens

A pathogen is an infectious biological agent that causes disease to its host. Pathogens include bacteria, viruses, fungi, parasites, and prions. Fecal coliform bacteria are a subgroup of total coliform bacteria, and Escherichia coli (E. coli) is a particular genus and species of fecal coliform. Fecal coliform bacteria depend on their host environment for survival and reproduction and are found in the intestinal tracts of warm-blooded animals such as dairy cows. The presence of fecal coliform bacteria in water can indicate the presence of animal waste and may indicate the presence of pathogens. In order for viruses to actively replicate, they need to have invaded a host cell. There is some evidence that viruses may be transmitted from animals to man (US EPA 2004).

Use of the surface water, such as for recreation, could bring humans in direct contact with these pathogenic organisms resulting in disease outbreaks. In addition, pathogens could be leached down to drinking water supplies and individuals utilizing well water could be exposed. Additionally, an exposure route exists through the consumption of contaminated food.

Manure management practices and access to groundwater determine the degree to which groundwater may be impacted. The presence of microorganisms in groundwater is heavily dependent upon geologic conditions such as flow pathways and mechanisms, sunlight, temperature, pH, and soil properties (SWRCB, 2008). In addition, the characteristics of the microbial community are also important factors that influence the transport of microorganisms (SWRCB, 2008).

Pharmaceuticals and Hormones

Veterinary pharmaceuticals are routinely used at dairies for the purpose of therapeutics, growth-improvements, and health-protection purposes. Antibiotics are a major component of veterinary pharmaceuticals (Bradford, 2008). Most of the antibiotics are not completely metabolized by the cows and are subsequently excreted from the treated animal shortly after medication. Little is currently known about the toxicity of antibiotics or their degradation byproducts, the potential synergistic effects of various mixtures of contaminants, or the effects of long-term exposure to low levels of antibiotics (Bradford, 2008, Chee-Sanford, J.C., et al, 2009)

Animals also eliminate estrogen, androgen, and gestagen hormones from their bodies in their feces and urine. At present hormones do not have MCLs at either the state or federal level. Steroid hormones, however, have been classified as highly potent endocrine-disrupting chemicals (EDCs), which may interfere with the normal function of the endocrine system of humans and animals. Physiological and reproductive disorders in birds, fish, shellfish, turtles, gastropods, and mammals could be caused by EDCs, including steroid hormones. Steroid hormones are a particular concern because there is evidence that very low concentrations of these chemicals can adversely affect the reproduction of fish and other aquatic species (Bradford, 2008).

Application of animal wastes to agricultural land may serve as an important pathway to disseminate antibiotics and hormones in the environment. However, limited studies have been conducted on the environmental persistence, sorption, and transport of various pharmaceutical compounds (Bradford, 2008). One study indicated that longer residence times for dairy wastewater in secondary and tertiary lagoons have the effect of lowering hormone levels than those found in the primary lagoon (Zheng, 2007). The theory being that longer residence times allow more time to remove hormones by degradation (biodegradation, photodegradation, etc.) and settle hormone-associated manure particles (Zheng, 2007). Similarly, longer residence times for solid manure wastes also reduces hormone concentrations.

A second study by Arnon, et al (2008) found seepage of hormones as well as inorganic contaminants from dairy waste lagoons to deep groundwater. The study concluded that hormones were detected in different geological media and under different redox conditions and suggest that their degradation in the subsurface environment is limited, and therefore, natural attenuation cannot be relied on as a removal mechanism (Arnon, 2008).

Regional Groundwater Quality[4]

Sacramento River HR

In general, the groundwater quality of the Sacramento River HR is excellent with some isolated areas of local impairments (DWR, 2003a). Problem areas that are the result of natural conditions include the north end of Sacramento Valley in the Redding subbasin and along the margins of the valley in the vicinity of Sutter Buttes where marine sedimentary rocks contain brackish to saline water near the surface. Water from the older deposits below mix with the fresh water in the alluvial sediments and degrade the quality by creating high TDS concentrations. High salinity is also noticed in shallow groundwater near Maxwell, Colusa County (DWR, 2009) as well as high TDS and boron concentrations in some groundwater of Yolo County (DWR, 2009). Other natural impairments include the presence of hydrogen sulfide concentrations in groundwater near volcanic and geothermal areas of the western portion of the region. Groundwater in the Sierra foothills can be impaired with natural concentrations of uranium, radon, or heavy metals from sulfide mineral deposits.

According to data collected from public water supply wells throughout the HR, 95 percent of the wells sampled from 1994 to 2000 were in compliance with the states drinking water standards. Of the 5 percent that did not meet the drinking water standards, the contaminants included nitrates (33 percent), volatile and semi-volatile organic compounds (32 percent), inorganics (i.e. heavy metals) (26 percent), radiological elements (5 percent), and pesticides (4 percent) (DWR, 2003a). Average TDS concentrations throughout the HR range from 105 (Lake Almanor Valley) to 880 (Yolo) mg/L. **Table 5-1** shows the three most frequently occurring contaminants by contaminant group for the Sacramento River HR. The number of wells where the contaminant exceeded the MCL for that contaminant is also shown.

TABLE 5-1
TOP THREE CONTAMINANTS BY CONTAMINANT GROUP - SACRAMENTO RIVER HR

Contaminant Group	Contaminant – # of wells	Contaminant – # of wells	Contaminant – # of wells
Inorganics – Primary	Cadmium – 4	Chromium (Total) – 3	3 tied at 2
Inorganics – Secondary	Manganese – 221	Iron – 166	Specific Conductance – 3
Radiological	Gross Alpha – 4		
Nitrates	Nitrate (as NO3) – 22	Nitrate + Nitrite – 5	Nitrate Nitrogen (NO3-N) – 2
Pesticides	Di(2-Ethylhexyl)phthalate–4		
VOCs	Tetrachloroethylene–11	Trichloroethylene – 7	Benzene – 4

SOURCE: California's Groundwater – Bulletin 118 (2002), Version 2 (Draft) (water quality data provided by California DHS)

San Joaquin River HR

Groundwater within the San Joaquin River HR is generally suitable for most urban and agricultural uses with some impairments, primarily due to nitrates (DWR, 2003b). The National Water Quality Assessment (NAQWA) for the San Joaquin Valley Groundwater Basin concluded that groundwater

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[4] A more detailed description of the groundwater quality for the three hydrologic regions and subbasins can be found in the Irrigated Lands Existing Conditions report, December 2008, which can be accessed at http://www.swrcb.ca.gov/rwqcb5/water_issues/irrigated_lands/long_term_program_development/rev_existing_conditions_report/index.shtml.

within the eastern portion of the San Joaquin Valley that supplies drinking water to the majority of the population has been degraded by fertilizers and pesticides (Dubrovsky et al. 1998). The sources of high nitrates and salts in groundwater include irrigated agriculture, dairies, discharges of wastewater to land, and disposal of sewage from community wastewater systems and septic tanks (DWR, 2009).

The primary non-nitrate constituents of concern include: TDS, boron, chloride, and organic compounds (i.e. pesticides, herbicides, solvents, etc.). Areas of high TDS concentrations are found in the central and west side areas of San Joaquin Valley. The high TDS content in the center of the valley is a result of a concentration of salts due to evaporation and poor drainage. Boron and chloride are likely a result of accumulation from evaporation around the center of the valley. Organic contaminants can be categorized as agricultural (e.g. pesticides and herbicides) and industrial (e.g. solvents such as trichloroethene (TCE) and dichloroethylene (DCE)). The industrial contaminants are generally found near airports, industrial areas, and landfills.

According to data collected from public water supply wells throughout the HR (10 of 11 basins and subbasins), 76 percent of the wells sampled from 1994 to 2000 were in compliance with the states drinking water standards. Of the 24 percent that did not meet the drinking water standards, the contaminants included radiological elements (30 percent), pesticides (33 percent), nitrates (16 percent), volatile and semi-volatile organic compounds (11 percent), and inorganics (i.e. heavy metals) (10 percent) (DWR, 2003b). Average TDS concentrations throughout the HR ranged from 54 (Yosemite Valley) to 1,190 (Tracy) mg/L. **Table 5-2** shows the three most frequently occurring contaminants by contaminant group for the San Joaquin River HR. The number of wells where the contaminant exceeded the MCL for that contaminant is also shown.

TABLE 5-2
TOP THREE CONTAMINANTS BY CONTAMINANT GROUP - SAN JOAQUIN RIVER HR

Contaminant Group	Contaminant –# of wells	Contaminant –# of wells	Contaminant –# of wells
Inorganics – Primary	Aluminum – 4	Arsenic – 4	4 tied at 2 exceedances
Inorganics – Secondary	Manganese – 123	Iron – 102	TDS – 9
Radiological	Uranium – 33	Gross Alpha – 26	Radium 228 – 6
Nitrates	Nitrate (as NO3) – 23	Nitrate + Nitrite – 6	Nitrate Nitrogen (NO3-N) – 3
Pesticides	DBCP – 44	Di(2-Ethylhexyl)phthalate – 11	EDB – 6
VOCs	Tetrachloroethylene–8	Dichloromethane – 3	Trichloroethylene – 3

SOURCE: California's Groundwater – Bulletin 118 (2002), Version 2 (Draft) (water quality data provided by California DHS)

Tulare Lake HR

In general, the groundwater quality of the Tulare Lake HR is adequate for most urban and agricultural uses with areas of local impairments. The primary constituents of concern are high TDS, nitrates, arsenic, and organic compounds (DWR, 2003c). However, salinity is arguably the primary contaminant affecting water quality because of the salts that are introduced into the basin with imported water supplies and the natural internal drainage of the region (DWR, 2009). High TDS concentrations are found primarily on the west side of San Joaquin Valley and in the trough of the valley and are generally higher in this HR than the other two. The high TDS on the west side of the San Joaquin Valley is due to recharge of stream flow originating from marine sediments from the Coast Ranges to the west of the valley. The center or trough of the valley contains high TDS from evaporation and poor drainage. Where the Corcoran Clay is present in the central and west-side portions of the valley, water quality is generally better below the clay than above it (DWR, 2003c). Nitrates occur naturally or as a result of human and animal waste products or from agricultural use of fertilizers. Areas of high nitrate concentrations are known to exist near the town of Shafter and other isolated areas within San Joaquin Valley. High levels of arsenic occur locally and appear to be associated with historical lakebed areas. Agricultural organic contaminants such as pesticides and herbicides have been detected throughout the valley but primarily along the east side, in areas where soil permeability is higher and depth to groundwater is shallower. Historical agricultural uses of the region have contributed to elevated concentrations of 1,2-Dibromo-3-chloropropane (DBCP – a soil fumigant) and ethylene dibromide (EDB – a pesticide). DBCP is now banned from use but was once used extensively on grapes. Solvents such as TCE and DCE are the primary solvents that have contaminated groundwater from industrial activities mostly found near airports, industrial areas, and landfills.

According to data collected from public water supply wells throughout the HR (14 of 19 basins and subbasins), 71 percent of the wells sampled from 1994 to 2000 were in compliance with the states drinking water standards. Of the 29 percent that did not meet the drinking water standards, the contaminants included pesticides (35 percent), nitrates (20 percent), radiological elements (19 percent), inorganics (i.e. heavy metals) (16 percent) volatile and semi-volatile organic compounds (10 percent), and (DWR, 2003c). Average TDS concentrations throughout the HR ranged from 189 (Kaweah) to 1,500 (Pleasant Valley) mg/L. **Table 5-3** shows the three most frequently occurring contaminants by contaminant group for the Tulare Lake HR. The number of wells where the contaminant exceeded the MCL for that contaminant is also shown.

TABLE 5-3
TOP THREE CONTAMINANTS BY CONTAMINANT GROUP - TULARE LAKE HR

Contaminant Group	Contaminant –# of wells	Contaminant –# of wells	Contaminant –# of wells
Inorganics - Primary	Fluoride – 32	Arsenic – 16	Aluminum – 13
Inorganics - Secondary	Iron – 155	Manganese – 82	TDS – 9
Radiological	Gross Alpha – 74	Uranium – 24	Radium 228 – 8
Nitrates	Nitrate(as NO3) – 83	Nitrate + Nitrite – 14	Nitrite(as N) – 3
Pesticides	DBCP – 130	EDB – 24	Di(2-Ethylhexyl)phthalate – 7
VOCs	Trichloroethylene – 17	Tetrachloroethylene – 16	Benzene – 6 MTBE – 6

SOURCE: California's Groundwater – Bulletin 118 (2002), Version 2 (Draft) (water quality data provided by California DHS)

Recently, groundwater in private domestic wells was analyzed as part of a study conducted under the State Water Resources Control Board Groundwater Ambient Monitoring and Assessment (GAMA) Program.[5] Private domestic wells in Tulare County were sampled and analyzed in 2006

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[5] The GAMA Program is California's comprehensive groundwater quality monitoring program created by the State Water Board in 2000 and later expanded by Assembly Bill 599 – the Groundwater Quality Monitoring Act of 2001.

and compared with drinking water standards. Thirteen chemicals were detected at concentrations above public drinking water standards (SWRCB, 2009). Chemicals detected above MCLs included arsenic, beryllium, chromium, nickel, nitrate, nitrite, perchlorate, thallium, bacteria indicators, 1,2-dibromo-3-chloropropane (DBCP), and radionuclides. Nitrate was the most frequently detected chemical above an MCL.

Nitrate was detected in 75 wells at concentrations greater than or equal to the MCL of 10 mg/L (nitrate as N). Total coliform bacteria were present in 60 wells, and fecal coliform bacteria were present in 13 wells. Thallium and DBCP were detected at concentrations above the MCL in six and eight wells, respectively. Aluminum, iron, manganese, TDS, and zinc were detected at concentrations above secondary MCLs. Vanadium was detected in 14 wells above the notification level of 50 μg/L.

Regulatory Setting

Federal

Clean Water Act

The Clean Water Act establishes the basic structure for regulating discharges of pollutants into "waters of the United States." The act specifies a variety of regulatory and non-regulatory tools to sharply reduce direct pollutant discharges into waterways, finance municipal wastewater treatment facilities, and manage polluted runoff.

Section 303(d) requires states, territories, and authorized tribes to develop a list of water-quality limited segments of rivers and other water bodies under their jurisdiction. These waters on the list do not meet water quality standards, even after point sources of pollution have installed the minimum required levels of pollution control technology. The law requires that these jurisdictions establish priority rankings for waters on the list and develop action plans, called TMDLs, to improve water quality.

Section 401 requires every applicant for a federal permit or license for any activity that may result in a discharge to a water body to obtain a water quality certification that the proposed activity will comply with applicable water quality standards.

Section 402 regulates point- and nonpoint-source discharges to surface waters through the National Pollutant Discharge Elimination System (NPDES) program. In California, the State Water Resources Control Board (State Water Board) oversees the NPDES program, which is administered by the Regional Water Quality Control Boards (RWQCBs). The NPDES program provides for both general permits (those that cover a number of similar or related activities) and individual permits. The NPDES program covers municipalities, industrial activities, and construction activities. The NPDES program includes an industrial stormwater permitting component that covers 10 categories of industrial activity

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The main goals of GAMA are to improve statewide groundwater monitoring and to increase the availability of groundwater quality information to the public.

that require authorization under an NPDES industrial stormwater permit for stormwater discharges. Dairy digester/co-digester facilities are covered by Category 5 which also includes landfills, land application sites, and open dumps with industrial wastes. Construction activities, also administered by the State Water Board, are discussed below.

Concentrated Animal Feeding Operations – Final Rule

The Environmental Protection Agency (EPA) promulgated revised regulations for concentrated animal feeding operations (CAFOs) on February 12, 2003. The 2003 regulations expanded the number of operations covered by the CAFO regulations and included requirements to address the land application of manure from CAFOs. The rule became effective on April 14, 2003 and authorized NPDES states to modify their programs by February 2005 and develop state technical standards.

Revised regulations that address the Second Circuit court's 2005 decision in *Waterkeeper Alliance et al. v. EPA*, 399 F.3d 486, were signed on October 31, 2008 and were published in the Federal Register on November 20, 2008. These regulations are effective on December 22, 2008. The 2008 final rule revises the 2003 regulations.

National Toxics Rule

The National Toxics Rule promulgates for 14 States, including California, the chemical-specific, numeric criteria for priority toxic pollutants necessary to bring all States into compliance with the requirements of section 303(c)(2)(B) of the Clean Water Act (CWA). States determined by EPA to fully comply with section 303(c)(2)(B) requirements are not affected by this rule, however California is not in compliance.

The rule addresses two situations. For a few States, EPA is promulgating a limited number of criteria which were previously identified as necessary in disapproval letters to such States, and which the State has failed to address. For other States, Federal criteria are necessary for all priority toxic pollutants for which EPA has issued section 304(a) water quality criteria guidance and that are not the subject of approved State criteria.

When these standards take effect, they will be the legally enforceable standards in the named States for all purposes and programs under the Clean Water Act, including planning, monitoring, NPDES permitting, enforcement and compliance.

California Toxics Rule

The U.S. Environmental Agency published the California Toxics Rule (CTR) in the Federal Register (65 Fed. Register 31682-31719), adding Section 131.38 to Title 40 of the Code of Federal Regulations, on May 18, 2000. The CTR contains numeric water quality criteria for priority toxic pollutants and other water quality standards provisions to be applied to waters in California. EPA promulgated this rule based on the Administrator's determination that the numeric criteria are necessary in California to protect human health and the environment.

EPA promulgated this rule to fill a gap in California water quality standards that was created in 1994 when a State court overturned the State's water quality control plans containing water quality criteria for priority toxic pollutants. Thus, the State of California has been without numeric water quality criteria for many priority toxic pollutants as required by the Clean Water Act, necessitating this action by EPA. These Federal criteria are legally applicable in the State of California for inland surface waters, enclosed bays and estuaries for all purposes and programs under the Clean Water Act.

Federal Antidegradation Policy (40 CFR Part 131.12)

The first antidegradation policy statement was released on February 8, 1968 and subsequently included in the EPA's first Water Quality Standards Regulation (40 CFR 130.17, 40 F,.R. 55340-41) published on November 28, 1975. The policy was refined in 1983 (48 F.R. 51400, 40 CFR 131.12). Antidegradation requirements and methods for implementing those requirements are minimum conditions to be included in a State's water quality standards as required by the Clean Water Act. The antidegradation policy and implementation methods are required, at a minimum, to be consistent with the following:

1. Existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected.
2. Where the quality of the waters exceed levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water, that quality shall be maintained and protected unless the State finds, after full satisfaction of the intergovernmental coordination and public participation provisions of the State's continuing planning process, that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located. In allowing such degradation or lower water quality, the State shall assure water quality adequate to protect existing uses fully. Further, the State shall assure that there shall be achieved the highest statutory and regulatory requirements for all new and existing point sources and all cost-effective and reasonable best management practices (BMPs) for nonpoint source control.
3. Where high quality waters constitute an outstanding National resource, such as waters of National and State parks and wildlife refuges and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected.
4. In those cases where potential water quality impairment associated with a thermal discharge is involved, the antidegradation policy and implementing method shall be consistent with section 316 of the Act.

The Antidegradation Policy established a three-tiered antidegradation program.

Tier 1 maintains and protects existing uses and water quality conditions necessary to support such uses. An existing use can be established by demonstrating that fishing, swimming, or other uses have actually occurred since November 28, 1975, or that the water quality is suitable to allow such uses to occur. Where an existing use is established, it must be protected even if it is not listed in the water quality standards as a designated use. Tier 1 requirements are applicable to all surface waters.

Tier 2 maintains and protects "high quality" waters -- water bodies where existing conditions are better than necessary to support CWA § 101(a)(2) "fishable/swimmable" uses. Water quality can be lowered in such waters. However, State and Tribal Tier 2 programs identify procedures that must be followed and questions that must be answered before a reduction in water quality can be allowed. In no case may water quality be lowered to a level which would interfere with existing or designated uses.

Tier 3 maintains and protects water quality in outstanding national resource waters (ONRWs). Except for certain temporary changes, water quality cannot be lowered in such waters. ONRWs generally include the highest quality waters of the United States. However, the ONRW classification also offers special protection for waters of exceptional ecological significance, i.e., those which are important, unique, or sensitive ecologically. Decisions regarding which water bodies qualify to be ONRWs are made by States and authorized Indian Tribes.

Antidegradation implementation procedures identify the steps and questions that must be addressed when regulated activities are proposed that may affect water quality. The specific steps to be followed depend upon which tier or tiers of antidegradation apply.

Safe Drinking Water Act

The Safe Drinking Water Act was established to protect the quality of waters actually or potentially designated for drinking use, whether from aboveground or underground sources. Contaminants of concern in a domestic water supply are those that either pose a health threat or in some way alter the aesthetic acceptability of the water. Primary and secondary maximum contaminant levels (MCLs) are established for numerous constituents of concern including turbidity, TDS, chloride (Cl), fluoride, nitrate, priority pollutant metals and organic compounds, selenium, bromate, trihalomethane and haloacetic acid precursors, radioactive compounds, and gross radioactivity. All domestic water suppliers must follow the requirements established by this Act and its associated amendments.

State

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act established the State Water Board and divided the state into nine regions, each overseen by a regional board. The nine regional boards have the primary responsibility for the coordination and control of water quality within their respective jurisdictional boundaries. Under the Porter-Cologne Water Quality Control Act, water quality objectives are limits or levels of water quality constituents or characteristics established for the purpose of protecting beneficial uses. The Act requires the RWQCBs to establish water quality objectives while acknowledging that water quality may be changed to some degree without unreasonably affecting beneficial uses. Designated beneficial uses, together with the corresponding water quality objectives, also constitute water quality standards under the federal Clean Water Act. Therefore, the water quality objectives form the regulatory references for meeting state and federal requirements for water quality control.

Regional Water Quality Control Board, Central Valley Region (Central Valley Water Board)

The Central Valley Water Board is responsible for implementing the Basin Plans for the Sacramento, and San Joaquin Rivers, and the Tulare Lake Basin. These plans identify the existing and potential beneficial uses of waters of the State and establish water quality objectives to protect these uses.

The basin plans also contain implementation, surveillance, and monitoring plans. Statewide and regional water quality control plans include enforceable prohibitions against certain types of discharges, including those that may pertain to nonpoint sources.

Beneficial uses and their corresponding water quality objectives, meet federal regulatory criteria for water quality standards and as such, California's basin plans serve as regulatory references for meeting both State and federal requirements for water quality control (40 CFR Parts 130 and 131). Beneficial uses are defined in Water Code section 13050(f) and **Table 5-4** below presents the identified beneficial uses for the surfaces waters in the basin plans of the Study Area.

Basin plans adopted by RWQCBs are primarily implemented through the NPDES permitting system and issuance of waste discharge requirements (WDRs) to regulate waste discharges so that water quality objectives are met. Basin plans provide the technical basis for determining WDRs and taking regulatory enforcement actions if deemed necessary.

TABLE 5-4
BENEFICIAL USES DESIGNATED FOR THE SACRAMENTO RIVER AND SAN JOAQUIN RIVER AND THE TULARE LAKE BASIN PLANS

Beneficial Uses for Surface Water defined in the Basin Plans

- Municipal and domestic supply
- Agricultural supply
- Industrial service supply
- Industrial process supply
- Ground water recharge
- Freshwater replenishment
- Hydropower generation
- Water contact recreation
- Non-contact water recreation
- Commercial and sport fishing[1]
- Aquaculture
- Warm freshwater habitat
- Cold freshwater habitat
- Estuarine habitat[1]
- Wildlife habitat
- Preservation of biological habitats of special significance
- Rare, threatened, or endangered species
- Migration of aquatic organisms[1]
- Spawning, reproduction, and/or early development
- Shellfish harvesting
- Navigation[2]

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1. Beneficial use is designated only for the Sacramento River and San Joaquin River Basins.
2. Beneficial use is designated only for the Tulare Lake Basin.

Statement of Policy With Respect to Maintaining High Quality of Waters in California (Resolution 68-16)

A key policy of California's water quality program is the State's Antidegradation Policy. This policy, formally known as the Statement of Policy with Respect to Maintaining High Quality Waters in California (State Water Board Resolution No. 68-16), restricts degradation of surface and ground waters. In particular, this policy protects water bodies where existing quality is higher than necessary for the protection of beneficial uses. Under the Antidegradation Policy, any actions that can adversely affect water quality in all surface and ground waters must (1) meet WDRs which will result in the best practicable treatment or control of the discharge necessary to assure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained, 2) not unreasonably affect present and anticipated beneficial use of the water, and (3) not result in water quality less than that prescribed in water quality plans and policies. Furthermore, any actions that can adversely affect surface waters are also subject to the Federal Antidegradation Policy (40 Code of Federal Regulations [CFR] section 131.12) developed under the Clean Water Act.

Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS)

In 2006, the Central Valley Water Board, the State Water Board, and stakeholders began a joint effort to address salinity and nitrate problems in California's Central Valley and adopt long-term solutions that will lead to enhanced water quality and economic sustainability (CVRWQCB, 2010a). The Central Valley Water Board is currently engaged in developing a significantly new regulatory program that will result in the development of a Salinity and Nitrate Management Plan to be implemented throughout the entire Central Valley (CVRWQCB, 2010b). This effort is referred to as the CV-SALTS Initiative.

The goal of CV-SALTS is to develop a comprehensive region-wide Salt and Nitrate Management Plan (Plan) describing a water quality protection strategy that will be implemented through a mix of voluntary and regulatory efforts. The Plan will serve as the basis for amendments to the three Basin Plans that cover the Central Valley Region (Sacramento River and San Joaquin River Basin Plan, the Tulare Lake Basin Plan and the Sacramento/San Joaquin Rivers Bay-Delta Plan). The basin plan "amendment" will likely be a suite of amendments to establish a comprehensive implementation plan to achieve water quality objectives for salinity (including nitrate) in the Region's surface waters and groundwater; and the Plan may include recommendations for numeric water quality objectives, beneficial use designation refinements, and/or other refinements, enhancements, or basin plan revisions.

CV-SALTS participants include the State Water Board and Central Valley Regional Water Board, the Central Valley Salinity Leadership Group (CVSLG), the Central Valley Salinity Coalition (CVSC), and interested parties outside these groups. The CVSLG consists of leadership from a wide range of organizations including state, federal and local agencies, regulated industries, agriculture, research institutions, and environmental and social justice organizations. Representatives of these groups serve on various working committees and subcommittees. The CVSC, a non-profit organization, was formed in 2008 as the funding arm of the CV-SALTS effort. The stakeholder-driven CV-SALTS Initiative is the Central Valley Water Board's primary mechanism to conduct the necessary studies, research and develop technical and science reports to formulate the components of the basin plan amendment and to implement the Salt Plan.

Construction Stormwater NPDES Permit

The federal Clean Water Act prohibits discharges of stormwater from construction projects unless the discharge is in compliance with an NPDES permit. The State Water Board is the permitting authority in California and has adopted a Statewide General Permit for Stormwater Discharges Associated with Construction Activity (Construction General Permit, Order No. 99-08) that encompasses one or more acres of soil disturbance. Effective July 1, 2010 all dischargers are required to obtain coverage under the updated Construction General Permit Order 2009-0009-DWQ, adopted on September 2, 2009. Construction activities include clearing, grading, excavation, stockpiling, and reconstruction of existing facilities (removal or replacement).

In general, the Construction General Permit requires that the landowner and/or contractor submit a notice of intent (NOI) and develop and implement a storm water pollution prevention plan (SWPPP). It is the responsibility of the landowner to obtain coverage under this General Permit prior to commencement of construction activities. To obtain coverage, the landowner must file an NOI with a vicinity map and the appropriate fee to the State Water Board. The NOI requirements of the General Permit are intended to establish a mechanism which can be used to clearly identify the responsible parties, locations, and scope of operations of dischargers covered by the General Permit and to document the discharger's knowledge of the requirements for a SWPPP. The new permit requires a risk-based permitting approach, dependent upon the likely level of risk imparted by a project. The new permit also contains several additional compliance items, including (1) additional mandatory BMPs to reduce erosion and sedimentation, which may include incorporation of vegetated swales, setbacks and buffers, rooftop and impervious surface disconnection, bioretention cells, rain gardens, rain cisterns, implementation of pollution/sediment/spill control plans, training, and other structural and non-structural actions; (2) sampling and monitoring for non-visible pollutants; (3) effluent monitoring and annual compliance reports; (4) development and adherence to a Rain Event Action Plan; (5) requirements for the post-construction period; (6) numeric action levels and effluent limits for pH and turbidity; (7) monitoring of soil characteristics on site; and (8) mandatory training under a specific curriculum. Under the updated permit, BMPs will be incorporated into the compliance action and monitoring requirements for each development site, as compared to the existing permit, where specific BMPs are implemented via a SWPPP. Under the updated permit, a SWPPP would be reviewed by the State Water Board.

California Department of Health Services Drinking Water Regulations

DHS serves as the primary responsible agency for drinking water regulations. DHS must adopt drinking water quality standards at least as stringent as federal standards, and may also regulate contaminants to more stringent standards than U.S. EPA, or develop additional standards. DHS regulations cover over 150 contaminants, including microorganisms, particulates, inorganics, natural organics, synthetic organics, radionuclides, and DBPs. The specific regulations promulgated by DHS, in coordination with the U.S. EPA, are summarized in **Table 5-5**.

TABLE 5-5
FEDERAL AND STATE DRINKING WATER REGULATIONS

Regulation	Promulgation Year	Contaminants Regulated
National Interim Primary Drinking Water Regulations	1975–1981	Inorganics, Organics, Physical, Radioactivity, Bacteriological
National Secondary Drinking Water Regulations	1979	Inorganics, Color, Corrosivity, Odor, Foaming Agents
Phase I Standards	1987	VOCs
Phase II Standards	1991	VOCs, SOCs, IOCs
Phase V Standards	1992	VOCs, SOCs, IOCs
Surface Water Treatment Rule	1989	Microbiological and Turbidity
Total Coliform Rule	1989	Microbiological
Lead and Copper Rule	1991 / 2003	Lead, Copper
Drinking Water Source Assessment and Protection Program	1996	Source Water Protection
Information Collection Rule	1996	Microbiological and Disinfectants / DBPs
Stage 1 Disinfectants/Disinfection Byproducts Rule	1998	Disinfectants / DBPs, Precursors

TABLE 5-5
FEDERAL AND STATE DRINKING WATER REGULATIONS

Regulation	Promulgation Year	Contaminants Regulated
Interim Enhanced Surface Water Treatment Rule	1998	Microbiological, Turbidity
Unregulated Contaminant Monitoring Rule	1999	Organics, Microbiological
Radionuclides Rule	2000	Radionuclides
Arsenic Rule	2001	Arsenic
Filter Backwash Rule	2002	Microbiological, Turbidity
Drinking Water Candidate Contaminant List	2003	Chemical, Microbiological
Stage 2 Microbiological and Disinfection Byproducts Rules	2006	Microbiological and Disinfectants / DBPs
Secondary Maximum Contaminant Levels	2006	Metals, Color, Foaming Agents, MTBE, Odor, Thiobencarb, Turbidity, TDS, and Anions
Primary MCL for Perchlorate	2007	Perchlorate
Interim Enhanced Surface Water Treatment Rule	2008	Microbiological and Turbidity

DBP = Disinfection by-product
IOC = Inorganic Compound
MCL = Maximum Contaminant Level
MTBE = methyl tertiary-butyl ether
SOC = Synthetic Organic Compound
TDS = Total Dissolved Solids
VOC = Volatile Organic Compound

5.2 Impacts and Mitigation Measures

Significance Criteria

The significance criteria for this analysis were adapted from criteria presented in Appendix G of the CEQA Guidelines and based on the professional judgment of the Central Valley Water Board and its consultants. The Proposed Project would result in a significant impact if it would:

- Violate any water quality standards or WDRs.
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there should be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted.
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site.
- Substantially alter the existing drainage pattern of the site or area, including through alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site.
- Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff.
- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.
- Place within a 100-year flood hazard area structures which would impede or redirect flood flows.

- Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam.

Issues Determined to Have No Impact on Project

Based on the scope of the proposed project plan and its geographical location, the proposed project would not result in impacts related to the following criteria. No impact discussion is provided for these topics for the following reasons:

- *Failure of Levee or Dam.* The addition of anaerobic digester and co-digester facilities would not be intended for human occupancy and would not require significant increases in staff to maintain the facilities. Therefore, although some facilities may be constructed in a potential inundation area, there would be no potential impact of loss, death or injury.

Impact 5.1: Construction associated with installation of dairy digesters and co-digester facilities could generate loose, erodible soils that may impair water quality. (Less than Significant)

During site grading and construction activities related to dairy digester and co-digester facilities, large areas of bare soil could be exposed to erosion by wind and water for extended periods of time. Bare soil surfaces are more likely to erode than vegetated areas due to the lack of dispersion, infiltration, and retention created by covering vegetation. Soil disturbance, excavation, cutting/filling, stockpiling, and grading activities could increase erosion and sedimentation to storm drains that empty to local surface waters. Construction water quality impacts are temporary and managed through the standard, industry accepted BMPs, which are managed and monitored by the contractor conducting the work.

If precautions are not taken to contain contaminants, construction could produce contaminated stormwater runoff. Runoff from future dairy projects would be collected in process water ponds and ditches at the project sites and would not be discharged to surface water canals. In addition, hazardous materials associated with construction equipment and practices, such as fuels, oils, antifreeze, coolants, and other substances, could adversely affect water quality if spilled or stored improperly. Potential chemical releases are regulated by the National Pollutant Discharge Elimination System (NPDES) permitting process.

For sites that would disturb more than one acre, the owner/operator of the proposed digester or co-digester would be required by the RWQCB to prepare and implement a SWPPP designed to reduce potential impacts to water quality during construction. Conditions of this permit would include adherence to requirements of the revised NPDES General Construction Permit, effective July 1, 2010. As discussed previously, permit requirements would include the following or equivalent measures:

- Preparation of a site-specific SWPPP;
- Preparation of hazardous material spill control and countermeasure programs;
- Stormwater quality sampling, monitoring, and compliance reporting;
- Development and adherence to a Rain Event Action Plan;

- Adherence to numeric action levels and effluent limits for pH and turbidity; monitoring of soil characteristics on site;
- Mandatory training under a specific curriculum; and
- Mandatory implementation of BMPs, which could include, but would not be limited to, as necessary:
  - Physical barriers to prevent erosion and sedimentation including setbacks and buffers, rooftop and impervious surface disconnection, rain gardens and cisterns, and other installations;
  - Construction and maintenance of sedimentation basins;
  - Limitations on construction work during storm events;
  - Use of swales, mechanical, or chemical means of stormwater treatment during construction, including vegetated swales, bioretention cells, chemical treatments, and mechanical stormwater filters; and
  - Implementation of spill control, sediment control, and pollution control plans and training.

Adherence to these and/or other similar BMPs would be required as a condition of the permit, and would substantially reduce or prevent waterborne pollutants from entering natural waters. The specific set of BMPs would be determined prior to initiation of construction activities of any particular project, and a schedule for implementation, as well as a series of monitoring and compliance measures would be developed in coordination with the permitting agency, to meet Clean Water Act standards. Therefore, additional mitigation for stormwater quality is not required to protect water quality during construction, over and above that which is required by the NPDES General Construction Permit.

For sites that would disturb less than one acre, the amount of disturbance required for the construction of these facilities would be considered relatively minor and current standard practices sufficient to reduce the potential for impacting receiving waters. Implementation of the various water quality BMPs and the monitoring program outlined through a required SWPPP, where necessary, and incorporated into a NPDES permit would ensure that future digester and co-digester development would have a less-than-significant impact on water quality during construction activities.

Mitigation: None required.

Impact 5.2: Digester and co-digester development could adversely affect surface waters. (Significant)

Dairy operations produce a considerable amount of manure and wastewater, which contain nutrients, organic matter, salts, microorganisms, pathogens and pathogens including fecal bacteria. Under the Project, these manure and wastewater streams would be fed into the digester system for processing. The byproducts of the digestion process including both liquid effluent and solid digestate would be then applied to croplands. The separated liquids could be used for irrigation, flush water or fertilizer purposes and the solid wastes for soil amendment, fertilizer, compost, animal bedding or landfill alternative daily cover.

If the constituents of manure and byproducts of anaerobic digestion are not properly managed, they can pollute surface water quality by contributing excess nutrients, oxygen-demanding materials, and bacterial pathogens. Release of water that has come into contact with manure, feed, co-digestion substrates, or dead animals, may transport nutrients and other pollutants to surface waters. Substantial amounts of nitrogen and phosphorus may be transported to surface waters via such releases of water. Operation of dairy digesters would result in the processing of existing dairy waste streams, resulting in a net reduction in biochemical oxygen demand and microbial content of effluent waters. Other constituents, including salts, nutrients, heavy metals, and other inorganic water quality constituents, would not be substantially affected by the digestion process. In addition, any adverse effects to groundwater (discussed below in Impact 5.3) could impact surface waters in areas where groundwater flows into surface waters (identified as gaining conditions). Areas where surface waters lose water to ground water by outflow through the streambed are known as losing conditions.

In general, dairies already have required stormwater, irrigation and tailwater return systems in place. Irrigation and stormwater are typically collected on site and delivered back on the dairy's land application system. Dairies are required to retain all storm runoff on-site during a 25-year, 24-hour rainfall event plus the runoff from 120 days of December through March average rainfall plus all dairy wastewater, ultimately discharging such runoff to the wastewater lagoon. However, digester and co-digester operations could add additional volumes of wastewater to the existing retention systems that currently are required to have the capacity to provide for 120 days of wastewater storage during the winter months. For centralized digester facilities that are located outside of the footprint of current dairy operations, protective measures would be necessary to prevent impacts to surface waters.

The discharges of wastewater produced from the digesters or co-digesters would be regulated under the waste discharge program that is proposed as the subject of this EIR. The collection, treatment, storage, and disposal of wastes at the facility, specific to the changes with the addition of digester or co-digester improvements, would all be regulated and include specific performance standards. In general, WDRs developed by the Central Valley Water Board are based on water quality objectives as set in the respective Basin Plans. These objectives consider existing conditions and water quality criteria necessary to protect beneficial uses of surface waters within the region. Requirements such as retention of all stormwater runoff, limitations on discharges to surface waters, setback distances from surface water bodies, and specifications on land application would all be effective minimizing the potential to impair water quality of nearby surface waters. Implementation of the waste management and discharge requirements as described below in Mitigation Measure 5-2, would ensure that impacts on surface water quality would be less than significant.

Mitigation Measure

> **Measure 5.2:** WDRs for digester and co-digester facilities shall include design and operational requirements to manage all wastes and discharges to protect surface waters. Requirements shall include the following:

- Prohibitions against any surface water discharges (unless covered by separate NPDES permit),
- Prohibitions against any discharges that would cause exceedance of surface water quality objectives,
- Setbacks from surface water bodies
- Drainage requirements for co-digestion substrates/waste storage/receiving/handling areas to drain to on-site wastewater retention ponds,
- Lining requirements for retention ponds in new facilities and operational dairies,
- Monitoring requirements that include sampling data of soils, retention water, and waste streams to reconcile annually with Nutrient Management Plan (NMP),
- Requirements for tailwater return systems to minimize offsite discharges;
- Prohibitions against any unreasonable effects on beneficial uses of nearby surface waters.

. **Impact Significance After Mitigation:** Less than Significant

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Impact 5.3: Digester and co-digester development could adversely affect groundwater quality. (Significant)

The operation of anaerobic digesters or co-digesters for the treatment of dairy wastes, as well as co-digestion substrates could cause environmental degradation of groundwater quality. Reductions in groundwater quality could occur as a result of substrate handling procedures, dairy digester operation, and the disposal of digester effluent (including both liquid and solid digestate). If not properly managed, components of animal manure such as salts, nutrients (nitrogen, ammonia, phosphorous, potassium), pharmaceuticals and hormones, pathogens, chloride, boron, and heavy metals could enter into groundwater and, depending on the volume, the characteristics of the waste, and duration of the release, result in short term or ongoing groundwater quality degradation. It should also be noted that groundwater quality can also affect surface waters in areas where the groundwater flows into the surface waters (gaining conditions).

Salt Loading

Salts and salt loading to croplands is an important concern throughout the Central Valley. Salt management is becoming increasingly important in the San Joaquin Valley for urban and agricultural interests. If current practices for discharging waters containing elevated levels of salt continue unabated, the San Joaquin Valley can have a large portion of its ground water severely degraded within a few decades (RWQCB, 2009). For the Tulare Lake Basin, almost all of the salt loading introduced from outside of the basin concentrates in the underlying aquifers (CVRWQCB, 2010b). Salinity increases can affect municipal, agricultural, and industrial beneficial uses of water. Salinity increases in municipal use can affect the ability to recycle and reuse municipal wastewater. In digester/co-digester operations, salt concentrations are found in the manure, as a byproduct of some water softening processes, and in co-digestion substrates.

Salt treatment options include membrane treatment, evaporative ponds, deep well injection, and flash distillation. Evaporation ponds and deep well injection technologies are not considered a viable option because of the high volumes of water that would then not be reused and the environmental impact of their implementation. Reverse osmosis is another technology that can remove salinity, however, the cost and other high energy demands make it infeasible and unsustainable. Another option for obtaining salt balance includes conveyance of salts out of the valley provided beneficial uses of waters are not impaired. According to the Basin Plan for the Sacramento and San Joaquin Valley Basin, Policy 10 of the Central Valley Water Board is to encourage construction of facilities to convey agricultural drain water from the San Joaquin and Tulare Lake Basins (RWQCB, 2009). Degradation of ground water in the Tulare Lake Basin by salts is unavoidable without a plan for removing salts from the Basin (RWQCB, 2004). The Basin Plan also identifies a salt and boron control program for the Lower San Joaquin River as an amendment to the Basin Plan for control of salt and boron discharges into the lower San Joaquin River basin, approved by the Central Valley Water Board in Resolution No. 2004-0108. The goal of the salt and boron control program is to achieve compliance with salt and boron water quality objectives without restricting the ability of dischargers to export salt out of the San Joaquin River basin. In addition, the Central Valley Water Board is engaged in developing a comprehensive regional salinity management plan through the CV-SALTS Initiative, a stakeholder-regulator collaborative effort to update the Water Quality Control Plans for the Sacramento and San Joaquin River Basins, the Tulare Lake Basin and the Bay-Delta to address salinity management as a regional priority.

Based on a study conducted by J.L. Meyer in 1973, “reasonable” salt loading rates under normal situations were determined to help prevent the vertical migration of salts within the soil profile (Meyer, 1973 as cited in RWQCB, 2008). Unless environmental conditions show differently, “reasonable” is accepted to be a maximum annual non-nitrate salt loading rate of 2,000 pounds per acre for single-cropped land and 3,000 pounds per acre for double-cropped land.

Substrate storage and handling, as well as digester effluent could potentially contribute to salt loading associated with a proposed digester facility. Improper handling and storage of digester substrates could result in the accidental release of substrates or leachate from substrates. Such releases could infiltrate into groundwater, resulting in the unintentional release of salts to groundwater, which could degrade groundwater quality.

The amount of salt that is contained in digester effluent depends on the substrate that is input into the digester. The digestion process neither adds nor reduces the total salt content of the substrate that it processes, but simply passes salt from the substrate through to the digester effluent. For every unit of salt that is fed into a digester from dairy wastes or other substrates, that same unit of salt is released from the digester in its effluent. Depending on the characteristics of the digester facility, the digester effluent may be released on site at the dairy where the initial effluent was produced, or off site in a separate location. Therefore, the potential salt related effects of implementing dairy digesters or co-digesters depends substantially on the digester characteristics, the location, the existing quality of the supply water, and whether it accepts only dairy wastes, or dairy wastes combined with other co-digestion substrates. The following configurations are considered:

1. Digesters serving a single dairy and are located on the dairy site accepting only on-site manure substrate (*manure only*);
2. Digesters serving a single dairy, located on the dairy site, accepting additional, non-dairy co-digestion substrates (*manure plus other substrates*);
3. Centralized digesters serving one or more dairies and are located off-site from a dairy that are accepting manure substrate only (*manure only*); and
4. Centralized digesters serving one or more dairies, located off-site, accepting non-dairy waste co-digestion substrates (*manure plus other substrates*).

Digesters serving a single dairy (*manure only)*. Operation of an anaerobic digester on site at a single dairy to treat only wastes from that dairy (e.g., where no additional or outside digester co-digestion substrates are incorporated for digestion), would not result in any change in salt loading associated with the dairy. That is, in comparison to existing operations, where dairy wastes are discharged onto fields for the production of crops, the same load of salt would be applied to the fields as compared to existing conditions. Therefore, no change in salt loading would occur.

Digesters serving a single dairy (*manure plus other substrates*). For on-site digesters serving a single dairy that also incorporate an additional or supplemental co-digestion substrates, all of the salt contained in that additional co-digestion substrate would be processed through the digester, and would be released as digester effluent. Release of this effluent would therefore result in a potential net increase in the amount of salt that is applied to land at a specific dairy site.

Centralized digesters serving one or more dairies (*manure only)*. Centralized dairy digester facilities located offsite that treat only dairy waste from two or more dairies, would also result in the release of salts in digester effluent. These salts would be land applied as digester effluent, in support of agriculture. Land application of digester effluent would likely occur in the vicinity of the off site or centralized plant. This situation would result in a net reduction in the application of salts at the original dairy waste application site (as relevant), and a net increase in salt application at the new site.

Centralized digesters serving one or more dairies (*manure plus other substrates*). For off site digesters that also accept an additional or supplemental co-digestion substrate, all of the salt contained in that additional co-digestion substrate would be processed through the digester, and would be released as digester effluent. This salt load would be in addition to the salt associated with the dairy waste processed by the digester. Therefore, release of this additional effluent would result in a net increase in the total load of salt that is applied to the land at the original dairies or at a new site. However, there could be a reduction in salt loading where the co-digestion substrate might otherwise have been disposed, within the jurisdictional boundaries of the Central Valley Water Board (Region 5) without the co-digestion facility.

Nitrogen/Nutrients

Historical activities throughout the Central Valley have caused areas of concern for nutrients, and nitrogen in particular which commonly shows up as nitrate in groundwater. Widespread occurrence of nitrate at concentrations of concern affects both rural and public drinking-water supplies in various areas but notably in the eastern San Joaquin Valley (Burow, 2007). The general trend in concentrated livestock production throughout the United States has been associated with a trend of increasing nitrogen contamination locally in groundwater (Bukart and Stoner, 2002). Concentrated livestock operations provide both point sources of nitrogen in the immediate area of the confinement as well as larger areas of intense non-point sources as fields close to facilities that are used for manure disposal.

The processes of anaerobic digestion do not significantly alter total nitrogen content from the manure or co-substrates leaving potentially high nitrogen concentration in liquid digestate that would be subsequently applied to croplands. After reaching the soil's root zone, nitrogen can either volatilize or may be assimilated by plants. It may also be denitrified through microbial action, releasing gaseous nitrogen; or it may be leached below the root zone. The more denitrification that occurs in the root zone, the less the nitrate is leached down to the water table (Harter, 2009). Denitrification requires anoxic conditions, which in the root zone occur locally and are often limited to prolonged flooding conditions (Harter, 2009). Dairy operations have been shown to drive denitrification of dairy-derived nitrate in groundwater of San Joaquin Valley (Esser, et al, 2009). .

Various studies of the transport and fate of nutrients suggest that wastewater from dairy facilities that contain nitrogen levels above the crop requirements can potentially leach into the groundwater. Therefore, nitrogen levels can be managed through reasonable application which requires careful timing and prudent monitoring of crop nutrient requirements, available nutrients in the soil, and water inputs (Bradford, et al, 2008). Any additional nutrient loading through application of liquid or solid digestate as a result of implementation of digester and co-digester facilities could further degrade groundwater quality if not managed appropriately.

The conversion of the organic nitrogen to ammonium through the digestion process can reduce the risk of leaching and impacts on groundwater quality. Within the aerobic soil environment, ammonium can either be taken up by plants or converted to nitrate via nitrification, which is the most readily available form for plant uptake. As it is readily available to plants or rapidly converted to nitrate, ammonium functions as a fertilizer. Since the rate of organic nitrogen mineralization in the soil is not predictable, its application can be problematic as it can be mineralized when minimal plant growth is occurring. If organic nitrogen is mineralized and converted to nitrate during times of minimal plant uptake, there is a higher potential to leach nitrate. Because addition of digesters and co-digesters will result in a higher percentage of nitrogen in the ammonium form, it will allow a more accurate application of manure nitrogen as fertilizer during the time of uptake and minimize leaching losses due to organic nitrogen (Zublena, 1997). Under existing conditions, the manure used for land application would have the higher organic nitrogen forms which require microbial activity to break it down into the mineralized form which can take several years (Zublena, 1997).

If the liquid or solid digestate is applied when crops are not in the growing phase, then a possibility for leaching past the plant root zone exists. However, with appropriate timing of nutrient application that corresponds as closely as possible with plant nutrient uptake characteristics, the potential for leaching past the root zone can be minimized. Reasonable application can be achieved through implementation of an appropriate NMP that is designed to maximize harvest and minimize leaching. Development of a nutrient budget that includes planned rates of nutrient applications for each crop that do not exceed the crop’s requirements for total nitrogen that consider the stage of crop growth as well as all other nutrient sources can be effective (Bradford, et al, 2008). The potential improvements in groundwater quality associated with nutrient-managed fields indicate that appropriate management of manure can significantly reduce nitrate leaching from dairy crop fields (Harter, 2002).

Several factors affect the amount of digestate that can be applied including the total nitrogen content, the forms of nitrogen and their relative concentrations, residual organic nitrogen from prior applications, and crop nitrogen requirements. The addition of digestion processes would have the beneficial effect of reducing the organic nitrogen content of the manure that would otherwise be applied to cropped fields. Regardless, through implementation of a NMP which establishes a site specific analysis of the various factors involved to establish acceptance criteria that are consistent with agronomic rates and water quality objectives, the application of nitrogen can be effectively managed. The NMP can also be used to regulate the method of nutrient application that promotes efficient nutrient use such as applying digestate close to planting for maximum plant uptake, avoiding excess irrigation, maintaining vegetative buffer zones, use of cover crops, and development of co-substrate acceptance criteria. With measures such as these required as part of Best Practical Treatment or Controls (BPTCs) under the General Order WDRs for digesters and co-digesters and identified below in Mitigation Measure 5-3, the amount of nitrogen that would be released to the groundwater would be minimized.

Addition of an anaerobic digester or co-digester would require construction of an irrigation storage pond to store liquid digestate until land application is appropriate. Leakage from below-grade digesters and/or irrigation storage ponds is a potential source of nitrogen compounds to be leached to groundwater (McNab, et al, 2007). If existing structures are utilized, the integrity of the walls and bottoms of the digester may be compromised and result in the release of nitrogen compounds. Due to its negative charge, nitrate has the highest possibility of leaching and impacting groundwater quality. However, due to the anaerobic environment, most nitrogen within the digester and irrigation storage pond will be in a mineralized form (ammonium or nitrate) rather than organic nitrogen, which is more readily available for plants (Pillars, 2010). While nitrate contamination resulting from the land application of animal manure is well recognized, the impact of manure lagoon leakage on groundwater quality is less well characterized (Esser, et al., 2009). However, the operations of dairies themselves have been attributed as sources of nitrate contamination in groundwater (McNab, et al, 2007).

Pathogens

Pathogens including bacteria, viruses, and parasites most commonly associated with diary manure include cryptosporidium, E. Coli 0157, and salmonella. If not controlled or managed effectively, pathogens can be transmitted to humans through groundwater supplies. Anaerobic digestion processes destroy more than 90 percent of pathogens if operated under appropriate conditions including retention time and operating temperature (Pillars, 2010). In addition, the fate and transport of pathogens under NMP conditions has been shown as effective in protecting groundwater quality (Bradford and Segal, 2009). Pathogens can also be controlled through a reduction in attractions for rodents, birds, and other animals that could come in contact with affected manure or digestate. Otherwise, monitoring and reporting requirements for pathogen indicators can ensure protection of groundwater.

Pathogens could, however, potentially be released during substrate transport and storage associated with the digester facility, as relevant, or as a result of leaks or other accidental releases during digester operation. The anaerobic digestion process has been proven to provide a substantial reduction in the number of pathogens. Pathogens could be added to the liquid digestate within the irrigation storage pond from stormwater that has come in contact with manure and/or dairy digester facilities. However, the addition of pathogens from stormwater runoff from the production area is not associated with the implementation of new digesters or co-digesters. In addition, due to the fact that digesters are sealed to be gas tight, there is little chance for manure and associated pathogens to leak from the digester. It is anticipated that stormwater that comes in contact with the digester will contain very little, if any, pathogens. As such, implementation of new anaerobic digesters and co-digesters could significantly reduce the risk of pathogens contaminating surface water and groundwater. Thus, there is a less-than-significant risk related to pathogens impairing groundwater.

Chloride

Chloride is a component of salt, as discussed above. Therefore, the digestion process will not have a significant effect on the chloride concentration of manure. Thus, the effluent concentration should be similar to the influent (i.e., manure). Effects discussed for potential salt impacts, above, related to the type of digester facility that would be implemented, also apply to the discussion of chloride. Please refer to the discussion of salts, above.

Boron

Boron is an essential micronutrient but may be toxic to sensitive plants in concentrations as low as 0.5 milligram per liter (USGS, 2010). The U.S. Environmental Protection Agency has no standards for boron in drinking water. Boron is found in concentrations potentially harmful to plants in the northern and southwestern parts of the Sacramento Valley and in the Tulare Basin in the extreme southern part of the San Joaquin Valley (USGS, 2010). Large concentrations of boron also have been detected in shallow ground-water in the western part of the San Joaquin Valley. Anaerobic digestion will not have a significant effect on the boron concentration of manure. Thus, the effluent concentration should be similar to the influent (i.e., manure).

Heavy Metals

Land application of digestate from either the anaerobic digestion of manure or manure plus co-digestion substrates can affect soil metal concentrations. Depending on the pH of the digestate applied, the digestate can cause heavy metal migration to groundwater, which can make the water unsuitable for consumption.

Antibiotics and Growth Hormones

The occurrence of antibiotics and growth hormones in both soils and groundwater beneath waste lagoons in dairies has been documented (Arnon, 2008). In one study, hormones were identified in soil samples at depth, however, the transport mechanisms for these detections were not well understood (Arnon, 2008). As mentioned in the setting section above, the application of animal wastes to agricultural land may serve as an important pathway to disseminate antibiotics and hormones in the environment. Longer residence times for dairy wastewater in secondary and tertiary lagoons have been shown to lower hormone levels compared to those found in the primary lagoon (Zheng, 2007). Similarly, longer residence times for solid manure waste also reduces hormone concentrations. Some studies have shown that significant reductions in the concentrations of steroid hormones in the effluent can be accomplished from anaerobic digestion processes (Ermawati, 2007). Current practices at operational dairies already include the application of manure and manure wastewater to croplands. The greatest risks associated with the transport of antibiotics to groundwater appear to be the development of antibiotic resistance (Bradford, 2008). Steroid hormones have been classified as highly potent endocrine-disrupting chemicals (EDCs), which may interfere with the normal function of the endocrine system of humans and animals

Summary

Dairy facilities that employ digester or co-digester improvements would alter the handling procedures compared to current conventional dairy operations. The large volume of waste currently generated at dairies is generally challenged by the lack of disposal area available at the facilities, which further limits the ability for effective manure management. Manure and wastewater are, therefore, usually land-applied within about 10 miles of the dairy (Bradford, 2008). The digestion processes would include the storage handling and application of digestion byproducts including solid wastes, liquid effluent, and sulfur biogas scrubber wastes that could potentially result in increases of groundwater contaminants such as salts, nutrients (primarily nitrate), pathogens, chloride, boron, heavy metals, antibiotics, and growth hormones. Biogas produced in an anaerobic digester contains methane (60 to 70 percent), carbon dioxide (30 to 40 percent), and traces of various gases, including hydrogen sulfide, ammonia, and sulfur-derived mercaptans (Kapdi, 2004). Hydrogen sulfide is always present in biogas, although concentrations vary with the feedstock. It has to be removed in order to avoid corrosion in compressors, gas storage tanks and engines. Hydrogen sulfide can be removed either in the digester, from the crude biogas or in upgrading process and then either discharge into a wastewater treatment system (subject to requirements contained in a WDR permit issued by the Central Valley Water Board or used as a soil amendment.

Dairies would still be required to adhere to local enforcement agency requirements as part of the solid waste facility permit, and WDRs developed specifically for digester or co-digester facilities. The waste streams that would be regulated under the proposed WDRs for digesters and co-digesters would include:

- Co-digestion substrates/waste storage/receiving/handling areas,
- Above ground digester tanks,
- In ground digester tanks,
- Liquid wastes (effluent),
- Solid wastes, and
- Sulfur Biogas scrubber wastes.

BMPs for protection of water quality in groundwater include application of waste at rates that are reasonable for the crop, soil, climate, special local situations, management system, and type of manure consistent with Title 27 CCR §22563(a). Reasonable application is considered to be application of wastes at a rate that does not unreasonably degrade and does not pollute groundwater or create a nuisance condition.

By controlling the storage, handling, and application of all dairy waste and co-digestion substrates associated with the digestion and co-digestion processes, the potential impacts could be minimized. Therefore, implementation of **Mitigation Measure 5-3**, the potential impact to groundwater quality would be less than significant.

Mitigation Measure

> **Measure 5.3:** WDRs for the discharge to land from dairy digester and co-digester facilities shall include the following BPTC requirements or equivalent:
>
> - Prepare and implement site-specific Salt Minimization Plan (SMP) as approved by the Central Valley Water Board;
> - Prepare and implement a site-specific NMP that includes a soils and groundwater monitoring and reporting program that include a variety of waste constituents, as well as yearly reconciliation based on sampling results that measure agronomic rates;
> - Require all drainage be directed to a retention wastewater pond that has been designed to meet antidegradation provisions of Resolution 68-16 by an appropriately licensed professional;
> - Prohibit, decommission, or reduce use of regenerative water softeners on process water distribution networks or, alternatively, evaluate and install alternate technology that reduces or eliminates on-site brine disposal;
> - To the extent practicable, use crops that maximize salt uptake;
> - Apply liquid digestate consistently with crop water uptake rates;
> - Prohibit hazardous substances in co-digestion substrates processed by each facility as verified by laboratory analytical testing;
> - Apply digestate at an approved rate commensurate with agronomic rate;
> - Properly time application of digestate in accordance with crop requirements;
> - Avoid excess irrigation;
> - Maintain cover crops and vegetative buffer zones;
> - Develop co-substrate acceptance criteria;
> - Develop and implement a vector attraction reduction plan;
> - Monitor digestate, and groundwater for pathogen indicator organisms;
> - Require that solid wastes be stored on impermeable surfaces;
> - Maintain a neutral or alkaline pH for dairy digestate waste water applied to cropland
> - Prohibit hazardous waste, mammalian tissues, dead animals, and human waste from all discharges; and
> - Incorporate lined digester and co-digestion substrate storage facilities that meet the antidegradation provisions of Resolution 68-16, as relevant, into project

design in order to prevent groundwater contamination with salts, nutrients, and other constituents.

Each facility shall prepare a site-specific BPTC plan in accordance with the WDR requirements for review and approval to the Central Valley Water Board prior to commencement of operations. Annual monitoring reports shall be reviewed by the Central Valley Water Board and any revisions deemed necessary to the handling, storage, or land application of wastes shall be incorporated into facility operations.

Impact Significance After Mitigation: Less than Significant

Implementation of Mitigation Measure 5.3 would minimize the impacts to groundwater quality by requiring all proposed digester and co-digester facilities to incorporate BPTC measures that are designed to protect groundwater quality from constituents of concern that have been identified in the waste stream of the digester process. By providing site-specific criteria through a NMP and SMP, facilities will be required to provide quantitative support that the proposed activities are not significantly impairing groundwater quality compared to existing conditions. The General Order WDRs for digesters and co-digesters would establish groundwater limitations and practices for each facility that would not unreasonably threaten present and anticipated beneficial uses or result in groundwater quality that exceeds water quality objectives as set forth in the respective Basin Plan. The General Order would contain tasks for ensuring BPTC measures and the highest water quality consistent with the maximum benefit to the people of the state and verify effectiveness of BPTC measures through a stringent monitoring and reporting program. Implementation of control measures including implementation of an NMP (already required by the Dairy General Order), a SMP, BPTC measures, and a monitoring/reporting program for each primary pollutant associated with dairy operations as would be required under the General Order WDRs for digesters and co-digesters, would be effective in reducing potential impacts to less than significant levels. Accordingly, the discharge of effluent would then also be in compliance with existing regulations including the antidegradation provisions of Resolution 68-16, California Code of Regulations (CCR) Title 27, Central Valley Water Board Basin Plan, and the Local Enforcement Agency Solid Waste Facility Permit, which are all designed to minimize impacts to groundwater and protect beneficial uses.

Impact 5.4: Development of dairy digester and co-digester facilities could be exposed to flooding hazards. (Significant)

Many lowland areas of the Central Valley are prone to flooding, especially in the former Tulare Lake, Buena Vista Lake, and Kern Lake beds. These former lake beds originally would accommodate seasonal flood flows, however the construction of farms, towns and infrastructure have altered these natural floodplains partly through the construction of levees. Other counties in the valley that often face flooding are Yuba, Stanislaus, and San Joaquin. Many areas protected by levees are susceptible to flooding in the event of levee failure or overtopping. The Federal Emergency Management Agency (FEMA) provides information on flood hazard and frequency for cities and counties on its Flood Insurance Rate Maps (FIRMs). FEMA identifies designated zones to indicate flood hazard potential. The addition of anaerobic digester and co-digester facilities could be located in areas that have been identified as subject to 100-year floods.[6] Centralized facilities and associated buildings, disposal fields and co-digestion substrate storage could be subject to damage if located in flood hazard areas. Workers at these facilities could also be subject to injury or death as a result of flooding hazards. Given the widespread extent of potential flooding hazards in many areas of the Central Valley, the risk of flooding may not be completely unavoidable, however protection measures and design requirements can minimize potential impacts. With implementation of Mitigation Measure 5.4, the potential impacts from flooding can be reduced to less-than-significant levels.

Mitigation Measure

> **Measure 5.4:** WDRs for digester and co-digester facilities shall include design requirements for individual or centralized anaerobic digester or co-digester facilities, application croplands, and associated facilities to protect them from FEMA 100-year flood events. Design measures may include, but are not limited to: facility sitting, access placement, grading foundation soils above projected water elevation, and site protection.
>
> **Impact Significance After Mitigation:** Less than Significant

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Impact 5.5: Development of dairy digester and co-digester facilities could require additional water supplies resulting in depletion of groundwater. (Less than Significant)

Dairies and agricultural facilities in general, typically receive water supplies through onsite groundwater pumping or private systems which provide groundwater, imported waters or surface waters. Dairies within the Central Valley also reuse process wastewater for some aspects of operation. With the available wastewater stored in the retention lagoons, reuse of this water can be used for the addition of water to the digestion process, if necessary. Co-digestion typically does not require additional water supplies because of the excess water already contained in the co-digestion substrate which is then separated from the solid materials. Considering the existing water usage for management of manure on dairies, development of digester or co-digester facilities would not significantly increase water demands. The development of a potential centralized facility off-site of a dairy, however could require new water demands. In addition, the construction of new digester or co-digester facilities could potentially introduce new impervious surfaces resulting in a potential reduction in area of groundwater recharge. However, the amount of impervious surfaces required for a new centralized facility would be relatively limited in areal extent and considering the generally low precipitation rates of the Central Valley, there would be less than significant effects on recharge rates and groundwater levels.

The California Senate Bill AB 610 requires that qualified large developments (including processing plants that occupy 40 acres) must provide a water supply assessment demonstrating adequate water supplies are available for any proposed needs prior to project approval. The purpose of the bill is to coordinate local water supply and land use decisions to help provide California's cities,

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[6] A 100-year floodplain is defined as an area calculated to have a one percent chance of flooding in any given year.

farms and rural communities with adequate water supplies. Some centralized digestion and co-digestion facilities may not be large enough to meet the minimum requirements of this bill and therefore do not represent a significant source of water supply demands. Those facilities that must adhere to the requirements of AB610 would be required to demonstrate adequate water supplies are available and therefore would have a less than significant impact on groundwater supplies.

Mitigation: None required.

Impact 5.6: Development of dairy digester and co-digester facilities could contribute to cumulative impacts to water quality. (Significant)

The geographic scope of potential cumulative water quality impacts includes the entire Region 5. As discussed in this chapter, past projects have caused water quality impacts in the Central Valley. Past projects that have historically discharged to cropland have led in some instances to the degradation of both surface waters and groundwater in various areas of Region 5. For example, groundwater in the Tulare Lake Basin has been degraded by salt loading through a combination of natural processes and human activities. On a cumulative basis, on-going activities, including dairies and other agricultural activities, continue to have the potential for additional degradation of surface waters and groundwater. However, the operation of digesters and co-digesters, as required by Mitigation Measure 5.2, would be prohibited from discharging into surface waters unless covered by a separate NPDES permit with effluent limitations to protect surface water quality. Despite the possible hydraulic connection of groundwater to surface waters in isolated areas of gaining conditions, a prohibition on direct discharge to surface waters combined with the other elements of Mitigation Measure 5.2, the cumulative contribution of digesters and co-digesters on surface water quality would be less than significant.

The addition of a projected 200 dairy digesters to be developed over the next ten years (see discussion in Chapter 4, Approach to Environmental Analysis), has the potential to contribute pollutants through land application of solid digestate and liquid effluent to groundwater. A thorough analysis of the range of potential impacts to groundwater of the Central Valley has already been laid out in this chapter. As with the discussion of the project effects under Impact 5.3, the potential impacts will vary from constituent to constituent. For some contaminants of concern, such as pathogens, the addition of digester and co-digester facilities will be effective in reducing the amount of pathogens that might otherwise be applied to land without the dairy digesters and co-digesters. The dairy digesters would also result in the conversion of more of the nitrogen into its mineralized form, which is more readily available to plants than organic nitrogen compounds, which release nitrogen slowly and not always at times and rates useful to plants. Reducing the time organic nitrogen remains in the surface soil reduces the potential that slowly mineralized nitrogen will be available to leach to groundwater.

For manure only digesters, other contaminants of concern (i.e., salts, chloride, boron) would be relatively unchanged by the digestion process and have no additional adverse effects on groundwater quality compared to existing conditions. digesters using co-digestion substrates would likely vary considerably in their constituents but could potentially include concentrations of nitrogen, salt, phosphorus, chloride, and/or boron that would be at risk of adversely affecting groundwater if not managed appropriately. The addition of co-digestion substrates in some instances would represent a potential additional loading that is not currently present under existing conditions. Therefore, overall, considering the significant impacts of past, present, and future projects, the dairy digesters and co-digesters could have an incremental contribution to groundwater quality impacts that is cumulatively considerable.

The existing regulatory environment for the Central Valley, including the antidegradation provisions of Resolution 68-16, CCR Title 27, Dairy General Order, the Conditional Waiver for Agricultural Discharges, Central Valley Water Board Basin Plans, and the Local Enforcement Agency Solid Waste Facility Permit, imposes measures designed to protect water quality throughout the cumulative region considered. In recent years, a large percentage of past projects contributing to the significant environmental impact have come under more stringent regulatory requirements such as the Dairy General Order which include measures that are designed to reduce the potential impacts to surface waters and groundwater. The implementation of NMPs are designed as a means to ensure that potential impacts to water quality are minimized. Other industries in Region 5 are similarly required to adhere to some of these same regulatory requirements such as State Board Resolution 68-16, CCR Title 27, Central Valley Water Board basin plans.

To address cumulative impacts of salts and nitrate impacts throughout Region 5, the Central Valley Water Board through the CV-SALTS initiative is currently engaged in a collaborative stakeholder effort aimed at developing a region-wide Salt and Nitrate Management Plan. The Plan once developed will be implemented through basin plan amendments. This basin planning effort will result in the establishment of a comprehensive implementation plan to achieve water quality objectives for salts and nitrate throughout Region 5.

As discussed under impacts 5.2 and 5.3, a number of mitigation measures (Mitigation Measures 5.2, 5.3, and 5.4) are proposed in this chapter that would reduce the potential water quality impacts of dairy digesters and co-digesters permitted under the program to a level of less than significant. These same measures would also help reduce the program's cumulative contribution to water quality, as they would occur within the context of the broader regulation of past, present, and future projects, all working toward reducing cumulative impacts (e.g., Dairy General Order and CV-SALTS initiative). Nevertheless, given the existing, significant cumulative impacts caused by other projects to groundwater throughout Region 5, and in particular those areas most likely to be affected by the future development of dairy digesters and co-digesters, the program's potential incremental contribution to groundwater quality remains cumulatively considerable, even after mitigation.

Mitigation Measure

Measure 5.6. Implement Mitigation Measures 5.2, 5.3, and 5.4.

Impact Significance After Mitigation: Significant and Unavoidable

Implementation of the above mitigation measures were determined as discussed in impacts 5.2 and 5.3 to reduce the impacts to a less than significant level on an incremental project basis. However, the incremental contribution of the program to the significant cumulative effects of past and future projects may be cumulatively considerable even with mitigation.

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CHAPTER 6

Air Quality and Greenhouse Gas Emissions

6.1 Setting

Environmental Setting

The environmental setting first identifies the air quality pollutants of concern in California, including criteria air pollutants, toxic air contaminants (TACs), odors, and greenhouse gases (GHGs) that could be emitted during the dairy anaerobic digestion process. This discussion also explains California's climate and meteorology and their effect on air quality.

Air Quality Pollutants of Concern

Criteria Air Pollutants

Ozone. Short-term exposure to ozone can irritate the eyes and cause constriction of the airways. Besides causing shortness of breath, ozone can aggravate existing respiratory diseases such as asthma, bronchitis, and emphysema. Ozone is not emitted directly into the atmosphere, but is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving reactive organic gases (ROG) (also termed volatile organic compounds or VOCs) and nitrogen oxides (NOx). ROG and NOx are known as precursor compounds for ozone. Significant ozone production generally requires ozone precursors to be present in a stable atmosphere with strong sunlight for approximately three hours. Ozone is a regional air pollutant because it is not emitted directly by sources, but is formed downwind of sources of ROG and NOx under the influence of wind and sunlight. Ozone concentrations tend to be higher in the late spring, summer, and fall, when the long sunny days combine with regional subsidence inversions to create conditions conducive to the formation and accumulation of secondary photochemical compounds, like ozone. Ground level ozone in conjunction with suspended particulate matter in the atmosphere leads to hazy conditions generally termed as "smog."

Carbon Monoxide (CO). Ambient CO concentrations normally are considered a local effect and typically correspond closely to the spatial and temporal distributions of vehicular traffic. Wind speed and atmospheric mixing also influence carbon monoxide concentrations. Under inversion conditions, CO concentrations may be distributed more uniformly over an area that may extend some distance from vehicular sources. When inhaled at high concentrations, CO combines with hemoglobin in the blood and reduces the oxygen-carrying capacity of the blood. This results in reduced oxygen reaching the brain, heart, and other body tissues. This condition is especially critical for people with cardiovascular diseases, chronic lung disease, or anemia, as well as for fetuses.

Carbon monoxide concentrations have declined dramatically in California due to existing controls and programs and most areas of the state have no problem meeting the CO State and federal standards. CO measurements and modeling were important in the early 1980's when CO levels were regularly exceeded throughout California. In more recent years, CO measurements and modeling have not been a priority in most California air districts due to the retirement of older polluting vehicles, less emissions from new vehicles and improvements in fuels. The clear success in reducing CO levels is evident in the first paragraph of the executive summary of the California Air Resources Board *2004 Revision to the California State Implementation Plan for Carbon Monoxide Updated Maintenance Plan for Ten Federal Planning Areas* (CARB, 2004), shown below:

> "The dramatic reduction in carbon monoxide (CO) levels across California is one of the biggest success stories in air pollution control. Air Resources Board (CARB or Board) requirements for cleaner vehicles, equipment and fuels have cut peak CO levels in half since 1980, despite growth. All areas of the State designated as non-attainment for the federal 8-hour CO standard in 1991 now attain the standard, including the Los Angeles urbanized area. Even the Calexico area of Imperial County on the congested Mexican border had no violations of the federal CO standard in 2003. Only the South Coast and Calexico continue to violate the more protective State 8-hour CO standard, with declining levels beginning to approach that standard."

Respirable Particulate Matter (PM10 and PM2.5). PM10 and PM2.5 consist of particulate matter that is 10 microns or less in diameter and 2.5 microns or less in diameter, respectively. (A micron is one-millionth of a meter). PM10 and PM2.5 represent fractions of particulate matter that can be inhaled into the air passages and the lungs and can cause adverse health effects. Some sources of particulate matter, such as wood burning in fireplaces, demolition, and construction activities, are more local in nature, while others, such as vehicular traffic, have a more regional effect. Very small particles of certain substances (e.g., sulfates and nitrates) can cause lung damage directly, or can contain adsorbed gases (e.g., chlorides or ammonium) that may be injurious to health. Particulates also can damage materials and reduce visibility. Large dust particles (diameter greater than 10 microns) settle out rapidly and are easily filtered by human breathing passages. This large dust is of more concern as a soiling nuisance rather than a health hazard. The remaining fraction, PM10 and PM2.5, are a health concern particularly at levels above the federal and State ambient air quality standards. PM2.5 (including diesel exhaust particles) is thought to have greater effects on health, because these particles are so small and thus, are able to penetrate to the deepest parts of the lungs. Scientific studies have suggested links between fine particulate matter and numerous health problems including asthma, bronchitis, acute and chronic respiratory symptoms such as shortness of breath and painful breathing. Recent studies have shown an association between morbidity and mortality and daily concentrations of particulate matter in the air. Children are more susceptible to the health risks of PM10 and PM2.5 because their immune and respiratory systems are still developing.

Mortality studies since the 1990s have shown a statistically significant direct association between mortality (premature deaths) and daily concentrations of particulate matter in the air. Despite important gaps in scientific knowledge and continued reasons for some skepticism, a comprehensive evaluation of the research findings provides persuasive evidence that exposure to fine particulate air pollution has adverse effects on cardiopulmonary health (Dockery and Pope, 2006). The CARB has estimated that achieving the ambient air quality standards for PM10 could reduce premature mortality rates by 6,500 cases per year (CARB, 2002).

Nitrogen Dioxide (NO_2). NO_2 is a reddish brown gas that is a by-product of combustion processes. Automobiles and industrial operations are the main sources of NO_2. NO_2 may be visible as a coloring component of a brown cloud on high pollution days, especially in conjunction with high ozone levels.

NO_2 is an air quality concern because it acts a respiratory irritant and is a precursor of ozone. NO_2 is a major component of the group of gaseous nitrogen compounds commonly referred to as nitrogen oxides (NOx). Nitrogen oxides are produced by fuel combustion in motor vehicles, industrial stationary sources (such as industrial activities), ships, aircraft, and rail transit. Typically, nitrogen oxides emitted from fuel combustion are in the form of nitric oxide (NO) and nitrogen dioxide (NO_2). NO is often converted to NO_2 when it reacts with ozone or undergoes photochemical reactions in the atmosphere. Therefore, emissions of NO_2 from combustion sources are typically evaluated based on the amount of NOx emitted from the source.

Sulfur dioxide (SO_2). SO_2 is a combustion product of sulfur or sulfur-containing fuels such as coal, diesel, and biogas. SO_2 is also a precursor to the formation of atmospheric sulfate, particulate matter and contributes to potential atmospheric sulfuric acid formation that could precipitate downwind as acid rain. SO_2 is a major component of the group of gaseous sulfurous compounds commonly referred to as sulfur oxides (SOx)

Hydrogen sulfide (H_2S). H_2S is generated by the anaerobic decomposition of manure and other organic material. It is emitted naturally in geothermal areas and is also associated with certain industrial processes. Exposure to low concentrations of H_2S may cause irritation to eyes, nose, or throat. Exposure to higher concentrations (typically at work settings) can cause olfactory fatigue, respiratory paralysis, and death. However, no health effects have been found in humans exposed to typical environmental concentrations.

Lead. Lead has a range of adverse neurotoxin health effects, and was formerly released into the atmosphere primarily via leaded gasoline products. The phase-out of leaded gasoline in California resulted in decreasing levels of atmospheric lead. Dairy digester and co-digester facilities would not introduce any new sources of lead emissions; consequently, lead emissions are not required to be quantified and are not further evaluated in this analysis.

Toxic Air Contaminants

TACs are airborne substances that are capable of causing short-term (acute) and/or long-term (chronic and/or carcinogenic) adverse human health effects (i.e., injury or illness). TACs are substances for which federal or State criteria air pollutant standards have not been adopted. Thus, for TACs, there

is no federal or State ambient air quality standard against which to measure a project's air quality impacts. For this reason, TACs are analyzed by performing a health risk assessment. TACs include both organic and inorganic chemical substances. They may be emitted from a variety of common sources including gasoline stations, automobiles, dry cleaners, industrial operations, and painting operations. The current California list of TACs includes approximately 200 compounds, including particulate emissions from diesel-fueled engines and ammonia, which can be emitted through the construction and/or operation of dairy digester and co-digester facilities.

Diesel Particulate Matter. Diesel particulate matter (DPM) is the most complex of diesel emissions. Diesel particulates, as defined by most emission standards, are sampled from diluted and cooled exhaust gases. This definition includes both solids and liquid material that condenses during the dilution process. The basic fractions of DPM are elemental carbon and heavy hydrocarbons derived from fuel and lubricating oil. DPM contains a large portion of the polycyclic aromatic hydrocarbons (PAH) found in diesel exhaust. Diesel particulates include small nuclei mode particles of diameters below 0.04μm and their agglomerates of diameters up to 1μm. DPM is expected to be the TAC of greatest concern generated by the construction and operation of dairy digester and co-digester facilities since it would be emitted outside of the digester and thus not captured during the digestion process.

In 2001, CARB assessed the statewide health risks from exposure to DPM and to other TACs. Ambient exposures to diesel particulates in California are significant fractions of total TAC levels in the State. CARB subsequently developed the *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles* (CARB, 2000). According to this plan, the statewide cancer risk from exposure to diesel exhaust was about 540 per million (i.e., 540 cancers per million people) as compared to a total risk for exposure to all ambient air toxics of 760 per million as reported in 2000. This estimate of risk from diesel exhaust, which accounts for a substantial portion (about 70 percent) of the total risk from TACs, included both urban and rural areas in the State. It can be considered as an average worst-case for the State, since it assumes constant exposure to outdoor concentrations of diesel exhaust and does not account for expected lower concentrations indoors, where people spend most of their time.

Ammonia. Ammonia is a TAC and is considered a precursor to PM2.5. Ammonia is generated during anaerobic decomposition of manure and is therefore of interest in evaluating the air quality impacts of the project. Ammonia gas (a base) is known to react with acids in the atmosphere (typically nitric or sulfuric acid) to form ammonium nitrates or sulfates, which are particulates. Although it is known that the release of ammonia gas is a participant in the formation of ammonium nitrate, it is difficult to forecast how much ammonium nitrate would be created by a release of a certain amount of ammonia. The reaction that forms ammonium nitrate or ammonium sulfate depends on the presence of other chemicals that are in turn part of a complex photochemical process occurring in the atmosphere (including NOx and SOx, which the San Joaquin Valley Air Pollution Control District (SJVAPCD) focuses on controlling in order to also limit ammonium nitrate and ammonium sulfate generation). At the same time, both ammonia and ammonium particulates are subject to removal processes that constantly remove the pollutants from the atmosphere. No health effects have been found in humans exposed to typical environmental (moderate) concentrations of ammonia.

In high concentrations, it can severely irritate the eyes, nose, ears, and throat. Lung damage and death may occur after exposure to very high concentrations of ammonia. Individuals with asthma may be more sensitive to breathing ammonia than others.

Odorous Emissions

Manure generated at dairies can be a source of substantial odor. Though offensive odors from stationary sources rarely cause any physical harm, they still remain unpleasant and can lead to public distress generating citizen complaints to local governments. The occurrence and severity of odor impacts depend on the nature, frequency and intensity of the source; wind speed and direction; and the sensitivity of receptors. The *CEQA Guidelines* recommends that odor impacts be considered for any proposed new odor sources located near existing receptors, as well as any new sensitive receptors located near existing odor sources. Generally, increasing the distance between the receptor and the source will mitigate odor impacts.

Greenhouse Gas Emissions

Global climate change refers to observed changes in weather features that occur across the Earth as a whole, such as temperature, wind patterns, precipitation, and storms, over a long period (CAT, 2006; CEC, 2006; CEC, 2008; IPCC, 2007). Global temperatures are modulated by naturally occurring atmospheric gases, such as water vapor, carbon dioxide, methane, and nitrous oxide. These gases allow sunlight into the Earth's atmosphere, but prevent radiative heat from escaping into outer space, thus altering Earth's energy balance in a phenomenon called the "greenhouse effect". The term "natural greenhouse effect" refers to how greenhouse gases trap heat with the system-troposphere system; the term "enhanced greenhouse effect" refers to an increased concentration of greenhouse gases, which results in an increase in temperature of the surface-troposphere system. Some greenhouse gases are short lived, such as water vapor, while others, such as sulfur hexafluoride, have a long lifespan in the atmosphere.

Earth has a dynamic climate that is evidenced by repeated episodes of warming and cooling in the geologic record. Consistent with a general warming trend, global surface temperatures have increased by 0.74°C ± 0.18°C over the past 100 years (IPCC, 2007). The recent warming trend has been correlated with the global Industrial Revolution, which resulted in increased urban and agricultural centers at the expense of forests and reliance on fossil fuels (CAT, 2006). Eleven of the past twelve years are among the twelve warmest years recorded since 1850 (CEC, 2006). Although natural processes and sources of greenhouse gases contribute to warming periods, recent warming trends are attributed to human activities as well (CAT, 2006; CEC 2006a). Potential global warming impacts may include, but are not limited to, loss in snow pack, sea level rise, more extreme heat days per year, more high ozone days, more large forest fires, and more drought years. Secondary effects are likely to include a global rise in sea level, impacts to agriculture, changes in disease vectors, and changes in habitat and biodiversity. While the possible outcomes and the feedback mechanisms involved are not fully understood, and much research remains to be done, the potential for substantial environmental, social, and economic consequences over the long term may be great.

Whether naturally or anthropogenically produced, greenhouse gases of concern include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6) (CAT, 2006; CAPCOA, 2009; OPR, 2008). In terms of Global Warming Potential (GWP), each of these gases varies substantially from one another. GWP is a measure of how much a given mass of GHG will contribute to global warming, comparing one GHG to the same mass of CO_2 on a relative scale (CAPCOA, 2009; CAT, 2006; IPCC, 2007). The GWP depends on the absorption of infrared radiation by a given species, the spectral location of its absorbing wavelengths, and the atmospheric lifetime of the species. GHG emissions are measured in units of pounds or tons of CO_2 equivalents (CO_2e). As an example, HFC-23 contributes 14,800 times as much as CO_2 to the GWP over 100 years. GWP values for key GHGs are summarized in the following table. The following sections contain a general discussion of the natural and anthropogenic sources of each GHG.

TABLE 6-1
GLOBAL WARMING POTENTIAL OF GREENHOUSE GASES

Gas	Lifetime (years)	Global Warming Potential for 100-Year Time Horizon
Carbon Dioxide (CO_2)	50-200	1
Methane (CH_4)	12	25
Nitrous Oxide (NO_2)	114	298
Perfluorocarbons (PFC-14)	50,000	7.300
Hydrofluorocarbons (HFC-23)	270	14,800
Sulfur Hexafluoride (SF_6)	3.200	22.800

SOURCE: IPCC. 2007. Table 2.14, Chapter 2, Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the IPCC. Available at: http://ipcc-wg1.ucar.edu/wg1/Report/AR4WG1_Print_Ch02.pdf

Carbon Dioxide (CO_2). In the atmosphere, carbon generally exists in its oxidized form as CO_2. Natural sources of CO_2 include animal and plant respiration, ocean-atmospheric exchange and volcanic eruptions. Anthropogenic sources of CO_2 include the combustion of fossil fuels, such as coal, oil, and gas in power plants, automobiles, industrial facilities and other sources, and specialized industrial production processes and product uses (i.e., mineral production, metal production, and use of petroleum based products). The largest source of CO_2 emissions globally is the combustion of fossil fuels. Sinks of CO_2 include forests, wetlands and agriculture. When CO_2 sources exceed CO_2 sinks, the Earth’s natural balance is no longer in equilibrium. Since the late 1800s, the concentration of CO_2 in the atmosphere has risen approximately 30% (CAT, 2006; CAPCOA, 2009).

Methane (CH_4). Methane in the atmosphere is eventually oxidized, yielding carbon dioxide and water. Natural sources of methane include, but are not limited to, anaerobic production, wetlands, termites, oceans, methane gas hydrates (clathrates), volcanoes and other geologic structures, wildfires, and animals. Anthropogenic sources of methane include, but are not limited to, landfills, natural gas systems, coal mining, manure management, forested lands, wastewater treatment, rice cultivation, composting, petrochemical production, and field burning of agricultural residues. In California, agricultural processes contribute significant sources of anthropogenic methane (CAT, 2006; CAPCOA, 2009).

Nitrous Oxide (N_2O). In the atmosphere, nitrous oxide reacts with ozone. Primary natural sources of nitrous oxide include bacterial breakdown of nitrogen in soils and oceans. Anthropogenic sources of nitrous oxide include fertilizer application, production of nitrogen fixing crops, nitric acid production, animal manure management, sewage treatment, combustion of fossil fuels, and nitric acid production (CAT, 2006; CAPCOA, 2009).

Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), and Sulfur Hexafluoride (SF_6). HFCs are man-made chemicals containing the element fluorine. Developed as alternatives to ozone-depleting substances for industrial, commercial and consumer products, they are used predominantly as refrigerants and aerosol propellants. PFCs are man-made as well, primarily used as replacements to ozone-damaging chlorofluorocarbons and hydrochlorofluorocarbons. Sources include aluminum production and semiconductor manufacturing. Man made, major releases of SF_6 come from leakage from electrical substations, magnesium smelters and some consumer goods, such as tennis balls and training shoes. Each of these GHGs possesses a relatively high GWP and long atmospheric lifetimes (CAT, 2006; CAPCOA, 2009).

California Climate and Meteorology

The jurisdictional boundaries of the Central Valley Region (Region 5) encompasses approximately 60,000 square miles, or about 40 percent of the State's total area. There is considerable variation in climate and meteorology across Region 5, and as such, will be discussed below for California as generally representative of Region 5.

Air quality is affected by the rate, amount, and location of pollutant emissions and the associated meteorological conditions that influence pollutant movement and dispersal. Atmospheric conditions (for example, wind speed, wind direction, and air temperature) in combination with local surface topography (for example, geographic features such as mountains and valleys), determine how air pollutant emissions affect local air quality.

Because of the strong influence of the Pacific Ocean and mountains, variations in climate in California run in a general east-to-west direction. California’s climate varies from Mediterranean (most of the State) to steppe (scattered foothill areas), to alpine (high Sierra), to desert (Colorado and Mojave Deserts).

The Sierra Nevada, Coast and Cascade Ranges act as barriers to the passage of air masses. During summer, California is protected from much of the hot, dry air masses that develop over the central United States. Because of these barriers, and California’s western border of the Pacific Ocean, summer weather in portions of the State is generally milder than that in the rest of the country and is characterized by dry, sunny conditions with infrequent rain.

In winter, the same mountain ranges prevent cold, dry air masses from moving into California from the central areas of the United States. Consequently, winters in California are also milder than would be expected at these latitudes.

Regulatory Setting

Federal

Clean Air Act

The Clean Air Act (CAA) is a federal law that regulates air emissions from stationary and mobile sources. Principal provisions include the authorization for the United States Environmental Protection Agency (USEPA) to establish National Ambient Air Quality Standards (NAAQS) to protect public health and public welfare and to regulate emissions of hazardous air pollutants. Six criteria pollutants include carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, particulate matter (equal to or less than PM10) and lead. **Table 6-2** shows current federal and State ambient air quality standards and provides a brief discussion of the related health effects and principal sources for each pollutant. The CAA was amended in 1977 and 1990, primarily to set new deadlines for achieving attainment of NAAQS because many areas of the country had failed to meet the deadlines.

TABLE 6-2
STATE AND NATIONAL CRITERIA AIR POLLUTANT STANDARDS, EFFECTS, AND SOURCES

Pollutant	Averaging Time	State Standard	National Standard	Pollutant Health and Atmospheric Effects	Major Pollutant Sources
Ozone	1 hour	0.09 ppm	---	High concentrations can directly affect lungs, causing irritation. Long-term exposure may cause damage to lung tissue.	Formed when reactive organic gases (ROG) and nitrogen oxides (NOx) react in the presence of sunlight. Major sources include on-road motor vehicles, solvent evaporation, and commercial / industrial mobile equipment.
	8 hours	0.07 ppm	0.075 ppm		
Carbon Monoxide	1 hour	20 ppm	35 ppm	Classified as a chemical asphyxiant, carbon monoxide interferes with the transfer of fresh oxygen to the blood and deprives sensitive tissues of oxygen.	Internal combustion engines, primarily gasoline-powered motor vehicles.
	8 hours	9.0 ppm	9 ppm		
Nitrogen Dioxide	1 hour	0.18 ppm	0.100 ppm	Irritating to eyes and respiratory tract. Colors atmosphere reddish-brown.	Motor vehicles, petroleum refining operations, industrial sources, aircraft, ships, and railroads.
	Annual Avg.	0.030 ppm	0.053 ppm		
Sulfur Dioxide	1 hour	0.25 ppm	---	Irritates upper respiratory tract; injurious to lung tissue. Can yellow the leaves of plants, destructive to marble, iron, and steel. Limits visibility and reduces sunlight.	Fuel combustion, chemical plants, sulfur recovery plants, and metal processing.
	3 hours	---	0.5 ppm		
	24 hours	0.04 ppm	0.14 ppm		
	Annual Avg.	---	0.03 ppm		
Respirable Particulate Matter (PM10)	24 hours	50 µg/m3	150 µg/m3	May irritate eyes and respiratory tract, decreases in lung capacity, cancer and increased mortality. Produces haze and limits visibility.	Dust and fume-producing industrial and agricultural operations, combustion, atmospheric photochemical reactions, and natural activities (e.g., wind-raised dust and ocean sprays).
	Annual Avg.	20 µg/m3	---		
Fine Particulate Matter (PM2.5)	24 hours	---	35 µg/m3	Increases respiratory disease, lung damage, cancer, and premature death. Reduces visibility and results in surface soiling.	Fuel combustion in motor vehicles, equipment, and industrial sources; residential and agricultural burning; Also, formed from photochemical reactions of other pollutants, including NOx, sulfur oxides, and organics.
	Annual Avg.	12 µg/m3	15 µg/m3		
Lead	Monthly Ave.	1.5 µg/m3	---	Disturbs gastrointestinal system, and causes anemia, kidney disease, and neuromuscular and neurological dysfunction.	Present source: lead smelters, battery manufacturing & recycling facilities. Past source: combustion of leaded gasoline.
	Quarterly	---	1.5 µg/m3		

TABLE 6-2
STATE AND NATIONAL CRITERIA AIR POLLUTANT STANDARDS, EFFECTS, AND SOURCES

Pollutant	Averaging Time	State Standard	National Standard	Pollutant Health and Atmospheric Effects	Major Pollutant Sources
Hydrogen Sulfide	1 hour	0.03 ppm	No National Standard	Nuisance odor (rotten egg smell), headache and breathing difficulties (higher concentrations)	Geothermal Power Plants, Petroleum Production and refining
Sulfates	24 hour	25 µg/m3	No National Standard	Breathing difficulties, aggravates asthma, reduced visibility	Produced by the reaction in the air of SO2.
Visibility Reducing Particles	8 hour	Extinction coefficient of 0.23/km; visibility of 10 miles or more	No National Standard	Reduces visibility, reduced airport safety, lower real estate value, discourages tourism.	See PM2.5.

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ppm = parts per million; µg/m^3 = micrograms per cubic meter.

SOURCE: California Air Resources Board (CARB), 2010a. *Ambient Air Quality Standards,* available at http://www.arb.ca.gov/research/aaqs/aaqs2.pdf Standards last updated February 16, 2010. California Air Resources Board, 2009a. *ARB Fact Sheet: Air Pollution Sources, Effects and Control,* http://www.arb.ca.gov/research/health/fs/fs2/fs2.htm, page last reviewed December 2009.

Pursuant to the 1990 amendments to the CAA, the USEPA classifies air basins, or portions of air basins, as “attainment” or “nonattainment” for each criteria air pollutant, based on whether or not the NAAQS had been achieved. **Table 6-3** shows the current attainment statuses across the project area by air basin (shown in **Figure 6-1**) for the pollutants of highest concern (ozone and particulates).

TABLE 6-3
REGION 5 CRITERIA POLLUTANT ATTAINMENT STATUS BY AIR BASIN

Air Basin	State Ozone	Federal Ozone	State PM10	Federal PM10	State PM2.5	Federal PM2.5
Great Basin Valleys Air Basin	N	U	N	N	A	U
Lake County Air Basin	A	U	A	U	A	U
Mojave Desert Air Basin	N	N	N	N	N	U
Mountain Counties Air Basin	N	N	N	U	U	N
North Central Coast Air Basin	N	U	N	U	A	U
Northeast Plateau Air Basin	NT	U	N	U	U	U
Sacramento Valley Air Basin	N	N	N	N	N	N
San Francisco Bay Area Air Basin	N	N	N	U	N	N
San Joaquin Valley Air Basin	N	N	N	A	N	N
South Central Coast	N	N	N	U	N	U

A Attainment. An area is designated attainment if the state or federal standard for the specified pollutant is met.

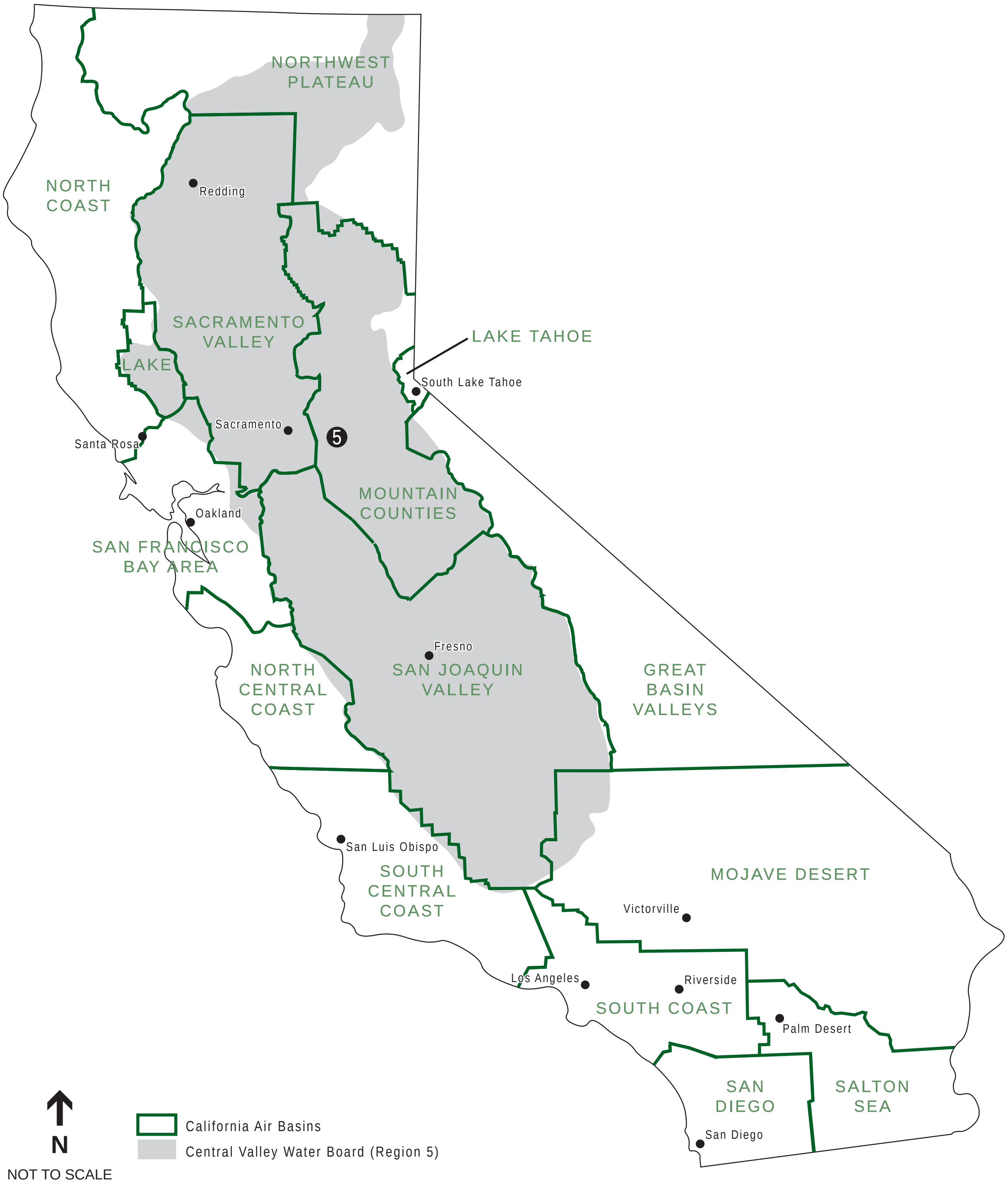
N Nonattainment. An area is designated nonattainment if the State or federal standard for the specified pollutant is not met.

NT Nonattainment – Transitional. An area is designated non-attainment – transitional to signify that the area is close to attaining the standard for that pollutant.

U Unclassified. An area is designated unclassified if the data are incomplete and do not support a designation of attainment or nonattainment.

Air basins classified as N or NT areas have at least one area within that basin that has shown a violation of the relevant ambient standard.

SOURCE: California Air Resources Board (CARB), 2010b. *Area Designation Maps,* http://www.arb.ca.gov/desig/adm/adm.htm, page updated March 29, 2010 and accessed April 30, 2010.



SOURCE: CA Air Resources Board, 2008; Central Valley Water Board, 2009; and ESA, 2010

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Figure 6-1
California Air Basins

The 1990 amendments to the CAA requires each state to prepare an air quality control plan referred to as the State Implementation Plan (SIP). The amendments added requirements for states containing areas that violate the NAAQS to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIP is a living document that is periodically modified to reflect the latest emissions inventories, planning documents, and rules and regulations of air basins as reported by the agencies with jurisdiction over them. The USEPA has responsibility to review all state SIPs to determine if they conform to the mandates of the CAA and will achieve air quality goals when implemented. If the USEPA determines a SIP to be inadequate, it may prepare a Federal Implementation Plan (FIP) for the nonattainment area and may impose additional control measures. Failure to submit an approvable SIP or to implement the plan within mandated timeframes can result in sanctions being applied to transportation funding and stationary air pollution sources in the air basins.

Regulation of TACs, termed Hazardous Air Pollutants (HAPs) under federal regulations, is achieved through federal, State and local controls on individual sources. The 1977 amendments to the CAA required the USEPA to identify National Emission Standards for Hazardous Air Pollutants (NESHAPs) to protect public health and welfare. These substances include certain volatile organic chemicals, pesticides, herbicides, and radionuclides that present a tangible hazard, based on scientific studies of exposure to humans and other mammals. There is uncertainty in the precise degree of hazard.

Relevant to the CAA, GHGs and climate change, *Massachusetts v. Environmental Protection Agency* (549 U.S. 497) is the pivotal federal court case. In this case, twelve states and cities, including California, sued to force the USEPA to regulate GHGs as a pollutant pursuant to the CAA. This lawsuit was pursued in conjunction with several environmental organizations. The petitioners contended that the CAA gave the USEPA the necessary authority and the mandate to address GHGs in light of scientific evidence on global warming.

The USEPA was one of several respondents in the case. The USEPA contended that it did not have the authority under the CAA to regulate GHGs, and even if the USEPA did have such authority, it would decline to exercise it. Central to this case was the exact definition of an air pollutant as stipulated in the CAA. In April 2007, the United States Supreme Court ruled five to four that the plaintiffs had standing to sue, that the CAA gave the USEPA the authority to regulate GHGs, and that the USEPA's reasons for not regulating GHG were found to be inadequate. Since this ruling, the USEPA has been developing regulations for geologic carbon sequestration projects and will be issuing GHG permits for large sources.

State

The CARB manages air quality, regulates mobile emissions sources, and oversees the activities of county APCDs and regional AQMDs. CARB establishes state ambient air quality standards and vehicle emissions standards.

California has adopted ambient standards that are more stringent than the federal standards for the criteria air pollutants. These are shown in **Table 6-2**. Under the 1988 California Clean Air Act (CCAA) patterned after the CAA, areas have been designated as attainment or nonattainment with respect to the state standards. **Table 6-3** summarizes the attainment status with California standards of the Program area by air basin for the pollutants of highest concern (ozone and particulates).

Toxic Air Contaminants

The State Air Toxics Program was established in 1983 under Assembly Bill (AB) 1807 (Tanner). A total of 243 substances have been designated TACs under California law; they include the 189 (federal) hazardous air pollutants (HAPs) adopted in accordance with AB 2728. The Air Toxics "Hot Spots" Information and Assessment Act of 1987 (AB 2588) seeks to identify and evaluate risk from air toxics sources; however, AB 2588 does not regulate air toxics emissions. Toxic air contaminant emissions from individual facilities are quantified and prioritized. "High-priority" facilities are required to perform a health risk assessment and, if specific thresholds are violated, are required to communicate the results to the public in the form of notices and public meetings.

CARB developed the *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles* (CARB, 2000), which represents proposals to reduce diesel particulate emissions, with the goal of reducing emissions and associated health risks by 75 percent in 2010 and by 85 percent in 2020. The program aims to require the use of state-of-the-art catalyzed diesel particulate filters and ultra low sulfur diesel fuel on diesel-fueled engines.

CARB recently published the *Air Quality and Land Use Handbook: A Community Health Perspective* (CARB, 2005). The primary goal in developing the handbook was to provide information that will help keep California's children and other vulnerable populations out of harm's way with respect to nearby sources of TACs. The handbook highlights recent studies that have shown that public exposure to air pollution can be substantially elevated near freeways and certain other facilities. The health risk is greatly reduced with distance. For that reason, CARB provides some general recommendations aimed at keeping appropriate distances between sources of air pollution and sensitive land uses, such as residences.

Greenhouse Gases

Executive Order S-3-05

In 2005, in recognition of California's vulnerability to the effects of climate change, Governor Schwarzenegger established Executive Order S-3-05, which sets forth a series of target dates by which statewide emission of greenhouse gas would be progressively reduced, as follows:

- By 2010, reduce greenhouse gas emissions to 2000 levels;
- By 2020, reduce greenhouse gas emissions to 1990 levels; and
- By 2050, reduce greenhouse gas emissions to 80 percent below 1990 levels.

Assembly Bill 32 (AB 32)

In 2006, California passed the California Global Warming Solutions Act of 2006 (Assembly Bill No. 32; California Health and Safety Code Division 25.5, §s 38500, et seq., or AB 32), which requires the CARB to design and implement emission limits, regulations, and other measures, such that statewide greenhouse gas emissions will be reduced to 1990 levels by 2020.

In December 2007, CARB approved the 2020 emission limit of 427 million metric tons of CO_2 equivalents (CO_2e) of greenhouse gases. The 2020 target of 427 million metric tons of CO_2e requires the reduction of 169 million metric tons of CO_2e, or approximately 30 percent, from the state's projected 2020 emissions of 596 million metric tons of CO_2e (business-as-usual).

AB 32 required development of a mandatory reporting rule for major sources of GHGs. The CARB reporting rule (California Code of Regulations Title 17, Subchapter 10, Article 2, §95100 to 95133) became effective in January 2009. The rule requires reporting of GHG emissions for:

- Cement plants;
- Petroleum refineries ($\geq$ 25,000 metric tons of CO_2e in any calendar year);
- Hydrogen plants ($\geq$ 25,000 metric tons of CO_2e in any calendar year);
- Electric generating facilities and cogeneration facilities (> 1 MW capacity and > 2,500 metric tons of CO_2e in any year)
- Electricity retail providers and marketers
- Other facilities that emit >25,000 metric tons of CO_2e, for stationary combustion sources, in any calendar year.

Cement plants, oil refineries, fossil-fueled electric-generating facilities/providers, cogeneration facilities, and hydrogen plants and other stationary combustion sources that emit more than 25,000 metric tons/year CO_2e, make up 94 percent of the point source CO_2e emissions in California.

In June 2008, CARB published its *Climate Change Draft Scoping Plan* (CARB, 2008a) that was approved and adopted by the CARB Board on December 11, 2008 as the *Climate Change Scoping Plan* (CARB, 2008b). The *Climate Change Draft Scoping Plan* reported that CARB met the first milestones set by AB 32 in 2007: developing a list of early actions to begin sharply reducing GHG emissions; assembling an inventory of historic emissions; and establishing the 2020 emissions limit. Key elements of the *Climate Change Scoping Plan* include:

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standards;
- Achieving a statewide renewables energy mix of 33 percent;
- Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system;
- Establishing targets for transportation-related GHG emissions for regions throughout California, and pursuing policies and incentives to achieve those targets;
- Adopting and implementing measures pursuant to existing state laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard; and
- Creating targeted fees, including a public goods charge on water use, fees on high global warming potential gases, and a fee to fund the administrative costs of the state's long-term commitment to AB 32 implementation (CARB, 2008b).

CARB has not yet determined what amount of GHG emissions reductions it recommends from local government land use decisions; however, the *Climate Change Scoping Plan* does state that successful implementation of the plan relies on local governments' land use planning and urban growth decisions because local governments have primary authority to plan, zone, approve, and permit land development to accommodate population growth and the changing needs of their jurisdictions. CARB further acknowledges that decisions on how land is used will have large effects on the GHG emissions that will result from the transportation, housing, industry, forestry, water, agriculture, electricity, and natural gas emission sectors.

The *Climate Change Scoping Plan* also includes recommended measures that were developed to reduce GHG emissions from key sources and activities while improving public health, promoting a cleaner environment, preserving our natural resources, and ensuring that the impacts of the reductions are equitable and do not disproportionately impact low-income and minority communities. These measures, shown below in **Table 6-4** by sector, also put the state on a path to meet the long-term 2050 goal of reducing California's GHG emissions to 80 percent below 1990 levels.

The total reduction for the recommended measures is 174 million metric tons/year of CO_2e, slightly exceeding the 169 million metric tons/year of CO_2e reductions estimated to be needed in the *Climate Change Draft Scoping Plan*. The measures in the *Climate Change Scoping Plan* approved by the Board will be developed over the next two years and be in place by 2012.

TABLE 6-4
LIST OF RECOMMENDED ACTIONS BY SECTOR

Measure No.	Measure Description	GHG Reductions (Annual Million Metric Tons CO_2e)
Transportation		
T-1	Pavley I and II – Light Duty Vehicle Greenhouse Gas Standards	31.7
T-2	Low Carbon Fuel Standard (Discrete Early Action)	15
T-3[1]	Regional Transportation-Related Greenhouse Gas Targets	5
T-4	Vehicle Efficiency Measures	4.5
T-5	Ship Electrification at Ports (Discrete Early Action)	0.2
T-6	Goods Movement Efficiency Measures. • Ship Electrification at Ports • System-Wide Efficiency Improvements	3.5
T-7	Heavy-Duty Vehicle Greenhouse Gas Emission Reduction Measure – Aerodynamic Efficiency (Discrete Early Action)	0.93
T-8	Medium- and Heavy-Duty Vehicle Hybridization	0.5
T-9	High Speed Rail	1
Electricity and Natural Gas		
E-1	Energy Efficiency (32,000 GWh of Reduced Demand) • Increased Utility Energy Efficiency Programs • More Stringent Building & Appliance Standards Additional Efficiency and Conservation Programs	15.2
E-2	Increase Combined Heat and Power Use by 30,000 GWh (Net reductions include avoided transmission line loss)	6.7
E-3	Renewables Portfolio Standard (33% by 2020)	21.3
E-4	Million Solar Roofs (including California Solar Initiative, New Solar Homes Partnership and solar programs of publicly owned utilities) • Target of 3000 MW Total Installation by 2020	2.1

TABLE 6-4
LIST OF RECOMMENDED ACTIONS BY SECTOR

Measure No.	Measure Description	GHG Reductions (Annual Million Metric Tons CO_2e)
CR-1	Energy Efficiency (800 Million Therms Reduced Consumptions) • Utility Energy Efficiency Programs • Building and Appliance Standards • Additional Efficiency and Conservation Programs	4.3
CR-2	Solar Water Heating (AB 1470 goal)	0.1
Green Buildings		
GB-1	Green Buildings	26
Water		
W-1	Water Use Efficiency	1.4†
W-2	Water Recycling	0.3†
W-3	Water System Energy Efficiency	2.0†
W-4	Reuse Urban Runoff	0.2†
W-5	Increase Renewable Energy Production	0.9†
W-6	Public Goods Charge (Water)	TBD†
Industry		
I-1	Energy Efficiency and Co-Benefits Audits for Large Industrial Sources	TBD
I-2	Oil and Gas Extraction GHG Emission Reduction	0.2
I-3	GHG Leak Reduction from Oil and Gas Transmission	0.9
I-4	Refinery Flare Recovery Process Improvements	0.3
I-5	Removal of Methane Exemption from Existing Refinery Regulations	0.01
Recycling and Water Management		
RW-1	Landfill Methane Control (Discrete Early Action)	1
RW-2	Additional Reductions in Landfill Methane • Increase the Efficiency of Landfill Methane Capture	TBD†
RW-3	High Recycling/Zero Waste • Commercial Recycling • Increase Production and Markets for Compost • Anaerobic Digestion • Extended Producer Responsibility • Environmentally Preferable Purchasing	9†
Forests		
F-1	Sustainable Forest Target	5
High Global Warming Potential (GWP) Gases		
H-1	Motor Vehicle Air Conditioning Systems: Reduction of Refrigerant Emissions from Non-Professional Services (Discrete Early Action)	0.26
H-2	SF_6 Limits in Non-Utility and Non-Semiconductor Applications (Discrete Early Action)	0.3
H-3	Reduction of Perfuorocarbons in Semiconductor Manufacturing (Discrete Early Action)	0.15
H-4	Limit High GWP Use in Consumer Products Discrete Early Action (Adopted June 2008)	0.25
H-5	High GWP Reductions from Mobile Sources • Low GWP Refrigerants for New Motor Vehicle Air Conditioning Systems • Air Conditioner Refrigerant Leak Test During Vehicle Smog Check • Refrigerant Recovery from Decommissioned Refrigerated Shipping Containers • Enforcement of Federal Ban on Refrigerant Release during Servicing or Dismantling of Motor Vehicle Air Conditioning Systems	3.3
H-6	High GWP Reductions from Stationary Sources • High GWP Stationary Equipment Refrigerant Management Program: - Refrigerant Tracking/Reporting/Repair Deposit Program - Specifications for Commercial and Industrial Refrigeration Systems	10.9

TABLE 6-4
LIST OF RECOMMENDED ACTIONS BY SECTOR

Measure No.	Measure Description	GHG Reductions (Annual Million Metric Tons CO_2e)
	• Foam Recovery and Destruction Program • SF Leak Reduction and Recycling in Electrical Applications • Alternative Suppressants in Fire Protection Systems • Residential Refrigeration Early Retirement Program	
H-7	Mitigation Fee on High GWP Gases	5
Agriculture		
A-1	Methane Capture at Large Dairies	1.0†

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1. This is not the SB 375 regional target. CARB will establish regional targets for each California's 18 Metropolitan Planning Organization (MPO's) regions following the input of the regional targets advisory committee and a consultation process with MPO's and other stakeholders per SB 375

† GHG emission reduction estimates are not included in calculating the total reductions needed to meet the 2020 target

Senate Bill 97 (SB 97)

SB 97, signed August 2007 (Chapter 185, Statutes of 2007; Public Resources Code §21083.05 and 21097), acknowledges that climate change is a prominent environmental issue that requires analysis under CEQA. This bill directed the Governor's Office of Planning and Research (OPR), which is part of the state Resources Agency, to prepare, develop, and transmit to CARB guidelines for the feasible mitigation of GHG emissions (or the effects of GHG emissions), as required by CEQA, by July 1, 2009. The Resources Agency was required to certify and adopt those guidelines by January 1, 2010. On December 31, 2009, the Natural Resources Agency delivered its rulemaking package to the Office of Administrative Law for their review pursuant to the Administrative Procedure Act. The adopted guidelines became effective on March 18, 2010 (for more information on the adopted guidelines, see the *OPR Proposed Amendments to the CEQA Guidelines* discussion below).

Governor's Office of Planning and Research (OPR)

On June 19, 2008, OPR published a technical advisory on CEQA and Climate Change. The advisory provides OPR's perspective on the emerging role of CEQA in addressing climate change and greenhouse gas emissions, while recognizing that approaches and methodologies for calculating greenhouse gas emissions and addressing environmental impacts through CEQA review are rapidly evolving. The advisory recognizes that OPR will develop, and the Resources Agency will adopt amendments to the CEQA Guidelines pursuant to SB 97. In the interim, the technical advisory "offers informal guidance regarding the steps lead agencies should take to address climate change in their CEQA documents" (OPR, 2008).

The technical advisory points out that neither CEQA nor the CEQA Guidelines prescribe thresholds of significance or particular methodologies for performing an impact analysis. "This is left to lead agency judgment and discretion, based upon factual data and guidance from regulatory agencies and other sources where available and applicable" (OPR, 2008). OPR recommends that "the global nature of climate change warrants investigation of a statewide threshold of significance for GHG emissions" (OPR, 2008). Until such a standard is established, OPR advises that each lead agency should develop its own approach to performing an analysis for projects that generate greenhouse gas emissions (OPR, 2008).

Agencies should then assess whether the emissions are “cumulatively considerable” even though a project’s greenhouse gas emissions may be individually limited. OPR states: “Although climate change is ultimately a cumulative impact, not every individual project that emits GHGs must necessarily be found to contribute to a significant cumulative impact on the environment” (OPR, 2008). Individual lead agencies may undertake a project-by-project analysis, consistent with available guidance and current CEQA practice (OPR, 2008).

Finally, if the lead agency determines emissions are a cumulatively considerable contribution to a significant cumulative impact, the lead agency must investigate and implement ways to mitigate the emissions (OPR, 2008). OPR states: “Mitigation measures will vary with the type of project being contemplated, but may include alternative project designs or locations that conserve energy and water, measures that reduce vehicle miles traveled (VMT) by fossil-fueled vehicles, measures that contribute to established regional or programmatic mitigation strategies, and measures that sequester carbon to offset the emissions from the project” (OPR, 2008). OPR concludes that “A lead agency is not responsible for wholly eliminating all GHG emissions from a project; the CEQA standard is to mitigate to a level that is “less than significant” (OPR, 2008). The technical advisory includes a list of mitigation measures that can be applied on a project-by-project basis.

OPR Proposed Amendments to the CEQA Guidelines

On April 13, 2009, OPR submitted to the Secretary for Natural Resources its proposed amendments to the state CEQA Guidelines for GHG emissions, as required by Public Resources Code §21083.05 (Senate Bill 97) (OPR, 2009) to provide guidance to public agencies regarding the analysis and mitigation of the effects of GHG emissions in draft CEQA documents. The Natural Resources Agency adopted the CEQA Guidelines Amendments with minor, non-substantial changes on December 31, 2009 and transmitted the Adopted Amendments and the entire rulemaking file to the Office of Administrative Law (OAL). The adopted guidelines became effective on March 18, 2010.

The proposed amendments suggest relatively modest changes to various portions of the existing CEQA Guidelines. Modifications address those issues where analysis of GHG emissions may differ in some respects from more traditional CEQA analysis.

Proposed amendments include a new section (15064.4) to assist lead agencies in determining the significance of the GHG impacts. This section urges lead agencies to quantify, where possible, the GHG emissions of projects. In addition to quantification, this section recommends consideration of several other qualitative factors that may be used in determination of significance including:

1. the extent to which the project may increase or reduce GHG emissions as compared to the existing environmental setting;
2. whether the GHG emissions exceed a threshold of significance that the lead agency determines applies to the project; and
3. the extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions.

The proposed amendments include a new subdivision 15064.7(c) to clarify that in developing thresholds of significance, a lead agency may appropriately review thresholds developed by other public agencies, including the CARB's recommended CEQA Thresholds, or suggested by other experts, such as the California Air Pollution Control Officers Association (CAPCOA), so long as any threshold chosen is supported by substantial evidence.

The proposed amendments also include a new subdivision 15130(f) to emphasize that the effects of GHG emissions are cumulative, and should be analyzed when the incremental contribution of those emissions may be cumulatively considerable.

In addition, the proposed amendments add a new set of environmental checklist questions (VII. Greenhouse Gas Emissions) to the CEQA Guidelines Appendix G. The new set includes the following two questions:

a. Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?
b. Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of GHG?

California Air Pollution Control Officers Association (CAPCOA)

In January 2008, CAPCOA issued a “white paper” on evaluating and addressing GHGs under CEQA (CAPCOA, 2008). This resource guide was prepared to support local governments as they develop their programs and policies around climate change issues. The paper is not a guidance document. It is not intended to dictate or direct how any agency chooses to address GHG emissions. Rather, it is intended to provide a common platform of information about key elements of CEQA as they pertain to GHG, including an analysis of different approaches to setting significance thresholds.

The paper notes that for a variety of reasons local agencies may decide not to have a CEQA threshold. Local agencies may also decide to assess projects on a case-by-case basis when the projects come forward. The paper also discusses a range of GHG emission thresholds that could be used. The range of thresholds discussed includes a GHG threshold of zero and several non-zero thresholds. Non-zero thresholds include percentage reductions for new projects that would allow the state to meet its goals for GHG emissions reductions by 2020 and perhaps 2050. These would be determined by a comparison of new emissions versus business as usual emissions and the reductions required would be approximately 30 percent to achieve 2020 goals and 90 percent (effectively immediately) to achieve the more aggressive 2050 goals. These goals could be varied to apply differently to a new project, by economic sector, or by region in the state.

Other non-zero thresholds are discussed in the paper, including:

- 900 metric tons/year CO_2e (a market capture approach);
- 10,000 metric tons/year CO_2e (potential CARB mandatory reporting level with Cap and Trade);

- 25,000 metric tons/year CO_2e (the CARB mandatory reporting level for the statewide emissions inventory);
- 40,000 to 50,000 metric tons/year CO_2e (regulated emissions inventory capture – using percentages equivalent to those used in air districts for criteria air pollutants),
- Projects of statewide importance (9,000 metric tons/year CO_2e for residential, 13,000 metric tons/year CO_2e for office project, and 41,000 metric tons/year CO_2e for retail projects), and
- Unit-based thresholds and efficiency-based thresholds that were not quantified in the report.

Local

The project applies to areas within the Central Valley Water Board jurisdiction of Region 5. As shown above in **Figure 6-1** and listed in **Table 6-3**, 10 of California’s 15 air basins are fully or partially encompassed within Region 5. The CARB has delegated much of its air pollution control authority to local air pollution control districts (APCDs) and air quality management districts (AQMDs). For some air basins covering more than one county, a unified air district has been formed to manage air quality issues throughout the basin. In other multicounty air basins, individual county air districts manage air quality in only their county. Individual air districts or groups of air districts prepare air quality management plans designed to bring an air basin into compliance for nonattainment criteria pollutants. Those plans are submitted to the CARB for approval and usually contain an emissions inventory and a list of rules proposed for adoption. The project would not preempt or supersede the authority of local agencies to prohibit, restrict, or control air pollutant sources subject to those agencies’ control.

Some California counties, including Madera, Glenn, and Kings Counties, possess General Plans that include a Dairy Element, which provides guidance and policies regarding the management existing and new dairies within the counties. Such guidance includes buffer zones between dairies and sensitive receptors, and policies addressing air quality issues from dairies. However, no local ordinances have been identified that specifically relate to the operation of dairy digesters or co-digester facilities.

Although dairies are found throughout the Region 5 geographic area, most dairies are located within the eight San Joaquin Valley counties (San Joaquin, Stanislaus, Merced, Madera, Fresno, Tulare, Kings, western portion of Kern). These counties are all located within the geographic area of the SJVAPCD. Within the remaining portions of Region 5 are many additional counties and several air districts; it is expected that the other air districts will follow the lead of the SJVAPCD for air quality permits for dairy manure digester facilities.

6.2 Impacts and Mitigation Measures

Approach and Methods

Criteria Pollutants

Construction of dairy digester and co-digester facilities would produce emissions of PM10 and PM2.5 from fugitive dust primarily during earthmoving activities, as well as construction equipment and haul truck exhaust emissions of ROG, NOx, PM10, PM2.5, and CO. Implementation of standard best management practices would reduce the potential for air quality violations from construction of digester facilities. This impact is discussed and mitigation measures are identified below in Impact 6.1.

In regards to operational criteria air pollutant emissions, additional sources and emissions would include any additional diesel equipment on-site for pre-processing, increased truck traffic on the local roadway network, and the post processing of the biogas. The potential NOx emissions that could result from the combustion of the biogas on-site to produce electricity are an important issue and are analyzed below. This impact is discussed and mitigation measures are identified below in Impact 6.2.

The Urban Emissions model (URBEMIS 2007), version 9.2.4, was used to quantify direct emissions of criteria pollutants from digester construction and operations, including off-road equipment and fugitive dust emissions during construction activities and on-road vehicle pollutant emissions during operations. Cumulative criteria pollutant impacts are discussed in Impact 6.6. Additional information and model results are presented in Appendix AQ.

Odors

Due to the transport, storage, and pre-processing activities of the odiferous cow manure and other organic substrates for potential co-digestion, the siting of these digester facilities, in particular centralized facilities not located on dairies, could lead to objectionable odors at off-site receptors in the vicinity. This impact is discussed and mitigation measures are identified below in Impact 6.3.

Toxic Air Contaminants

Since accurate quantification of health risks requires detailed site specific information which is not available on a programmatic level, health risk impacts are discussed qualitatively below in Impact 6.4. This includes a description of general methodology, risk models, TAC sources, and potential mitigation measures.

Greenhouse Gases

The development of dairy digester and co-digestion facilities could result in changes in (temporary, short-term) and operation-related (long-term) emissions of GHGs. This Program EIR does discuss, for consideration by decision makers, estimated GHG emissions associated with dairy digester and co-digester facilities, as well as the potential direct and indirect reduction in GHGs from digester operations.

As discussed above, at this time there are no adopted quantitative statewide guidelines for GHG emission impacts. In the interim, local agencies must develop methods to analyze the impact of GHG in CEQA review documents. This Program would be considered to have a significant impact if it would be in conflict with the AB 32 State goals for reducing GHG emissions. It is assumed that AB 32 will be successful in reducing GHG emissions and reducing the cumulative GHG emissions statewide by 2020. It is important that the State has taken these measures, because no project individually could have a major impact (either positively or negatively) on the global concentration of GHG. Therefore, the project has been reviewed to determine whether it would conflict with the goals of AB 32.

GHG emissions associated with the dairy digester and co-digester facilities were calculated using the URBEMIS 2007 Version 9.2.4 model based on the projected equipment and traffic information contained in Chapter 3 (Program Description). In addition, methane capture and electricity generation information provided by the USEPA AgSTAR program (USEPA, 2010) was averaged for all California dairy digester and co-digester facilities and applied to the Program EIR based on the projected number of digesters that could be developed by the year 2020 in Region 5. This data was used to determine the annual metric tons of CO_2e that would be displaced through dairy digester operations. This impact is discussed below in Impact 6.5. Additional information and model results are presented in Appendix AQ.

Thresholds of Significance

CEQA defines a significant effect on the environment as a substantial, or potentially substantial, adverse change in the physical conditions of the area affected by the project. According to Appendix G of the CEQA Guidelines, a project would have a significant effect on air quality or associated with GHG if it would:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- Result in a cumulatively considerable net increase of any nonattainment pollutant (including releasing emissions that exceed quantitative thresholds for ozone precursors);
- Expose sensitive receptors to substantial pollutant concentrations;
- Create objectionable odors affecting a substantial number of people;
- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; or
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHG.

The following discussion of environmental impacts is limited to those potential impacts that could result in some level of potentially significant environmental change, as defined by CEQA. However, consistent with the CEQA Guidelines for a program-level EIR (CEQA Guidelines §15168), the Central Valley Water Board is preparing this EIR to address the environmental impacts of the

Central Valley Water Board's decision to implement a waste discharge regulatory program. Following this approach for large scale programs, as individual dairy digester and co-digester facilities are proposed, the lead agency will examine these individual projects to determine whether their construction and operational effects were fully analyzed in this Program EIR. It is possible that future review of these individual dairy digester and co-digester facilities may require an air quality study that could include further modeling (e.g., AERMOD) or analysis of these particular air quality impacts on a project-by-project basis.

Finally, as described above, it is expected that the other air districts will follow the lead of the SJVAPCD for air quality permits. Thus, the analyses below follow the methodology and threshold recommendations outlined by the SJVAPCD specifically (SJVAPCD, 2010), and implements mitigation measures more generally to account for the varied air district requirements.

Impact 6.1: Construction of dairy digester and co-digester facilities within Region 5 would generate short-term emissions of criteria air pollutants: ROG, NOx, CO, SO_2, PM10, and PM2.5 that could contribute to existing nonattainment conditions and further degrade air quality. (Significant)

Construction related emissions for dairy digesters would arise from a variety of activities, including: (1) grading, excavation, road building, and other earth moving activities; (2) travel by construction equipment and employee vehicles, especially on unpaved surfaces; (3) exhaust from construction equipment; (4) architectural coatings; and (5) asphalt paving.

Construction-related fugitive dust emissions would vary from day to day, depending on the level and type of activity, silt content of the soil, and the weather. In the absence of mitigation, construction activities may result in significant quantities of dust, and as a result, local visibility and PM10 concentrations may be adversely affected on a temporary and intermittent basis during construction. In addition, the fugitive dust generated by construction would include not only PM10, but also larger particles, which would fall out of the atmosphere within several hundred feet of the site and could result in nuisance-type impacts. For digester facilities in the SJVAPCD jurisdiction, the construction contractor must comply with SJVAPCD Regulation VIII (Fugitive PM10 Prohibition) by law, which includes measures for fugitive dust control.

Construction equipment and construction-worker commute vehicles would also generate criteria air pollutant emissions. Criteria pollutant emissions of ROG and NOx from these emissions sources would incrementally add to regional atmospheric loading of ozone precursors during the construction period. Construction emissions for an individual dairy digester (assuming construction would disturb four acres and would take a full year) were modeled using URBEMIS 2007 and are depicted below in **Table 6-5**. Phases of construction, duration, and additional assumptions are provided in Appendix AQ.

TABLE 6-5
INDIVIDUAL DIGESTER CONSTRUCTION UNMITIGATED EMISSIONS (TONS PER YEAR)

Pollutant	SJVAPCD Thresholds (tons/yr)	Unmitigated Project Construction Emissions (tons/yr)[1] Year 2011	
ROG	10	1	
NO_x	10	3	
PM10	15	Fugitive Dust	1
		Exhaust	<1
		Total	1
PM2.5	NA	Fugitive Dust	<1
		Exhaust	<1
		Total	<1
SO_2	NA	0	
CO	NA	2	

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1. Emission factors were generated by the URBEMIS 2007 model for the SJVAPCD jurisdiction. Heavy duty equipment is based on the URBEMIS defaults assuming that a total of four acres would be disturbed, with one acre disturbed daily. Additional information and model results are provided in Appendix AQ.

Bold values are in excess of applicable standard. The SJVAPCD does not have established thresholds for construction emissions. However, the SJVAPCD recommended that the following thresholds be applied (SJVAPCD, 2010): 10 tons per year for ROG and NOx, 15 tons per year for PM10. CO, SO_2 and PM2.5 do not have an established emissions threshold of significance.

As depicted in **Table 6-5** above, the construction of a single dairy digester is not anticipated to exceed the SJVAPCD thresholds of significance in most cases. However, due to the uncertainties regarding size of potential central facilities, or whether new lagoons would be developed for anaerobic digestion, dairy digester construction activities are considered potentially significant without mitigation.

Mitigation Measures

Measure 6.1a: Applicants shall prepare and submit an Air Quality Technical Report as part of the environmental assessments for the development of future dairy digester or co-digester facilities on a specific project-by-project basis. The technical report shall include an analysis of potential air quality impacts (including a screening level analysis to determine if construction and operation related criteria air pollutant emissions would exceed applicable air district thresholds, as well as any health risk associated with TACs from all dairy digester or co-digester facility sources) and reduction measures as necessary associated with digester developments through the environmental review process. Preparation of the technical report should be coordinated with the appropriate air district and shall identify compliance with all applicable New Source Review and Best Available Control Technology (BACT) requirements. The technical report shall identify all project emissions from permitted (stationary) and non-permitted (mobile and area) sources and mitigation measures (as appropriate) designed to reduce significant emissions to below the applicable air district thresholds of significance, and if these thresholds cannot be met with mitigation, then the individual digester project could require additional CEQA review or additional mitigation measures.

Measure 6.1b: Applicants shall require construction contractors and system operators to implement the following Best Management Practices (BMPs) as applicable during construction and operations:

- Facilities shall be required to comply with the rules and regulations from the applicable AQMD or APCD. For example, development of dairy digester and co-digester facilities in the SJVAPCD jurisdiction shall comply with the applicable requirements of Regulation VIII (Fugitive PM10 Prohibitions) and Rule 9510 (Indirect Source Review).
- Use equipment meeting, at a minimum, Tier II emission standards, as set forth in §2423 of Title 13 of the California Code of Regulations, and Part 89 of Title 40 Code of Federal Regulations.
- Minimize idling time either by shutting equipment off when not in use or reducing the time of idling to 5 minutes (as required by the state airborne toxics control measure [Title 13, §2485 of the California Code of Regulations]). Provide clear signage that posts this requirement for workers at the entrances to the site.
- Comply with state regulations to minimize truck idling.
- Maintain all equipment in proper working condition according to manufacturer's specifications. The equipment must be checked by a certified mechanic and determine to be running in proper condition before it is operated.
- Use electric equipment when possible.
- Payment into an AQMD or APCD operated Voluntary Emission Reduction Agreement (VERA).
- Incorporate fuel cells where feasible as an alternative to internal combustion engines, which generate NOx emissions, to generate energy from the biogas produced at dairy digester and co-digester facilities.

- Where feasible as an alternative to internal combustion engines, which generate NOx emissions, use biogas from dairy manure digester and co-digester projects as a transportation fuel (compressed biomethane) or inject biomethane into the utility gas pipeline system.

Impact Significance After Mitigation: Less than Significant

Implementation of Mitigation Measures 6.1a and 6.1b would ensure that BMPs are followed during construction activities and that construction emissions for digester development to be built under this Program EIR would be reduced to a less–than-significant level.

Impact 6.2: Pre-processing, digestion, and post-processing operational activities of dairy digester and co-digester facilities in Region 5 would result in emissions of criteria air pollutants at levels that could substantially contribute to a potential violation of applicable air quality standards or to nonattainment conditions. (Significant)

Emissions associated with dairy digester operations would depend on several factors, such as the size and type of facility (i.e., digesters on individual dairies versus centralized locations), any equipment needed for pre-processing manure/co-substrate, the increased truck traffic on the local roadway network (including haul trucks for co-digester facilities and for potential waste or biogas transport to centralized facilities), and the post processing of the biogas (e.g., flaring of excess biogas, combusting for electricity, or cleaning up biogas for use as a transportation fuel or injection to utility transmission lines). Operational sources of fugitive dust would primarily be equipment and truck movement over paved and unpaved surfaces. Sources of fugitive dust at digester facilities in the SJVAPCD jurisdiction must comply with SJVAPCD Regulation VIII (Fugitive PM10 Prohibition) by law unless specifically exempted, which includes measures for fugitive dust control. Other air districts have similar fugitive dust control regulations.

In order to quantify potential operational emissions for a single dairy digester, information was incorporated from several sources. In regards to truck and employee trips, estimates detailed in the *Microgy Pipeline Project for Cloverdale, Hollandia, and Wreden Dairies IS/MND* (SJVAPCD, 2008), which assumed that 6 trucks per day would be needed to haul co-digestion organic substrates to the three dairies (or 2 trucks per dairy digester facility), and that two employees would routinely monitor the digesters and central gas conditioning facility, were assumed for this analysis as well. For the on-site equipment, it was assumed that one loader would operate two hours per day, seven days per week to handle any material handling needs (ESA, 2010). Since NOx and SOx production from biogas combustion is the primary concern of the SJVAPCD, these emissions were back-calculated using the SJVAPCD BACT standards and an average digester energy capacity of 261 kilowatts (USEPA, 2010), which is based on the installed energy capacity category for California dairy digester and co-digester facilities that combust the biogas for electricity and co-generation. Using the above assumptions, with more information included in Appendix AQ, operational emissions for an individual digester are presented in **Table 6-6** below.

TABLE 6-6
INDIVIDUAL DIGESTER OPERATION UNMITIGATED EMISSIONS (TONS PER YEAR)

		Year 2012 Unmitigated Operation Emissions (tons/year)			
Pollutant	SJVAPCD Thresholds (tons/year)	Vehicle and Equipment Emissions[1]	Biogas Combustion Emissions[2]	Net VOCs Emitted Without Digester[3]	Total Net Emissions
ROG	10	0.1	0.7	(0.8)	0
NO_x	10	0.5	0.5	0	1.0
PM10	15	3.7	0.3	0	4.0
PM2.5	NA	0.8	0.3	0	1.1
SO_2	NA	0	0.2	0	0.2
CO	NA	0.5	8.4	0	8.9

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1. On-road vehicle and off-road equipment emissions were estimated using URBEMIS 2007. Assumes two heavy truck and two employee trips per day, with a one-way trip length of 20 miles. See Appendix AQ for more details.
2. Biogas combustion emissions are based on BACT standards provided by the SJVAPCD (Norman, 2010) and assumes that the dairy digester and co-digester facilities will comply with these standards. Also of note, BACT is typically not required for CO emissions, but is included for disclosure purposes.
3. The VOCs emitted without a dairy digester is based on the SJVAPCD proposed VOC emission factor of 1.3 lbs per head per year from lagoons and assuming that the digester would reduce emissions by 60 percent (Norman, 2010). The average head of cows that feed the digesters at existing California dairies is 1,983 cows (USEPA, 2010). This average was used to determine the proportion of VOCs that would have been emitted to the atmosphere without the digester. This value in (parentheses) was then subtracted from the emissions total.

Bold values are in excess of applicable standard. The SJVAPCD recommended that the following thresholds be applied (SJVAPCD, 2010): 10 tons per year for ROG and NOx, 15 tons per year for PM10. CO, SO_2 and PM2.5 do not have an established emissions threshold of significance.

As depicted in **Table 6-6** above, the operation of a single dairy digester is not anticipated to exceed the SJVAPCD thresholds of significance in most cases. However, due to uncertainties in the assumptions, such as biogas combustion engine size, and traffic and equipment requirements of potential central facilities, dairy digester operational activities are considered potentially significant without mitigation. Mitigation measures have been incorporated below to determine if emissions would be significant on a project specific level and control strategies to reduce these emissions.

Mitigation Measure

> **Measure 6.2:** Implement Mitigation Measures 6.1a and 6.1b.
>
> **Impact Significance After Mitigation:** Less than Significant
>
> Implementation of Mitigation Measures 6.1a and 6.1b would ensure that BMPs are followed during operations and that emissions from digester operations to be built under this Program EIR would be reduced to a less-than-significant level.

Impact 6.3: Operation of dairy digester and co-digester facilities in Region 5 could create objectionable odors affecting a substantial number of people. (Significant)

Although odors from raising livestock are exempt from direct regulation by the local air quality jurisdiction under California state law (CHSC 41705[a]), odor can still be considered a perceived nuisance and an environmental impact. Factors that affect odor impacts include the proposed dairy digester design and exposure duration. Typical manure management operations at dairies include collection, treatment, storage, and reuse of the manure. Manure management at dairies without incorporation of digester facilities typically flush or scrape manure into on-site storage ponds or stockpiles, respectively, or a combination of these techniques are used. Manure in storage ponds and stockpiles would naturally undergo anaerobic decomposition, and as a result, odorous compounds, such as ammonia and H_2S, could be released into the environment, especially when the surface layer of the manure is agitated. However, in the operation of dairy digester and co-digester facilities, the manure would be flushed, scraped, or transported into the digester, which would limit its open air degradation. Operation of dairy digester and co-digester facilities is anticipated to reduce odors currently associated with dairy waste products since anaerobic digestion occurs in a closed system. Volatile organic compounds are broken down through the anaerobic digestion process, and exhaust is generally processed in a more controlled environment.

However, the transport, storage, and pre-processing activities of the odiferous cow manure and other organic substrates for potential co-digestion could produce nuisance odors at digesters. In addition, the siting of these digester facilities (especially centralized facilities not located on dairies) could lead to objectionable odors at off-site receptors in the vicinity. Several mitigation measures shall be implemented in order to ensure the potential nuisance impact associated with odors would not affect a substantial number of people.

Mitigation Measures

> **Measure 6.3a:** Applicants for the development of digester facilities shall comply with appropriate local land use plans, policies, and regulations, including applicable setbacks and buffer areas from sensitive land uses for potentially odoriferous processes.

Measure 6.3b: Applicants shall implement an Odor Management Plan (OMP) as part of each application submitted to establish digester and co-digester facilities. The OMP will specifically address odor control associated with digester operations and will include:

- A list of potential odor sources.
- Identification and description of the most likely sources of odor.
- Identification of potential, intensity, and frequency of odor from likely sources.
- A list of odor control technologies and management practices that could be implemented to minimize odor releases. These management practices shall include the establishment of the following criteria:
  - Establish time limit for on-site retention of undigested co-substrates (i.e., organic co-substrates must be put into the digester within 48 hours of receipt).
  - Provide negative pressure buildings for indoor unloading. Treat collected foul air in a biofilter or air scrubbing system.
  - Establish contingency plans for operating downtime (e.g., equipment malfunction, power outage).
  - Manage delivery schedule to facilitate prompt handling of odorous co-substrates.
  - Modification options for land application practices if land application of digestate results in unacceptable odor levels.
  - Protocol for monitoring and recording odor events.
  - Protocol for reporting and responding to odor events.

Impact Significance After Mitigation: Less than Significant

Impact 6.4: Construction and operation of dairy digester and co-digester facilities in Region 5 could lead to increases in chronic exposure of sensitive receptors in the vicinity to certain toxic air contaminants from stationary and mobile sources. (Significant)

For construction impacts, emissions of toxics can occur from site preparation and construction activities that are required for dairy digester and co-digester facilities. Large construction projects may last many months and may result in significant levels of DPM emissions and possibly resulting in long-term significant health risks. The nearest sensitive receptors must be included in the modeling analysis to determine worst case impacts from construction activities.

The impacts from operation of a typical digestion facility can be determined by comparing the facility’s pre- and post-project emissions. For operations, air toxics emissions could include DPM from trucks that deliver manure and/or co-substrate to the facility, or from trace amounts of air toxics that may be released as fugitives in the anaerobic digester or from the potential combustion or flaring of the biogas. After reviewing Authority to Construct permits for a dairy digester facility in the Central

Valley, including a biogas fired internal combustion engine and biogas flare, the primary air toxics considered include H_2S and ammonia (SJVAPCD, 2007). Additional air toxics that could be generated by the combustion of biogas (either in an engine or flare) include benzene, formaldehyde, and other products of incomplete combustion.

H_2S corrodes engine parts in the combustion chamber and in the exhaust system. Combustion of biogas containing H_2S generates sulfur dioxide, which can react with water to produce sulfuric acid. New facilities should include control technologies that convert the H_2S to sulfur, which is then removed from the gas stream. In addition, ammonia may form in the anaerobic digestion process from nitrogen compounds contained in the manure and organic substrates for co-digestion. This already occurs under existing conditions where anaerobic digestion of manure occurs in ponds and is released to the atmosphere. It is unclear at this stage whether the use of the digesters would result in an increase, decrease, or equal amount of ammonia emissions as compared to existing standard operations. This uncertainty is primarily due to the addition of co-digestion substrates, which add nitrogen to the anaerobic digestion process. However, control of ammonia is not a primary concern for the SJVAPCD because neither California nor USEPA have established Ambient Air Quality Standards for ammonia and ammonia concentrations in the atmosphere are not expected to approach levels that would be toxic. Additionally, the SJVAPCD approach to control ammonia impacts is based on limiting NOx and SOx (i.e., via BACT standards) available to generate ammonium particulates, rather than directly limiting ammonia emissions (Gill and Sweet, 2010).

Health impacts from exposure to toxic emissions related to the digester facilities are dependent on the magnitude of concentrations that the public can be exposed to, as well as to the relative toxicities of the individual pollutants released from each type of facility. Exposure levels are determined by carrying out dispersion modeling of estimated toxics emissions from typical proposed facility sources (described above) by using a screening model, such as the EPA model SCREEN3 (EPA, 1995). The SCREEN3 model predicts possible worst-case impacts, by using hypothetical worst-case meteorology. For calculating more accurate impacts at site-specific facilities, the EPA model AERMOD can be used (American Meteorological Society, 2006). AERMOD uses meteorological data that is representative of the site, as well as multiple toxic emission source types, such as point, area, or volume to represent the emission sources.

For a screening analysis, cancer and non-cancer health risks can be calculated by applying algorithms given in the document published by California Office of Environmental Health Hazard Assessment (OEHHA) to calculate health risks (OEHHA, 2003). For more accurate site specific risks, AERMOD can be run in conjunction with the CARB model "Hot Spots Analysis Reporting Program" (HARP) to estimate cancer and non-cancer health risks that the public can be exposed to (CARB, 2009b). HARP uses the same toxicity values as are given in the OEHHA Risk Assessment Guidelines and incorporates multi-pathway uptake factors for the various toxic species to calculate risks.

The estimated cancer risks from digester facility emissions are then compared to the applicable Air District significance thresholds to determine if the impacts from the scenarios evaluated might result in significant impacts to the public. In addition, Hazard Quotients are estimated for non-carcinogens in HARP to determine if the modeled exposure levels exceed established health thresholds, called Reference Exposure Levels (RELs), to test for significance. The estimated risks for the various digester scenarios can then be used to estimate health risks, and for those scenarios with unacceptable risks, mitigation measures are applied to determine if the projects can achieve acceptable health risks to the public. Due to the unknown site specific exposure and information that is needed to quantify and evaluated health risk associated with dairy digester and co-digester facilities, this impact is considered potentially significant.

Mitigation Measures

Measure 6.4a: Implement Mitigation Measures 6.1a and 6.1b.

Measure 6.4b: Based on the Air Quality Technical Report (specified in Measure 6.1a), if the health risk is determined to be significant on a project-by-project basis with DPM as a major contributor, then the applicants shall either use new diesel engines that are designed to minimize DPM emissions (usually through the use of catalyzed particulate filters in the exhaust) or retrofit older engines with catalyzed particulate filters, which will reduce DPM emissions by 85%.

Measure 6.4c: H_2S contained in the biogas shall be scrubbed.

Impact Significance After Mitigation: Less than Significant

Implementation of Mitigation Measures 6.4a, 6.4b, and 6.4c would ensure that BMPs are followed during construction and operations and that TAC emissions from digester operations to be built under this Program EIR would be reduced to a less-than-significant level.

Cumulative Impact 6.5: Construction and operation of dairy digester and co-digester facilities in Region 5 would reduce GHG emissions. (No Impact)

“The most common GHG that results from human activity is carbon dioxide, followed by methane and nitrous oxide” (OPR, 2008). State law defines GHG to also include hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride. These latter GHG compounds are usually emitted in industrial processes, and therefore are not applicable to dairy digesters or co-digester facilities. GHG impacts are considered to be exclusively cumulative impacts; there are no non-cumulative GHG emission impacts from a climate change perspective (CAPCOA, 2008). The emission estimates presented below include annual CO_2e GHG emissions from off-road equipment, trucks, and workers during construction and operations of cumulative dairy digester and co-digester facilities in Region 5 (assuming 200 new digesters could be developed by the year 2020), as well as the amount of CO_2e reduced by the capture and combustion of methane in biogas and subsequent electricity displacement due to on-site generation. Appendix AQ contains information regarding assumptions and emissions calculations used in this analysis.

Four types of analyses are used to determine whether the project could conflict with the state goals for reducing GHG emissions. The analyses are as follows:

a. Any potential conflicts with the CARB's 39 recommended actions in the Climate Change Scoping Plan.

b. The relative size of the potential dairy digester and co-digester facilities. The operational GHG emissions will be compared to the size of major facilities that are required to report GHG emissions (25,000 metric tons/year of CO_2e)[1] to the State. In reaching its goals the CARB will focus upon the largest emitters of GHG emissions. Although this criterion is typically applied on a project-by-project basis, we have included it in this analysis as a quantitative comparison.

c. The general energy efficiency parameters of dairy digester and co-digester facilities to determine whether its design is inherently energy efficient.

d. Any potential conflicts with applicable City or County plans, policies, or regulations adopted for the purpose of reducing the emissions of GHGs.

With regard to Criterion A described above, the project does not pose any apparent conflict with the most recent list of the CARB early action strategies (see **Table 6-4**). In fact, an established goal of the project is the furthering of compliance with the GHG reduction measures contained in AB 32, specifically Measures E-3 (achieve a 33% renewables mix by 2020) and RW-3 (high recycling/zero waste). Anaerobic digestion produces biogas which is a renewable energy source (supports Measure E-3) and anaerobic digestion is one of the categories listed under measure RW-3.

Regarding Criterion B, GHG emissions during construction (assuming 20 of the 200 projected digesters would be constructed concurrently during the year) would be approximately 7,146 metric tons CO_2e. This estimate is conservative and was developed since there are no specific construction schedules available at this time (see Impact 6.6 and Appendix AQ for more information). In comparison to the major emitter criterion of 25,000 metric tons/year of CO_2e, the short-term construction emissions would equate to approximately 29 percent of this threshold and would be less than significant in regard to this criterion. In addition, some of these GHGs emitted during construction would be off-set as the digesters start operating (see discussion below). Finally, implementation of the BMPs applicable to construction activities included in Mitigation Measure 6.1b would reduce GHGs associated with dairy digester and co-digestion facility construction.

In regards to operations, as shown in **Table 6-7**, the overall impact of the operation of the assumed dairy digester and co-digestion facilities to be built in the next 10 years would be a net decrease in GHG emissions of 1,650,014 metric tons of CO_2e emissions per year. The majority of this reduction is due to methane capture through the closed system inherent in the dairy digester process, whereas conventional manure storage structures result in large quantities of methane release into the atmosphere from the anaerobic digestion of animal waste. When the captured biogas is combusted, the substantial methane portion is converted to CO_2, which is much less damaging as a GHG than methane (methane has a global warming potential approximately 23 times greater than CO_2). In addition, the analysis assumed that 180 of the assumed digester facilities would burn the biogas on-site to produce electricity (or co-generation), which would displace energy produced from oil, natural gas, or coal.

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[1] As noted above the 25,000 metric ton annual limit identifies the large stationary point sources in California that make up approximately 94 percent of the stationary emissions. If the project's total emissions are below this limit, its total emissions are equivalent in size to the smaller projects in California that as a group only make up 6 percent of all stationary emissions. It is assumed that the activities of these smaller projects generally would not conflict with State's ability to reach AB 32 overall goals.

These GHG emission benefits outweigh the increased emissions associated with on-road vehicles and off-road equipment for digester operations. Thus, dairy digester and co-digester facilities to be built under the Program would not exceed the 25,000 metric tons/year CO_2e threshold used to classify major emitters.

TABLE 6-7
OPERATIONAL GREENHOUSE GAS EMISSIONS

Sources	Greenhouse Gas Emissions (metric tons/year) CO_2e
On-road Vehicles[1]	10,715
Off-road Equipment[1]	5774
Methane Capture[2]	(1,530,752)
Indirect Electricity Displacement[3]	(135,751)
Total Net Unmitigated Emissions (metric tons/year)	**(1,650,014)**

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1. Emissions of on-road vehicles and off-road equipment were modeled using URBEMIS 2007. Operational assumptions are described in more detail in Impact 6.6 and Appendix AQ.
2. GHG emission reductions from methane capture is based on the USEPA AgSTAR average for California dairy digester and co-digester facilities (USEPA, 2010) and multiplied by the projected number of dairy digester and co-digester facilities in Region 5 under the Program by year 2020.
3. Indirect electricity was determined based on the average digester energy capacity of 261 kilowatts, which is based on the USEPA AgSTAR installed energy capacity category for California dairy digester and co-digester facilities that combust the biogas for electricity and co-generation (USEPA, 2010) and using the Statewide average lbs/mWh emission factors for CO_2, N_2O, and CH_4 (California Climate Action Registry, 2009).

With respect to GHG analysis Criterion C, biogas generated through the anaerobic digestion process is captured in the digester and can be combusted in a flare, used directly in internal combustion engines to produce electricity and heat, or the biogas can be upgraded to biomethane through the removal of hydrogen sulfide, CO_2, and moisture. Biomethane can be used in place of natural gas for various processes, including use by utility companies if the biomethane is upgraded to utility standards and pumped into a natural gas supply pipeline, as well as for electrical generation, heating, and for natural gas-fueled vehicles. Thus, development of dairy digester and co-digester facilities would result in an inherently efficient and renewable source of energy.

Finally, with regard to Criterion D, dairy digester development and operations would comply with applicable City or County plans, policies, or regulations adopted for the purpose of reducing the emissions of GHGs. As described for Criterion A, the Program would directly support several GHG reduction measures contained in AB 32 (increased renewables mix and high recycling/zero waste), which would also be beneficial in meeting any local jurisdiction reduction goals.

Based upon the analysis of Criteria A, B, C and D presented above, development of dairy digester can co-digester facilities would result in a net decrease in GHG emissions and therefore would not result in a cumulatively considerable increase in GHG emissions and would not impair the State's ability to implement AB 32. This impact would be a beneficial impact.

Mitigation: None required.

Cumulative Impact 6.6: Development of dairy digester and co-digester facilities in Region 5, together with anticipated cumulative development in the area, would contribute to regional criteria pollutants. (Significant)

CEQA requires that the EIR examine cumulative impacts. As discussed in CEQA Guidelines §15130(a)(1), a cumulative impact "consists of an impact which is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts." The analysis of cumulative impacts need not provide the level of detail required of the analysis of impacts from the project itself, but shall "reflect the severity of the impacts and their likelihood of occurrence" (CEQA Guidelines §15130(b)). A cumulative impact occurs when two or more individual effects, considered together, are considerable or would compound or increase other environmental impacts. Cumulative impacts can result from individually minor but collectively significant impacts, meaning that the project's incremental effects are considerable when viewed in connection with the effects of past, current, and probable future projects. Notably, any project that would individually have a significant air quality impact would also be considered to have a significant cumulative air quality impact.

Cumulative Construction Impacts

Construction equipment and construction-worker commute vehicles would generate criteria air pollutant emissions. Criteria pollutant emissions of ROG and NOx from these emissions sources would incrementally add to regional atmospheric loading of ozone precursors during the construction period. Construction emissions (assuming 20 of the 200 projected digesters would be constructed within a single year) were scaled based on the individual digester construction scenario (described in Impact 6.1) modeled using URBEMIS 2007 and are depicted below in **Table 6-8**. As shown below, dairy digester construction would be cumulatively significant for ROG, NOx, and PM10 without mitigation. Mitigation measures have been incorporated below to reduce these emissions. Phases of construction, duration, and additional assumptions are provided in Appendix AQ.

TABLE 6-8
DIGESTER CUMULATIVE CONSTRUCTION UNMITIGATED EMISSIONS (TONS PER YEAR)

Pollutant	SJVAPCD Thresholds (tons/yr)	Unmitigated Project Construction Emissions (tons/yr)[a] Year 2011	
ROG	10		**25**
NO_x	10		**56**
PM10	15	Fugitive Dust	**22**
		Exhaust	3
		Total	**25**
PM2.5	NA	Fugitive Dust	5
		Exhaust	3
		Total	8
SO_2	NA		<1
CO	NA		43

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a Emission factors were generated by the URBEMIS 2007 model for the SJVAPCD jurisdiction. Heavy duty equipment is based on the URBEMIS defaults assuming that 20 (of the 200 total projected) digesters could be constructed during the most intense year. Additional information and model results are provided in Appendix AQ.

Bold values are in excess of applicable standard. The SJVAPCD does not have established thresholds for construction emissions. However, the SJVAPCD recommended that the following thresholds be applied (SJVAPCD, 2010): 10 tons per year for ROG and NOx, 15 tons per year for PM10. CO, SO_2 and PM2.5 do not have an established emissions threshold of significance.

Cumulative Operational Impacts

In order to quantify potential operational emissions for the projected dairy digester and co-digester facilities that could be developed by the year 2020, information was incorporated from the same sources as described above in Impact 6.2. Of the 200 digesters under the cumulative scenario, it was assumed that 180 of the digesters would combust the biogas on-site through a generator or co-digestion and that 10 of the facilities would be centralized, 5 of which were assumed to process biogas piped from digesters at individual dairies and 5 of which would have multiple digesters to process manure that would be piped or trucked from dairies and co-digestion organic substrates that would be trucked to the central facilities. The *Microgy Pipeline Project for Cloverdale, Hollandia, and Wreden Dairies IS/MND* (SJVAPCD, 2008) assumed that 6 trucks per day would be needed to haul co-digestion organic substrates to the dairies (or 2 trucks per dairy digester facility), and that two employees would routinely monitor the central gas conditioning facility and the dairy digesters. Thus, for our analysis, we assumed that 400 trucks per day would haul anaerobic digestion substrate for the cumulative development (i.e., 2 trucks per dairy digester). In addition, it was assumed that 2 employees would be needed for each of the centralized facility operations, or 20 employees total. For the on-site equipment, it was assumed that one loader would operate at each dairy digester facility for two hours per day, seven days per week to handle any material handling needs (ESA, 2010). Finally, NOx and SOx emissions were back-calculated using the SJVAPCD BACT standards and an average digester energy capacity of 261 kilowatts. Using the above assumptions, with more information included in Appendix AQ, operational emissions for projected dairy digester and co-digester facilities are presented in **Table 6-9** below.

TABLE 6-9
CUMULATIVE DIGESTER OPERATION UNMITIGATED EMISSIONS (TONS PER YEAR)

		Year 2020 Unmitigated Operation Emissions (tons/year)			
Pollutant	**SJVAPCD Thresholds (tons/year)**	**Vehicle and Equipment Emissions[1]**	**Biogas Combustion Emissions[2]**	**Net VOCs Emitted Without Digester[3]**	**Total Net Emissions**
ROG	10	5	**122**	(**155**)	(28)[4]
NO_x	10	**42**	**91**	0	**133**
PM10	15	**179**	61	0	**240**
PM2.5	NA	39	60	0	99
SO_2	NA	<1	37	0	37
CO	NA	44	1,521	0	1,565

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1. On-road vehicle and off-road equipment emissions were estimated using URBEMIS 2007. See Appendix AQ for more details.
2. Biogas combustion emissions are based on BACT standards provided by the SJVAPCD (Norman, 2010) and assumes that the dairy digester and co-digester facilities will comply with these standards. The emissions provided in this table assume that 180 of the 200 digesters will combust the biogas for electricity or co-generation. Also of note, BACT is typically not required for CO emissions, but is included for disclosure purposes.
3. The VOCs emitted without a dairy digester is based on the SJVAPCD proposed VOC emission factor of 1.3 lbs per head per year from lagoons and assuming that the digester would reduce emissions by 60 percent (Norman, 2010). The average head of cows that feed the digesters at existing California dairies is 1,983 cows (USEPA, 2010). This average was used to determine the proportion of VOCs that would have been emitted to the atmosphere without the 200 digesters. This value in (parentheses) was then subtracted from the emissions total.
4. This value shows a reduction in VOCs from cumulative digester operations.

Bold values are in excess of applicable standard. The SJVAPCD recommended that the following thresholds be applied (SJVAPCD, 2010): 10 tons per year for ROG and NOx, 15 tons per year for PM10. CO, SO_2 and PM2.5 do not have an established emissions threshold of significance.

As depicted in **Table 6-9** above, the operation of the projected dairy digester and co-digester facilities in Region 5 would generate cumulatively significant quantities of NOx and PM10 without mitigation. Mitigation measures have been incorporated below to reduce these emissions.

Mitigation Measure

Measure 6.6: Implement Mitigation Measures 6.1a and 6.1b.

Impact Significance After Mitigation: Significant and Unavoidable

Implementation of the above mitigation measures would ensure that criteria pollutant emissions would be reduced to a less-than-significant level on a project-by-project basis. However, cumulative construction and operation of digesters that are assumed over the next 10 years would generate cumulatively considerable emissions that would remain significant and unavoidable.

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CHAPTER 7
Land Use and Agricultural Resources

7.1 Setting

Environmental Setting

Regional Overview

The Central Valley encompasses approximately 60,000 square miles, and is surrounded by the Sierra Nevada Mountain range to the east, the Coastal and Klamath Mountain ranges on the west, the Oregon border on the north, and the Tehachapi Mountains ranges on the south. The two major river systems in the Central Valley region are the Sacramento River, which drains the northern portion of the valley, and the San Joaquin River that drains the central portion of the valley. Both rivers drain into the Sacramento-San Joaquin Delta. The southern end of the Central Valley includes the Tulare Lake Basin; this area is essentially a closed basin. During periods of exceptional precipitation, surface water can flow from the Tulare Lake Basin to the San Joaquin River.

The following 37 counties fall entirely or at least partially within the jurisdiction of the Central Valley Water Board: Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, El Dorado, Fresno, Glenn, Kern, Kings, Lake, Lassen, Madera, Mariposa, Merced, Modoc, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Joaquin, San Luis Obispo, Shasta, Sierra, Siskiyou, Solano, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Ventura, Yolo and Yuba.

Land Use

The total population of the Central Valley is approximately 7 million people (SWRCB, 2004). Most of that population is concentrated along State Route 99 in areas south of Sacramento and along Interstate 5 and State Route 99 north of Sacramento (DOF, 1998).

Although agriculture is widespread throughout the region, land uses within the project area vary greatly. Rural residential areas can also be found throughout the project area. Furthermore, the project area includes major urban and suburban areas along SR 99 and Interstate 5, including the cities of Redding, Sacramento, Stockton, Modesto, and Fresno. Additionally, the Sierra Nevada foothills located along the eastern side of the project area contains numerous rural communities, forestry, and mining operations. Supporting commercial and industrial land uses are located throughout the project area.

Agriculture

The state of California is by far the most agriculturally productive state in the country, producing over 12 percent of the entire national agricultural output. California grows over half the United States' fruits, nuts, and vegetables and produces more than 400 different crops and commodities. Agricultural uses within the Central Valley region typically consist of row crops, orchards, poultry and dairy operations. According to the California Department of Food and Agriculture, milk and cream products are the highest ranked commodity in the State, generating over $7 billion dollars in 2007 (CDFA, 2008-2009). The Central Valley is California's most productive agricultural region, with six of the top seven agriculturally producing counties located in the Central Valley. The Central Valley generated over 63 percent of the state's agricultural output in 2007 (Great Valley Center, 2009). Agricultural development in the valley varies from small farms to agricultural enterprises of several thousand acres. There are approximately 1.6 million cows at 1,400 dairies in the jurisdictional boundaries of the Central Valley Region (Region 5). Dairy digester facilities would be expected to be located at dairies or near dairies and accordingly in areas of agricultural land use.

Farmland Quality

Important Farmland

The Farmland Mapping and Monitoring Program of the Department of Conservation has identified and mapped areas important for agricultural uses through the development of Important Farmland Maps (DOC, 2010). Important Farmland Maps integrate resource quality (i.e., soil) and current land use information data. Farmland is designated in one of several categories: Prime Farmland, Farmland of Statewide Importance, Unique Farmland, Farmland of Local Importance (if adopted by a county), Grazing Land, Urban and Built-up Land, Other Land, and Water. Land Committed to Nonagricultural Use is an optional designation. Designations are further defined as follows (DOC, 2010):

- ***Prime[1] Farmland:*** Farmland with the best combination of physical and chemical features able to sustain long term agricultural production. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. Land must have been used for irrigated agricultural production at some time during the four years prior to the mapping date.
- ***Farmland of Statewide Importance:*** Farmland similar to Prime Farmland but with minor shortcomings, such as greater slopes or less ability to store soil moisture. Land must have been used for irrigated agricultural production at some time during the four years prior to the mapping date.
- ***Unique Farmland:*** Farmland of lesser quality soils used for the production of the state's leading agricultural crops. This land is usually irrigated, but may include non-irrigated orchards or vineyards as found in some climatic zones in California. Land must have been cropped at some time during the four years prior to the mapping date.

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[1] The term 'Prime' as it refers to rating for agricultural use has two meanings in California. The Farmland Mapping and Monitoring Program determines the location and extent of 'Prime Farmland' as described above; while under the state's Williamson Act, land may be enrolled under the 'Prime Agricultural Land' designation if it meets certain economic or production criteria (http://www.conservation.ca.gov/dlrp/fmmp/overview/Pages/prime_farmland_fmmp.aspx)

- ***Farmland of Local Importance:*** Land of importance to the local agricultural economy as determined by each county's board of supervisors and a local advisory committee. The definition of Farmland of Local Importance varies from county to county (DOC, 2010). Specific to this project, some counties list Confined Animal Agriculture facilities are part of Farmland of Local Importance separately (DOC, 2009).
- ***Grazing Land:*** Land on which the existing vegetation is suited to the grazing of livestock. This category was developed in cooperation with the California Cattlemen's Association, University of California Cooperative Extension, and other groups interested in the extent of grazing activities. The minimum mapping unit for Grazing Land is 40 acres. Due to variations in soil quality, smaller units of Grazing Land may appear within larger irrigated pastures.
- ***Urban and Built-up Land:*** Land occupied by structures with a building density of at least 1 unit to 1.5 acres, or approximately 6 structures to a 10-acre parcel. This land is used for residential, industrial, commercial, construction, institutional, public administration, railroad and other transportation yards, cemeteries, airports, golf courses, sanitary landfills, sewage treatment, water control structures, and other developed purposes.
- ***Other Land:*** Land not included in any other mapping category. Common examples include low density rural developments; brush, timber, wetland, and riparian areas not suitable for livestock grazing; confined livestock, poultry or aquaculture facilities; strip mines, borrow pits; and water bodies smaller than forty acres. Vacant and nonagricultural land surrounded on all sides by urban development and greater than 40 acres is mapped as Other Land. The Rural Mapping Project provides more detail on the distribution of various land uses within the Other Land category in nine counties, including all eight San Joaquin Valley counties. Rural Land categories include, Confined Animal Agriculture, among others (DOC, 2006).
- ***Water:*** Perennial water bodies with an extent of at least 40 acres.
- ***Land Committed to Nonagricultural Use:*** This category was developed in cooperation with local government planning departments and county board of supervisors. Land committed to Nonagricultural Use is defined as existing farmland, grazing land, and vacant areas which have a permanent commitment for development.

Land Capability Classifications

A land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit.

Capability classes are designated by numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. Capability subclasses are soil groups within one class, designated by adding a small letter (e, w, s, or c) to the class numeral. Lastly, capability units are soil groups within a subclass. The soils in a capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity. Capability units are generally designated by adding an Arabic numeral (1 through 10) to the subclass symbol. **Table 7-1** provides descriptions of all capability classes, subclasses, and units. Large portions of the Central Valley consist of Class I and Class II soils indicating that the soil has few limitations affecting how it can be used.

TABLE 7-1
LAND CAPABILITY CLASSIFICATION DEFINITIONS

Capability Classes	
Class I	Soils have few limitations restricting their use
Class II	Soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices
Class III	Soils have severe limitations that reduce the choice of plants or that require moderate conservation practices, or both
Class IV	Soils have very severe limitations that reduce the choice of plants or that require very careful management, or both
Class V	Soils are not likely to erode but have other limitations, impractical to remove, that limit their use
Class VI	Soils have severe limitations that make them generally unsuitable for cultivation
Class VII	Soils have very severe limitations that make them unsuitable for cultivation
Class VIII	Soil and miscellaneous areas have limitations that nearly preclude their use for commercial crop production
Capability Subclasses	
e	Main hazards is the risk of erosion unless close-growing plant cover is maintained
w	Water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage)
s	The soil is limited mainly because it is shallow, droughty, or stony
c	The chief limitation is climate that is very dry
Capability Units	
0	Indicates limitations caused by stony, cobbly, or gravelly material in the substratum
1	Indicates limitations caused by slope or by an actual or potential erosion hazard
2	Indicates a limitation of wetness caused by poor drainage or flooding
3	Indicates a limitation of slow or very slow permeability in a clayey subsoil or a semiconsolidated substratum
4	Indicates a low available water capacity in sandy or gravelly soils
5	Indicates limitations caused by a fine textured or very fine textured surface layer
6	Indicates limitations caused by salts or alkali
7	Indicates limitations caused by stony, cobbly, or gravelly material in the surface layer
8	Indicates that the soil has a very low or low available water capacity because the root zone generally is less than 40 inches deep over massive bedrock
9	Indicates that limitations caused by very low or low fertility, acidity, or toxicity cannot be overcome by adding normal amounts of fertilizer, lime, or other amendments
10	Indicates that the soil has a high content of organic material, such as peat and muck

SOURCE: USDA NRCS (1998)

Regulatory Setting

Federal

Renewable Energy System and Energy Efficiency Improvements Program

Also known as the 2002 Farm Bill, this program section directs the Secretary of Agriculture to make loan guarantees and grants to farmers, ranchers, and rural small businesses to purchase renewable energy systems and make energy efficiency improvements. The Secretary of Agriculture delegated the responsibility for this program to the USDA's Rural Development Division.

AgSTAR Program

AgSTAR is an outreach program designed to reduce methane emissions from livestock waste management operations by promoting the use of biogas recovery systems. AgSTAR is a collaborative effort of EPA, US Department of Agriculture, and US Department of Energy. AgSTAR provides an array of information and tools designed to assist producers in the evaluation and implementation these systems, including:

- Conducting farm digester extension events and conferences;
- Providing "How-To" project development tools and industry listings;
- Conducting performance characterizations for digesters and conventional waste management systems;
- Operating a toll free hotline;
- Providing farm recognition for voluntary environmental initiatives;
- Collaborating with federal and State renewable energy, agricultural, and environmental programs.

State

Currently there are no statewide land use regulations pertaining to dairy digester facilities (Sousa, 2010). Dairy digesters facilities developed as a result of the project would be located in areas designated and zoned for agricultural uses and would be subject to the land use policies and regulations of the local jurisdiction in which they are located.

California Land Conservation Act of 1965 (Williamson Act)

Under the provisions of §51200, *et seq.* of the California Land Conservation Act, private landowners contract with counties and cities to voluntarily restrict lands to agricultural or compatible open space uses (DOC, 2008). Private lands enrolled in this program are assessed for property taxes based on their actual use, not their potential market value. In 1994, the Williamson Act was amended to include specific language regarding "conditional compatibility" (§51238.1), mining compatibility (§51238.2) and grandfather provisions (§51238.3). Williamson Act lands are located throughout the Central Valley's agricultural regions, generally some distance from urban centers. In 2007, approximately 16.5 million acres of land were under Williamson Act contract statewide, a majority of which was located within the Central Valley (DOC, 2008).

Farmland Mapping and Monitoring Program

The California Department of Conservation, under the Division of Land Resource Protection, administers the Farmland Mapping and Monitoring Program (FMMP). The FMMP monitors the conversion of the state's farmland to and from agricultural use. The map series identifies eight classifications and uses a minimum mapping unit size of 10 acres. The FMMP also produces a biannual report on the amount of land converted from agricultural to non-agricultural use. The

FMMP maintains an inventory of state agricultural land and updates its "Important Farmland Series Maps" every two years.

The FMMP is an informational service only and does not have regulatory jurisdiction over local land use decisions. Three categories of farmland (Prime Farmland, Farmland of Statewide Importance, and Unique Farmland) are considered valuable and any conversion of land within these categories is typically considered to be an adverse impact.

Local

Individual digester projects within the scope of this program could also potentially require approvals or permits from other jurisdictions or agencies; such as individual counties, local air quality management districts, the California Department of Fish and Game, or the U.S. Army Corps of Engineers. As noted above, the Williamson Act is administered at the county level; therefore, permitted uses on Williamson Act lands vary depending on what county the contracted land is in. The waste discharge regulatory program would not preempt or supersede the authority of local agencies to prohibit, restrict, or control land uses subject to those agencies' control.

County Land Use Regulations and Ordinances

Various cities and counties within the project area contain design and aesthetic regulations relating to agricultural and dairies. Some California counties, including Madera, Glenn, and Kings Counties, possess General Plans that include a Dairy Element, which provides guidance and policies regarding the management and setting of existing and new dairies within the counties. Such guidance includes buffer zones between dairies and sensitive receptors, and policies addressing light and glare issues from dairies. No local ordinances have been identified that specifically relate to the operation of dairy digesters or co-digesters.

7.2 Impacts and Mitigation Measures

Approach and Methods

The analysis presented below evaluates whether the project may conflict with the type and intensities of the existing and planned land uses or result in the conversion of existing agricultural resources in the project area. Potential land use conflicts or incompatibility with adjacent areas are usually the result of other environmental effects, such as the generation of noise, aesthetical impacts, or objectionable odors. Potential land use conflicts to adjacent areas and the potential for the conversion of agricultural land to non-agricultural use resulting from the effects of the project are discussed below. Noise, traffic, air quality (including odor), and public service-related effects of the project to nearby areas are discussed in detail in other relevant chapters of the draft Program EIR. As noted previously, it is anticipated that most dairy digester facilities would be located in areas zoned for agricultural uses. In determining the level of significance, the analysis assumed that the dairy digester and co-digester facilities would comply with relevant federal, State, and local laws, regulations, ordinances and guidance.

Thresholds of Significance

The impact analysis presented below evaluates the potential for the project to adversely affect existing land uses and agricultural resources. Consistent with the CEQA Guidelines, Appendix G, the project may result in significant impacts to land use or agricultural resources if it would:

- Physically divide an established community;
- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the General Plan and zoning ordinance) adopted for the purpose of avoiding or mitigating a significant environmental effect;
- Conflict with any applicable habitat conservation plan or natural community conservation plan;
- Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, as shown on the maps prepared pursuant to the FMMP of the California Resources Agency, to non-agricultural use;
- Conflict with existing zoning for agricultural use or a Williamson Act;
- Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code §12220(g), timberland (as defined by Public Resources Code §4526), or timberland zoned Timberland Production (as defined in Government Code §51104(g));
- Result in the loss of forest land or conversion of forest land to non-forest use; or
- Involve other changes in the existing environment which, due to their location or nature, could result in conversion of farmland to non-agricultural uses.

The following discussion of environmental impacts is limited to those potential impacts that could result in some level of potentially significant environmental change, as defined by CEQA. As discussed in the Initial Study, dairy digester and co-digester facilities would not be located on forest land and the project would not result in the loss of forest land or conversion of forest land to non-forest use; therefore, impacts to forest land are not further evaluated in this EIR.

Impact Analysis

Impact 7.1: The project would not physically divide an established community. (Less than Significant)

Dairy digester facilities do not present a significant threat of physically dividing an established community since they would be located on agricultural lands. It is anticipated that facilities would be fully contained within existing or new dairies or in other areas that are predominately agricultural in nature. If required, gas collection pipelines would be placed underground and would not divide communities except temporarily during construction periods. Therefore, this impact is considered less than significant.

Mitigation: None required.

Impact 7.2: The project would not result in dairy digester and co-digester facilities that could conflict with an applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect. (Less than Significant)

At the project level, dairy digester facilities would be designed to be consistent with applicable land use plans, policies, and regulations. In general, the facilities would be located on sites zoned for agriculture. Dairy digester facilities would be considered an agricultural use; they support dairies by providing additional benefits from the dairy manure. Under this scenario, dairy manure management is an integral part of the agricultural use of the land and would not result in a significant land use conflicts. The placement of co-digester and central facilities would also be subject to local land use plans and policies and would thus not conflict with them. Based on these factors, the construction of dairy digestion facilities is unlikely to conflict with existing land use policies.

Several counties have adopted ordinances that specify locations and applicable setbacks for land application of effluent and solid digestate. Furthermore, local land use plans designate areas for future growth. As that growth occurs, conflicts may develop between land applications and urbanizing areas. However, the waste discharge regulatory program would not preempt or supersede the authority of local agencies to prohibit, restrict, or control the placement of facilities or the use of effluent or solid digestate subject to those agencies' control. Also, the regulatory program would require the discharger to obtain any necessary local governmental agency permits or authorizations prior to the application of effluent or solid digestate at each application site. Because the regulatory program would not conflict with any local land use plans, policies, or ordinances, this impact is considered less than significant.

Mitigation: None required.

Impact 7.3: Implementation of the project would not conflict with an applicable habitat conservation plan or natural community conservation plan. (Less than Significant)

Major adopted plans in Region 5 include the San Joaquin Multi-species Habitat Conservation and Open Space Plan, Natomas Basin Habitat Conservation Plan (HCP), Kern Water Bank Authority HCP/Natural Communities Conservation Plan and East Contra Costa County HCP. The continuation and expansion of agricultural facilities is provided for in most HCPs. Off-dairy digesters and centralized facilities may trigger the need for compliance measures, including site-specific surveys and payment of fees under adopted plans, but are not likely to conflict with approved plans due to their limited size (site footprint) and need to be placed near active agricultural areas. This impact is therefore considered less than significant.

Mitigation: None required.

Impact 7.4: Implementation of the project could result in the permanent conversion of land designated by the Department of Conservation FMMP as Prime Farmland, Farmland of Statewide Importance or Unique Farmland. (Less than Significant)

It is unknown how much of the land on which dairy digesters would be constructed has been designated as Important Farmland. Typically, dairy digester facilities would be considered an agricultural use; they support dairies by providing additional benefits from the dairy manure. However, there is the potential for some dairy digester centralized facilities to be located off-site of existing dairies on Important Farmland. As described previously in the setting discussion, Important Farmland designated by the Department of Conservation FMMP exists throughout the region. In general, these classifications are used for lands that have been used for irrigated agricultural production at some time during the four years prior to the mapping date.

Construction of central facilities at off-dairy locations may result in the conversion of Important Farmland; however, these facilities would typically be less than 5-acres in size and would therefore result in a minor loss in farmland. Any impacts related to pipeline construction (connecting dairies or dairies to central facilities) would be temporary in nature. Construction of the pipelines would require a temporary easement and may result in the temporary disturbance of land designated as Important Farmland. Because these impacts are temporary in nature and would not result in the permanent conversion of farmland they are considered less than significant. Furthermore, project development activities would emphasize minimizing disturbance to existing agricultural operations and would permit continued agricultural operations surrounding the facilities following project completion. For the reasons listed above, impacts to Important Farmland are considered less than significant.

Although not required, to further reduce the magnitude of this less-than-significant impact, Mitigation Measure 7.4 recommends that dairy digester and co-digester facilities not be sited on Important Farmland.

Mitigation Measure

> **Measure 7.4:** Whenever feasible, off-site project related facilities should not be sited on Important Farmland as defined by the California Department of Conservation's Farmland Mapping and Monitoring Program.
>
> **Impact Significance After Mitigation:** Less than Significant

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Impact 7.5: The project would not result in conflicts with existing zoning for agricultural use or a Williamson Act contract. (Less than Significant)

It is unknown how much of the land on which dairy digesters would be constructed has been zoned for agricultural use or is under a Williamson Act contract. Dairy digester facilities would be considered an agricultural use or use compatible with agriculture and are thus generally considered to be a compatible use with dairies. However, there is the potential for development of some central facilities to occur at locations off dairies on land zoned for agricultural use or under a Williamson Act contract. As noted above, Williamson Act land is located throughout the Central Valley's agricultural regions, generally some distance from the urban centers. In 2007, approximately 16.5 million acres of land were under Williamson Act contract statewide, a majority of which was located within the Central Valley (DOC, 2008).

The Williamson Act allows county governments to define compatible land uses for contract lands within their jurisdictions, as long as those uses are consistent with the compatibility principles set forth in Government Code, §51238.1. Public agencies acquiring contracted lands for a public use must comply with Government Code §51293. Two criteria must be met when acquiring contracted lands:

- The location is not based primarily on a consideration of the lower cost of acquiring land in an agricultural preserve.
- If the land for any public improvement is agricultural land covered under a Williamson Act contract and there is no other land within or outside the preserve on which it is reasonably feasible to locate the public improvement.

As previously discussed, the Williamson Act is administered at the county level; therefore, permitted uses on Williamson Act lands vary depending on what county the contracted land is in. The waste discharge regulatory program would not preempt or supersede the authority of local agencies to prohibit, restrict, or control land uses subject to those agencies' control; therefore, this impact is considered less than significant.

Mitigation: None required.

Impact 7.6: Implementation of the project would not result in the conversion of farmland to non-agricultural uses. (Less than Significant)

As discussed above, dairy digester and co-digester facilities are considered an agricultural use or a use compatible with agriculture. Therefore, the development of digester facilities would not result in the conversion of farmland to non-agricultural uses. Although there is the potential for development of some central facilities to occur at locations off dairies on land used for agriculture, these facilities would be limited in size and scope and would be used to support existing agricultural operations. Furthermore, these off-site facilities would typically be less than 5-acres in size and would therefore not constitute a significant loss of farmland. For the reasons listed above, this impact is considered less than significant.

Mitigation: None required.

Impact 7.7: Development of dairy digester and co-digester facilities would not result in cumulative land use impacts or cumulative impacts to agricultural resources. (Less than Significant)

As noted above, dairy digester and co-digester facilities would be located on existing dairies and are considered an agricultural use or a use compatible with agriculture. Central facilities could occur at locations off dairies on land used for agriculture, however these facilities would be limited in size and scope and would be used to support existing agricultural operations. Additionally, individual off-dairy centralized facilities would typically be less than 5-acres in size and would therefore not constitute a significant loss of farmland. Furthermore, individual projects within the scope of this program may also require approvals or permits from other jurisdictions or agencies, such as counties, local air quality management districts, California Department of Fish and Game, and/or the U.S. Army Corps of Engineers. These agencies may place additional conditions upon specific dairy digester facilities and/or discharges. Because most facilities would be fully contained within dairies or placed in areas zoned for agricultural use, and because digester facilities would adhere to all applicable local, regional, statewide, and federal plans, policies, and requirements, the project would not result in adverse cumulative land use impacts or cumulative impacts to agricultural resources.

Mitigation: None required.

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CHAPTER 8
Transportation and Traffic

8.1 Setting

Environmental Setting

Regional and Local Roadways

The network of regional and local roadways in the potentially affected areas of the Central Valley Water Board jurisdictional boundaries (Region 5) consists of Interstate freeways (e.g., I-5 that runs north-south on the spine of California), State highways (e.g., State Route 99, which runs parallel to I-5), and numerous local roads that are under the jurisdiction of a particular city or county public works department (see **Figure 8-1**). Local roads provide access to adjacent parcels and also provide a connection between local land uses and major thoroughfares.

Public Transit

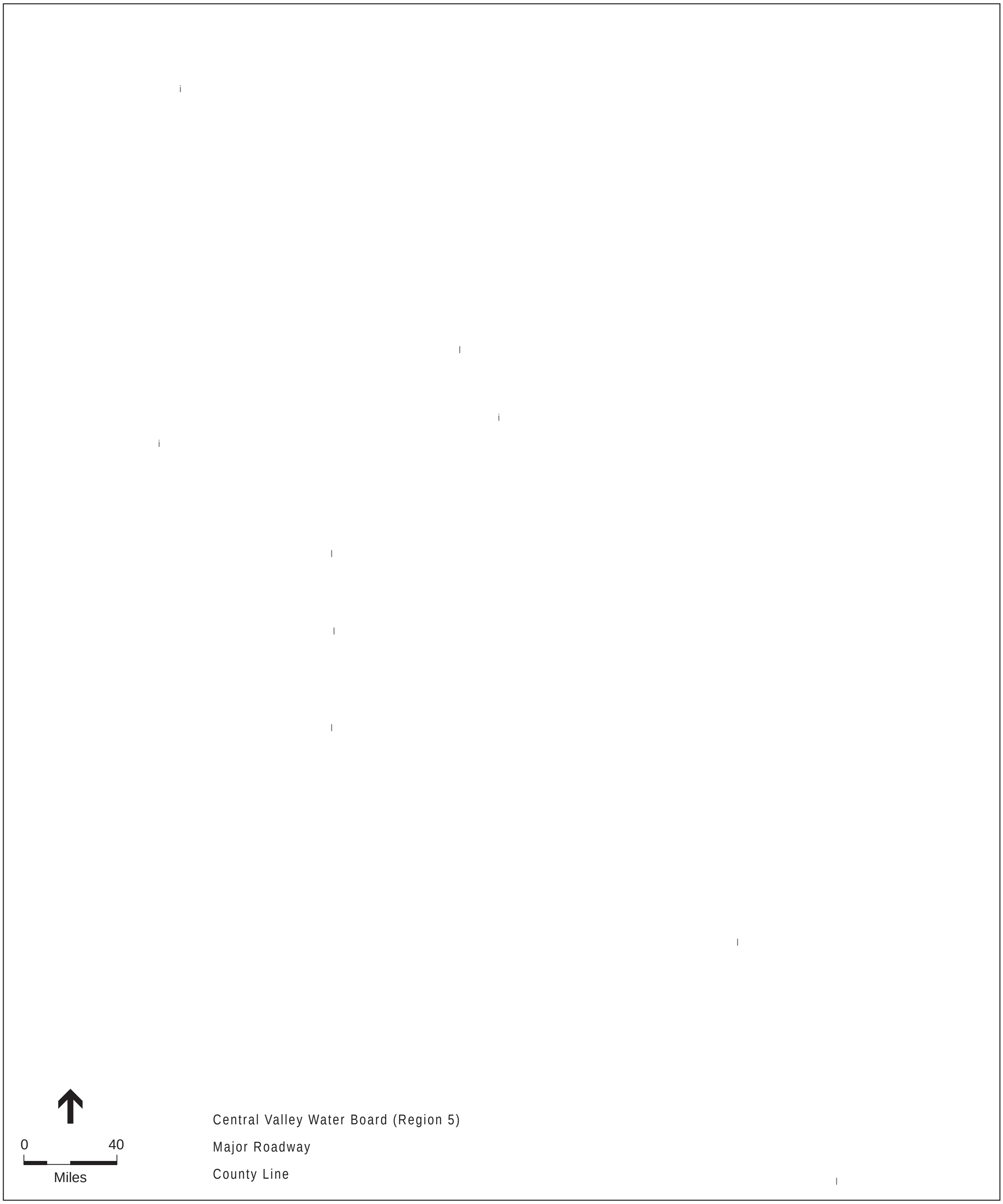
Public transit service is provided by various agencies in the study area; for example, the San Joaquin Regional Transit District, Stanislaus Regional Transit, Modesto Area Express, Madera Area Express, Fresno Area Express, and Golden Empire Transit District. Buses serve local and regional needs for public transportation with varying frequencies.

Bikeways/Pedestrian Circulation

The regional network of bicycle facilities includes a variety of Class I (bicycle paths), Class II (bicycle lanes, striped in roads), and Class III (bicycle routes without striping) bikeways within the cities and communities in the study area. Pedestrian facilities consist of sidewalks and intersection crosswalks in built-up areas.

Truck Routes

Cities often develop a truck route plan, which designates truck routes to provide contractors with the preferred travel roadways to and from connecting local roadways. For example, the cities of Stockton, Modesto, Fresno, and Bakersfield have such plans. Typically, counties do not develop a similar system of truck routes for unincorporated areas.



SOURCE: ESRI, 2010; and ESA, 2010

Central Valley Dairy Digester and Co-Digester Program EIR . 209481

Figure 8-1
Major Roadways in the Project Area

Regulatory Setting

Federal

The Federal Highway Administration (FHWA) oversees the interstate freeway system, but delegates approval authority of federal highway standards to State transportation departments, such as the California Department of Transportation (Caltrans).

State

Caltrans is responsible for planning, designing, constructing, operating, and maintaining all State highway and interstate freeway systems. As a result, any change to the State roadway system requires an encroachment permit from Caltrans. As stated above, the FHWA delegates authority to Caltrans to implement federal highway standards for interstates (e.g., I-5). Caltrans' construction practices require temporary traffic control planning "during any time the normal function of a roadway is suspended". In addition, Caltrans has the discretionary authority to issue special permits for the movement of vehicles/loads exceeding statutory limitations on the size, weight, and loading of vehicles contained in Division 15 of the California Vehicle Code. Requests for such special permits require the completion of an application for a Transportation Permit. The California Highway Patrol is notified about transportation of oversize/overweight loads. In addition to maintaining highways, and general regulations and laws dealing with licensing, traffic signage, and other noncommercial driver requirements, State laws and regulations also govern motor carriers on roadways within the State.

State highway weight and load limitations are specified in the California Vehicle Code, §35550 to 35559. The following general provisions would apply to the project:

- The gross weight imposed upon the highway by the wheels on any axle of a vehicle shall not exceed 20,000 pounds, and the gross weight upon any one wheel, or wheels, supporting one end of an axle, and resting upon the roadway, shall not exceed 10,500 pounds.
- The maximum wheel load is the lesser of the following: (a) the load limit established by the tire manufacturer, or (b) a load of 620 pounds per lateral inch of tire width, as determined by the manufacturer's rated tire width.

For vehicles with trailers or semi-trailer, the following provision applies:

- The gross weight imposed upon the highway by the wheels on any one axle of a vehicle shall not exceed 18,000 pounds, and the gross weight upon any one wheel, or wheels, supporting one end of an axle and resting upon the roadway, shall not exceed 9,500 pounds, except that the gross weight imposed upon the highway by the wheels on any front steering axle of a motor vehicle shall not exceed 12,500 pounds.

These weight and load limitations for State highways would also apply to county or city roadways if no limitations are specified by the local jurisdiction.

The California Vehicle Code also specifies requirements for the safe operation of motor vehicles, especially those motor vehicles used for the transportation of hazardous and explosive materials.

Local Regulations

County and City Land Use Regulations and Ordinances

Local regulations and ordinances vary widely in the project area. Traffic-related policies included in General Plans typically concern traffic resulting from project operation rather than project construction. However, some local jurisdictions incorporate restrictions to their General Plans that pertain to construction activities in or through their jurisdictional areas, such as assigning truck traffic routes, or requiring the development of Traffic Control Plans (TCP). TCP may be required for any project that includes lane closures, partial road closures, and road closures with detours. An encroachment permit generally is required from the responsible jurisdiction for any work to be performed in the roadway right-of-way.

8.2 Impacts and Mitigation Measures

Approach and Methods

This chapter assesses the transportation impacts that could result from the implementation of the proposed regulatory program and subsequent development of dairy manure digester and co-digester facilities in Region 5. As described in Chapter 3, Program Description, development of digesters could take place on individual dairies (i.e., the addition of dairy manure digester or co-digester facilities within the current footprint of individual dairies), or at centralized locations (whereby individual dairies would transport their manure by pipeline or truck to a central facility, or biogas from individual dairies would be piped to a central facility).

Due to the geographic scale of the project area and the range of actions that fall within the scope of development of future dairy digester and co-digester facilities, this impact analysis was conducted at a programmatic level. Assumptions regarding the types of transport and the types of roads used to haul materials were used to assess the overall significance of project impacts. In determining the level of significance, the analysis assumed that the dairy digester facilities would comply with relevant federal, State, and local law, regulations, ordinances and guidance. It is assumed that project-level analysis of transportation-related safety hazards (associated with turning movements by large trucks) would be required for site-specific digester and co-digester facilities as they are designed and constructed.

Thresholds of Significance

CEQA defines a significant effect on the environment as a substantial, or potentially substantial, adverse change in the physical conditions of the area affected by the project. An impact related to transportation would be considered significant if it would result in any of the following, which are from Appendix G of the CEQA *Guidelines*:

- Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit;

- Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways;
- Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks;
- Substantially increase hazards due to a design feature (e.g. sharp curves or dangerous intersections) or incompatible uses (e.g. farm equipment);
- Result in inadequate emergency access;
- Conflict with adopted policies, plans or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.

Additionally, the Institute of Transportation Engineers recommends the following screening criterion for assessing the effects of development projects that create permanent traffic increases (ITE, 1991):

- In lieu of other locally preferred thresholds, a traffic access/impact study should be conducted whenever a proposed development will generate 100 or more added (new) peak direction trips to or from the site during the adjacent roadway's peak hours or the development's peak hours.

The above criterion is intended to assess the effect of a traffic mix consisting primarily of automobiles and lightweight trucks. To account for the large percentage of heavy trucks associated with the project, the threshold level would reasonably be reduced to 50 new peak-direction trips. Therefore, project-related traffic is considered significant if transporting digestate or other materials to an off-site location would cause a substantial increase in traffic volumes, defined as the generation of 50 or more trips per hour. Trips using private roads within a dairy property or properties are not counted, because this type of travel activity would not affect State, county or other public roadways.

The following discussion of environmental impacts is limited to those potential impacts that could result in some level of potentially significant environmental change, as defined by CEQA. Implementation of the project would not affect air traffic patterns of airports in the project area (bullet 3 above). In addition, implementation of the project would neither directly or indirectly eliminate existing or planned alternative transportation corridors or facilities (e.g., bike paths, lanes, bus turnouts, etc.), include changes in policies or programs that support alternative transportation, nor construct facilities in locations in which future alternative transportation facilities are planned (bullet 6 above). Therefore, no impact would occur under either of these two categories, and these two categories are not discussed further within this section. It is noted, however, that the potential effect of project construction on existing bus transit service in the project area is discussed in Impact 8.1.

Impact 8.1: Construction of dairy digester and co-digester facilities would intermittently and temporarily increase traffic levels and traffic delays due to vehicle trips generated by construction workers and construction vehicles on area roadways. (Significant)

Although the project being evaluated under this Program EIR does not directly include construction of specific facilities, general information about construction is evaluated for facilities that could be developed as a result of the project. The analysis is based on the construction of project facilities as presented in Chapter 3, Program Description. The intensity and nature of the construction activity would vary over the construction period, and the number of vehicle trips generated by that activity would similarly vary. Vehicle trips would be generated primarily by construction workers commuting to and from the facility sites, and by trucks hauling materials and equipment to and from the sites (including delivery of pipe). Based on estimates of manpower per task and the experience of similar construction projects, there would be up to approximately 15 construction workers on an average day.

Construction equipment would be delivered to and removed from each project facility site in phases for site clearing, grading, excavation and foundation work; structure and building construction; interior, mechanical and electrical work; and finally, for road work, utilities and site finishing / landscaping. Earthwork (cut and fill) is expected to be balanced on-site (i.e., any excavated material cut would be used as fill on-site during the construction process), resulting in no off-hauling of cut or fill material, but that assumption will need to be confirmed during site-specific design of each facility.

Construction of pipelines, if proposed, would primarily involve open trenching, with pipelines installed (using a conventional cut-and-cover construction technique) within the existing roadway right-of-way. Jack and bore drilling may also be required for some areas of pipeline installation. The construction corridor for pipeline installation would be approximately 20 feet wide to allow for staging areas and vehicle access, though the width of the trench would be limited to about one to two feet beyond the diameter of the pipe.[1] Depending on the available road width, vehicles traveling past the construction zone could be restricted to alternate one-way traffic flow, controlled by flaggers. On average, 50 to 100 feet of pipeline could be installed per day. Trenches would be temporarily closed at the end of each work day, by covering with steel trench plates and installing barricades to restrict access to staging areas.

The primary off-site impacts resulting from the movement of construction trucks would include a short-term and intermittent lessening of roadway capacities due to the slower movements and larger turning radii of the trucks compared to passenger vehicles. Drivers could experience delays if they were traveling behind a heavy truck. The added traffic would be mostly apparent on the minor roadways serving the facility sites. Although project-related traffic is unlikely to exceed the threshold of significance of 50 or more trips per hour, project-level analysis of site-specific digester and co-digester facilities could determine that addition of project-generated traffic would be considered substantial in relation to traffic flow conditions on local roadways. For this program level analysis, this impact is considered potentially significant.

Mitigation Measure

> **Measure 8.1:** The contractor(s) will obtain any necessary road encroachment permits prior to installation of pipelines within the existing roadway right-of-way. As part of the road

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[1] The rule-of-thumb for trench width is multiply the pipe diameter by 1.25, and then add one foot.

encroachment permit process, the contractor(s) will submit a traffic safety / traffic management plan (for work in the public right-of-way) to the agencies having jurisdiction over the affected roads. Elements of the plan will likely include, but are not necessarily limited to, the following:

- Develop circulation and detour plans to minimize impacts to local street circulation. Use haul routes minimizing truck traffic on local roadways to the extent possible. Use flaggers and/or signage to guide vehicles through and/or around the construction zone.
- To the extent feasible, and as needed to avoid adverse impacts on traffic flow, schedule truck trips outside of peak morning and evening commute hours.
- Limit lane closures during peak traffic hours to the extent possible. Restore roads and streets to normal operation by covering trenches with steel plates outside of allowed working hours or when work is not in progress.
- Limit, where possible, the pipeline construction work zone to a width that, at a minimum, maintains alternate one-way traffic flow past the construction zone.
- Install traffic control devices as specified in Caltrans' Manual of Traffic Controls for Construction and Maintenance Work Zones where needed to maintain safe driving conditions. Use flaggers and/or signage to safely direct traffic through construction work zones.
- Coordinate with facility owners or administrators of sensitive land uses such as police and fire stations, hospitals, and schools. Provide advance notification to the facility owner or operator of the timing, location, and duration of construction activities.
- To the maximum extent feasible, maintain access to private driveways located within construction zones.
- Coordinate with the local public transit providers so that bus routes or bus stops in work zones can be temporarily relocated as the service provider deems necessary.

Impact Significance After Mitigation: Less than Significant

Implementation of Mitigation Measure 8.1 would lessen the impacts to traffic flow and congestion on area roadways to a less than significant level by avoiding as needed truck trips during peak commute hours, minimizing use of local roads by haul trucks, and coordinating with emergency service providers, schools, and transit providers.

Impact 8.2: Operations of dairy digester and co-digester facilities would increase traffic volumes on roadways serving the facility sites. (Less than Significant)

The dairy digesters and co-digester facilities would operate 24 hours a day, but most of the digestion process would be automated, and most traffic activities limited to daytime hours. The number of site visitors and employees at dairies is not anticipated to change substantially as a result of additional digester facilities. For dairy digester and co-digester projects at individual dairies, there would be increased truck trips associated with the delivery of feedstocks (in the case of co-digestion) and potentially the shipment of solid digestate. In the case of centralized facilities, there would be new employee trips, and there could be increased truck trips associated with the delivery of manure and co-digestion feedstocks and shipping of end products such as digestate and potentially biogas products.

In regards to truck and employee trips under facility operations, estimates detailed in the *Microgy Pipeline Project for Cloverdale, Hollandia, and Wreden Dairies* IS/MND (SJVAPCD, March 2008), which discussed anaerobic digester development on three dairies in order to centrally collect the biogas and pipe it into the gas network of the Southern California Gas Company, are incorporated by reference as applicable to this Program EIR analysis. Specifically, the Microgy project assumed that six trucks per day would be needed to haul co-digestion organic substrates to the dairies (or two trucks per dairy digester facility), and that two employees would routinely monitor the central gas conditioning facility and the dairy digesters. The number of daily truck trips would be twice the number of trucks per day (i.e., each truck would generate one trip to the facility site and one trip away from the site). Thus, it is assumed that up to 16 daily one-way vehicle trips (trucks and employee vehicles) would be generated on the roadway(s) that would access each facility. The project-related traffic would not exceed the threshold of significance of 50 or more trips per hour (and the vehicle trips would occur over the course of a day), and this impact would be less than significant.

Mitigation: None required.

Impact 8.3: Construction and operation of dairy digester and co-digester facilities could potentially cause traffic safety hazards for vehicles, bicyclists, and pedestrians on public roadways, and could increase traffic hazards due to possible road wear or to accident spills of manure, or co-digestion feedstocks or digestate. (Significant)

Neither project construction nor project operations would alter the physical configuration of the existing roadway network serving the area, and would not introduce unsafe design features, but trucks generated by the project would interact with other vehicles on project area roadways. Creation of a construction work zone on high-volume roadways would potentially create traffic safety hazards where traffic is routed into the travel lane adjacent to the work zone. Potential conflicts could also occur between construction traffic and bicyclists and pedestrians. For this program level analysis, this impact is considered potentially significant.

In addition, construction activity along roads as well as heavy truck traffic delivering equipment and materials to facilities sites could result in road wear and damage that result in a driving safety hazard. The degree to which this impact would occur depends on the existing roadway design (pavement type and thickness) and existing condition of the road. Freeways, major arterials and collectors are designed to accommodate a mix of vehicle types, including heavy trucks. The project's impacts are expected to be negligible on those roads. However, rural roadways may not have been constructed to support the weight and use of large construction equipment. For this program level analysis, this impact is considered potentially significant.

The accidental spill of digestate along project-related access roads could create potential safety hazards for other motorists. However, a Spill Prevention Plan must be submitted with the NOI, and each truck driver is required to know how to carry out the emergency measures described in the Spill Prevention Plan (therefore reducing roadway hazards if an accidental spill were to occur). Because of the low probability of accidental spills during the transport of digestate, this impact is considered less than significant.

Mitigation Measures

Measure 8.3a: Implement Measure 8.1, which stipulates actions required of the contractor(s) to reduce potential traffic safety impacts to a less-than-significant level.

Measure 8.3b: Prior to construction, the contractor(s), in cooperation with the agencies having jurisdiction over the affected roadways, will survey and describe the pre-construction roadway conditions on rural roadways and residential streets. Within 30 days after construction is completed, the affected agencies will survey these same roadways and residential streets in order to identify any damage that has occurred. Roads damaged by construction will be repaired to a structural condition equal to the condition that existed prior to construction activity.

Impact Significance After Mitigation: Less than Significant

Implementation of Mitigation Measures 8.1 and 8.3b would lessen the impacts to traffic safety on area roadways to a less than significant level by using traffic control devices to safely direct vehicular movements through the construction area, and by repairing damage to roadway pavement caused by project-generated heavy trucks, as well as by avoiding as needed truck trips during peak commute hours, minimizing use of local roads by haul trucks, and coordinating with emergency service providers, schools, and transit providers.

Impact 8.4: Construction of dairy digester and co-digester facilities could intermittently and temporarily impede access to local streets or adjacent uses (including access for emergency vehicles), as well as disruption to bicycle/pedestrian access and circulation. (Significant)

Operations of dairy digester and co-digestion facilities would have no effect on access to local streets or adjacent uses (including access for emergency vehicles). Nor would bicycle/pedestrian access and circulation be adversely affected by facility operations. The project could, however, result in construction of new pipelines within right-of-way of the public roadways. Such construction activity could result in road restrictions that affect the vehicle travel lanes in order to provide adequate construction work area, and could temporarily block vehicle, bicycle and pedestrian access to local streets or property driveways, including access for emergency vehicles. For this program level analysis, this impact is considered potentially significant.

Mitigation Measures

Measure 8.4: Implement Measure 8.1, which stipulates actions required of the contractor(s) to reduce potential access impacts to a less-than-significant level.

Impact Significance After Mitigation: Less than Significant

Implementation of Mitigation Measure 8.1 would lessen the impacts to access to local streets or adjacent uses to a less than significant level by coordinating with emergency service providers, including advance notification of the timing, location, and duration of construction activities.

Impact 8.5: Construction and operation of dairy digester and co-digester facilities could contribute to cumulative impacts to traffic and transportation (traffic congestion, traffic safety, and emergency vehicle access). (Significant)

The geographic scope of potential cumulative traffic impacts includes access routes to regional and local roadways used for haul routes and construction equipment/vehicle access throughout the project area. As described under Impact 8.2, operating the facilities associated with the project would generate less-than-substantial increases in traffic volumes on area roadways. Cumulatively (using the same trip generation assumptions applied under Impact 8.2), it is assumed that a total of about 800 one-way truck trips would be generated per day for the up to 200 dairy digester facilities, and a total of 400 employees would be needed for the dairy digester facilities. Given the dispersion of those additional vehicle trips over the Region 5 area, and the fact that the trips would occur over the course of a day, the project-related traffic on any one roadway during any hour of the day would not exceed the threshold of significance of 50 or more trips per hour, and the contribution to cumulative traffic conditions would be less than significant.

However, constructing those facilities, also described above, could result in intermittent and temporary traffic-related impacts in the cumulative context. Traffic impacts include temporary increases in traffic congestion, increased potential for traffic safety hazards, and temporary and intermittent impedances to access.

The project has the potential to contribute to potentially significant cumulative construction-related impacts as a result of (1) cumulative projects (such as land development projects) that generate increased traffic at the same time on the same roads as would the proposed project, causing increased congestion and delays; and (2) infrastructure projects in roads that would be used by project construction workers and trucks, which could affect detour routes around project work zones or could delay project-generated vehicles past the work zones of those other projects.

Implementation of circulation and detour plans, installing traffic control devices, and scheduling (to the extent feasible) truck trips outside of peak morning and evening commute hours (as identified in Mitigation Measures 8-1 and 8-3b) would reduce the project’s contribution to the cumulative impacts. However, some traffic disruption and increased delays would still occur during project construction, even with mitigation. Given the lack of certainty about the timing (and identification) of development of dairy digester and co-digester facilities, as well as that for other projects (specifically what projects would overlap), it is prudent to conclude for this program-level analysis that significant cumulative traffic and circulation impacts could occur.

Mitigation Measures

Measure 8.5a: Prior to construction, the project sponsor will coordinate with the appropriate local government departments, Caltrans, and utility districts and agencies regarding the timing of construction projects that would occur near project sites. Specific measures to mitigate potential significant impacts will be determined as part of the interagency coordination, and could include measures such as employing flaggers during key construction periods, designating alternate haul routes, and providing more outreach and community noticing.

Measure 8.5b: Implement Mitigation Measures 8.1 and 8.3b.

Impact Significance After Mitigation: Less than Significant.

Implementation of Mitigation Measure 8.5 would lessen the cumulative impacts to a less than significant level by coordinating mitigating strategies among the concurrent projects.

8.3 References

Institute of Transportation Engineers (ITE), 1991. *Traffic Access and Impact Studies for Site Development – A Recommended Practice*.

San Joaquin Valley Unified Air Pollution Control District, 2008. *Microgy Pipeline Project for Cloverdale, Hollandia and Wreden Dairies Initial Study and Mitigated Negative Declaration*, March 5, 2008.

CHAPTER 9
Biological Resources

9.1 Setting

Environmental Setting

A great diversity of vegetation and wildlife resources exist in the project area, the jurisdictional boundaries of the Central Valley Region (Region 5), across a broad range of physiographic regions. While most of this region lies within the Great Central Valley, the project area also includes portions of foothills and mountains of the Cascade, Sierra Nevada, and Klamath Ranges. The area can be further subdivided into many habitats, defined by the plant communities present and their associated wildlife species. Habitat types within the project area include annual grassland, chaparral, riparian, oak woodland, and hardwood forests, and more human-influenced habitats such as agricultural land, pastureland, and urban areas.

The varied habitat types within the project area are conducive to a variety of plant and animal species, many of which are endemic to the state. As a consequence of habitat conversion to agriculture and urban development as well as other factors, many of these species have become rare, threatened, or endangered. For example, in the project area, 69 plant species have been State or federally listed as endangered or threatened under the California Endangered Species Act of 1984 and/or the Federal Endangered Species Act of 1973; or State listed as rare under the Native Plant Protection Act of 1977 (CDFG, 2010a). Additionally, 60 species of animals have been State or federally listed as threatened or endangered in the project area (CDFG, 2010b). Many others are considered special-status species by local, State, and federal agencies.

This analysis focuses on the habitat types and resources that could be affected by the project. While the project area supports a wide variety of plant and animal species, the majority of the habitats that could be affected by the project have been altered in the past to support agricultural activities and urban development. Most of the areas where dairy digester and co-digester facilities would be constructed, and where discharges would occur are in active agricultural production; however, some relatively undisturbed terrestrial habitats could potentially also be affected, such as annual grasslands, seasonal wetlands, and vernal pools, although project planning and siting should be used to select locations where impacts to biological resources would be avoided. In addition, riparian areas and aquatic habitats (primarily agricultural ditches, streams, and freshwater marsh) could be indirectly affected by proposed discharges to agricultural lands. Each of these habitat types is discussed in greater detail below, and summarized in Table 9-1.

TABLE 9-1
POTENTIALLY AFFECTED HABITATS

Habitats/ Description	Common Wildlife Species	Special-status Species
Agricultural		
Cropland and pasture, includes row crops, hay and grain crops, and irrigated pasture	red-winged black bird, Brewer's blackbird, mourning dove, American crow, scrub jay, northern flicker, American robin, killdeer, white-faced ibis, red-tailed hawk, northern harrier, California vole, Botta's pocket gopher, California ground squirrel, deer mouse, black-tailed hare, raccoon, and coyote.	white-tailed kite, Swainson's hawk, San Joaquin kit fox, kangaroo rats.
Annual Grassland		
Open stand of grasses primarily on flat plains to gently rolling foothills, ridges, and south-facing slopes.	Western toad, gopher snake, northern harrier, killdeer, western kingbird, loggerhead shrike, savannah sparrow, pocket gopher, American badger, and coyote	California tiger salamander (upland habitat), Swainson's hawk, San Joaquin kit fox, kangaroo rats.
Seasonal Wetlands		
Areas that pond or remain flooded for a portion of the year.	valley garter snake, Sierran treefrog, black phoebe, house sparrow, red-winged blackbird, killdeer, and northern mockingbird	Orcutt grasses, vernal pool fairy shrimp, vernal pool tadpole shrimp, California tiger salamander
Vernal Pools		
Shallow depressional features that store water seasonally and support unique plant and wildlife species.	Same species found in seasonal wetlands	Orcutt grasses, vernal pool fairy shrimp, vernal pool tadpole shrimp, California tiger salamander
Freshwater Marsh		
Areas with extended periods of inundation, that support erect, rooted herbaceous plants that are hydrophytic and can withstand the anaerobic soil conditions.	herons and egrets, muskrats, raccoon, red-winged blackbirds, and a wide variety of waterfowl	giant garter snake, northern harrier, tricolor blackbird, Sanford's arrowhead, and rose mallow.
Irrigation Ditches		
Incised channels used to convey irrigation water to and from agricultural lands.	Same species found in agricultural and freshwater marsh habitats	giant garter snake
Intermittent/Perennial Streams		
Natural drainage features in the project area; most have been modified for flood control and/or irrigation purposes.	freshwater clams, crayfish, catfish, trout, striped bass, largemouth bass, sunfish, and crappie.	steelhead, salmon

SOURCE: ESA, 2010

Agricultural

Agricultural activities include soil cultivation for crop production and raising livestock. Agricultural activities usually take place on flat to gently rolling terrain, primarily in the Central Valley and the Modoc Plateau. Habitat types on agricultural lands where dairy digester and co-digester facilities could be constructed and where land discharges could occur include cropland and pasture, and other disturbed portions of dairies.

Croplands typically comprise row crops, hay, or grains planted in monocultures. Natural vegetation and weeds are generally eliminated by flood irrigation, tillage, and herbicide application, however integrated pest management (IPM) practices also include planting hedgerows of native vegetation to attract beneficial insects to control pest outbreaks. Pasture consists of perennial grasses and legumes planted for livestock forage, although the vegetation also could include native grasses and forbs and weedy non-natives. Pastures are managed to improve forage quality using irrigation, fertilizer application, and weed control. Habitats that are commonly found adjacent to agricultural lands include irrigation ditches, annual grasslands, seasonal wetlands, riparian woodlands, and freshwater marsh.

Although natural communities provide the highest value for wildlife, many of these natural habitats have been replaced by agricultural habitats throughout California with varying benefits to wildlife. The intensive management of agricultural lands, including disking, grazing, crop rotation, and the use of chemicals, further reduces the value of agricultural lands for wildlife. In spite of intensive management, however, some wildlife species have adapted to particular crop types and now use them for foraging and nesting/reproduction.

Compared to other agricultural crops, rice and grain are considered high-value crops for wildlife because many species forage on waste grain, and flooded rice fields provide habitat similar to freshwater marsh. Pasture also provides abundant forage and cover. Compared to rice and grains, row crops provide moderate-quality habitat because they provide only limited cover and foraging opportunities. Cotton crops provide low-quality wildlife habitat because they are frequently disturbed and require many applications of herbicides, resulting in limited foraging and nesting opportunities and lack of cover.

Common wildlife that could use agricultural areas include: red-winged black bird (*Agelaius phoeniceus*), Brewer’s blackbird (*Euphagus cyanocephalus*), mourning dove (*Zenaida macroura*), American crow (*Corvus brachyrhynchos*), scrub jay (*Aphelocoma californica*), northern flicker (*Colaptes auratu*s), American robin (*Turdus migratorius*), killdeer (*Charadrius vociferous*), white-faced ibis (*Plegadis chihi*), red-tailed hawk (*Buteo jamaicensis*), northern harrier (*Circus cyaneus*), California vole (*Microtus californicus*), Botta’s pocket gopher (*Thomomys bottae*), California ground squirrel (*Spermophilus beecheyi*), deer mouse (*Peromyscus maniculatus*), black-tailed hare (*Lepus californicus*), raccoon (*Procyon lotor*), and coyote (*Canis latrans*). Special-status species associated with agricultural lands include Swainson’s hawk (*Buteo swainsoni*), white-tailed kite (*Elanus leucurus*), burrowing owl (*Athene cunicularia*) and San Joaquin kit fox (*Vulpes macrotis*).

Annual Grassland

Although native perennial grasslands once occupied vast expanses of the project area, these have largely been replaced by non-native annual grassland communities. Annual grasslands are dominated by non-native annual species, including ripgut (*Bromus diandrus*), soft chess (*Bromus hordeaceus*), wild oat (*Avena fatua*), Italian ryegrass (*Lolium multiflorum*), and medusahead (*Taeniatherum caput-medusae*). In addition, a wide variety of native and invasive non-native broad-leaved plants (forbs) occur within the annual grassland community including yellow-star thistle (*Centaurea solstitialis*), coyote bush (*Baccharis pilularis*), black mustard (*Brassica nigra*), bull thistle (*Cirsium vulgare*) and toad rush (*Juncus bufonius*).

Wildlife species occurring in annual grasslands include: California tiger salamander (*Ambystoma californiense*) Pacific gopher snake (*Pituophis catenifer catenifer*), California kingsnake (*Lampropeltis* *getula californiae*), valley garter snake (*Thamnophis sirtalis fitchii*), western fence lizard (*Sceloporus occidentalis*), southern alligator lizard (*Elgaria multicarinata*), Gilbert's skink (*Eumeces gilberti*), American crow, red-winged blackbird, Brewer's black bird, western meadowlark (*Sturnella neglecta*), barn swallow (*Hirundo rustica*), red-tailed hawk, red-shouldered hawk (*Buteo lineatus*), American kestrel (*Falco sparverius*), barn owl (*Tyto alba*), burrowing owl, deer mice, California vole, blacktail hare, California ground squirrel, coyote, gray fox (*Urocyon cinereoargenteus*), raccoon, striped skunk (*Mephitis mephitis*), and opossum (*Didelphis virginiana*).

Seasonal Wetlands

Seasonal wetlands are ephemeral wetlands that pond or remain flooded for extended periods during a portion of the year, often the wet season, then could dry in spring or early summer. Vegetation found in seasonal wetlands include grasses such as Italian ryegrass (*Lolium multiflorum*), foxtail barley (*Hordeum marinum* ssp. *gussoneanum*), annual air grass (*Deschampsia danthoniodes*), spike rush (*Eleocharis macrostachya*), Pacific foxtail (*Alopecurus saccatus*), and Bermuda grass (*Cynadon dactylon*). Seasonal wetlands could support a diversity of birds, invertebrates, amphibians, and few reptiles which could use the wetland for foraging, cover, and/or breeding. Common wildlife species that could use the seasonal wetlands in the project area include valley garter snake, Sierran treefrog, (*Pseudacris sierra*), black phoebe (*Sayornis nigricans*), house sparrow (*Passer domesticus*), red-winged blackbird, killdeer, and northern mockingbird (*Mimus polyglottos*).

Vernal Pools

Vernal pools are a sub-set of seasonal wetlands that support specialized plants and animals. This community is dominated by native annual species occurring in shallow depressions in open grasslands where water collects and remains on the surface for extended periods during the rainy season. As these depressions dry in the spring, the plants grow and bloom often forming concentric rings of brightly colored flowers. Common species includes coyote thistle (*Eryngium vaseyi*), Fremont's goldfields (*Lasthenia fremontii*), white-head pincushion (*Navarretia leucocephala*), Douglas mesamint (*Pogogyne douglasii*), doublehorn calicoflower (*Downingia bicornuta*), cow's clover (*Trifolium depauperatum*), loosestrife hedge-hyssop (*Lythrum hyssopifolia*), toad rush, ranunculus (*Ranunculus bonariensis*) and hedge hyssop (*Gratiola ebracteata*). Special-status species found in seasonal wetlands and vernal pools include dwarf downingia (*Downingia pusilla*), legenere (*Legenere limosa*), Colusa grass (*Neostapfia colusana*), vernal pool fairy shrimp (*Branchinecta lynchi*), vernal pool tadpole shrimp (*Lepidurus packardi*), and California tiger salamander.

Freshwater Marsh

Freshwater marsh habitat is typically associated with the margins of rivers, streams or ponds, but can form anywhere shallow, slow moving perennial water is present. This habitat is characterized by erect, rooted herbaceous plants that are hydrophytic and can withstand the anaerobic soil conditions created by extended periods of inundation. Vegetation cover is typically continuous and dense. Plant species common to freshwater marsh habitat include cattails (*Typha latifolia*), tule (*Scirpus californicus*), sedges and umbrella sedges, rushes, water primrose (*Ludwigia peploides*), water smartweed (*Polygonum amphibium*), parrot feather (*Myriophyllum aquaticum*), pennyroyal (*Mentha* *pulegium*), verbena (*Verbena litoralis*), common yellow monkey flower (*Mimulus guttatus*), and smooth cocklebur (*Xanthium strumarium*). Freshwater marshes provide important breeding and foraging habitat for a wide variety of local wildlife such as herons and egrets, muskrats (*Ondatra zibethicus*), raccoon, red-winged blackbirds, and a wide variety of waterfowl. Special-status species that use freshwater marsh habitats in the project area include giant garter snake (*Thamnophis gigas*), northern harrier (*Circus cyaneus*), tricolor blackbird (*Agelaius tricolor*), Sanford's arrowhead (*Sagittaria sanfordii*), and rose mallow (*Hibiscus lasiocarpus*).

Irrigation Ditches

Irrigation ditches are used to convey water to and from agricultural land for irrigation and discharge of agricultural runoff. Depending on their location and use, these features could be largely maintained to be devoid of vegetation, or if not maintained, they could support freshwater marsh habitat. They would support plant and wildlife species, similar to those in both agricultural habitats and freshwater marsh habitat.

Intermittent/Perennial Streams

Perennial streams in the project area are included in the Sacramento-San Joaquin River drainage, which ultimately empties into San Francisco Bay. This large drainage is isolated by mountains on all sides and supports a variety of aquatic habitat types; consequently, it contains several endemic fish species. Streamflow depends primarily on snowmelt but is moderated by major dams on all large rivers except the Cosumnes River. Flows are greatest in winter and spring and least in summer and fall. Special-status fish species inhabiting streams in the project area include steelhead and salmon.

The project area also supports intermittent streams, which have flowing water during certain times of the year, when groundwater provides water for stream flow. Runoff from rainfall may be a supplementation source of waters for stream flow. During dry periods, intermittent streams may not have flowing water.

Special-Status Species

For the purposes of this EIR, special-status species include:

- Plants or animals listed or proposed for listing as threatened or endangered under the federal ESA (50 Code of Federal regulations [CFR] 17.12 [listed plants], 17.11 [listed animals] and various notices in the Federal Register [FR] [proposed species]).
- Plants or animals that are candidates for possible future listing as threatened or endangered under the federal ESA (61 FR 40, February 28, 1996);
- Plants or animals listed or proposed for listing by the State of California as threatened or endangered under the California ESA (14 California Code of Regulations [CCR] 670.5);
- Plants listed as rare or endangered under the California Native Plant Protection Act (California Fish and Game Code, §1900 et seq.);

- Plants that meet the definitions of rare and endangered under CEQA (State CEQA Guidelines, §15380);
- Plants considered under the California Native Plant Society (CNPS) to be “rare, threatened or endangered in California” (Lists 1A, 1B, and 2 in CNPS 2010);
- Plants listed by CNPS as plants about which more information is needed to determine their status and plants of limited distribution (Lists 3 and 4 in CNPS 2010), which may be included as special-status species on the basis of local significance or recent biological information; and
- Animals fully protected in California (California Fish and Game Code, §3511 [birds], §4700 [mammals], and §5050 [reptiles and amphibians]).

The California Natural Diversity Database (CNDDB) was queried to determine which special-status species have been recorded within the project area (CDFG, 2010c). While several hundred special-status species have been documented in the project area, many of these species occur in habitats that would not be affected by the project. Those special-status species that could be affected by the project are included in **Appendix-BIO**.

Plants

Special-status plants would not be expected to occur in croplands because they are typically eliminated by cultivation. They are also unlikely to occur in pastures because of habitat modification and intense grazing, although some plants could be present in pasture habitat where there is limited habitat alteration or less-intense grazing. Because pasture is not a habitat category used in the California Native Plant Society (CNPS) inventory or the CNDDB, no specific information on the occurrence of special-status plant species in pastures was found. The habitat most similar to pasture is grassland and many special-status plants have been reported to occur in grassland habitats (Great Basin grassland, meadows, and valley and foothill grassland) statewide. Undisturbed habitat adjacent to agricultural fields are more likely to support special-status plant species, including: succulent owl's-clover (*Castilleja campestris* ssp. *succulenta*), Mason's lilaeopsis (*Lilaeopsis masonii*), and hairy Orcutt grass (*Orcuttia pilosa*).

Wildlife

A number of special-status wildlife species could occur in agricultural habitats throughout California. Grain crops and pasture provide important habitat for species such as the Swainson’s hawk (*Buteo swainsoni*) and greater sandhill crane (*Grus canadensis tabida*). Pasture provides habitat for a number of other listed species including San Joaquin kit fox (*Vulpes macrotis mutica*), blunt-nosed leopard lizard (*Gambelia sila*), and Tipton kangaroo rat (*Dipodomys nitratoides nitratoides*). Undisturbed habitats adjacent to agricultural fields, such as seasonal wetlands, vernal pools, and irrigation ditches, could also support special-status species, including vernal pool fairy shrimp (*Branchinecta lynchi*), California tiger salamander (*Ambystoma californiense*), and giant garter snake (*Thamnophis gigas*).

Movement Corridors

Movements of wildlife generally fall into three basic categories: a) movements along corridors or habitat linkages associated with home range activities such as foraging, territory defense, and breeding; b) dispersal movements—typically one-way movements (e.g., juvenile animals leaving their natal areas or individuals colonizing new areas), and; c) temporal migration movements—these movements are essentially dispersal actions which involve a return to the place of origin (e.g., deer moving from winter grounds to summer ranges and fawning areas).

Given the project area's large size, it supports the local and regional movements of several species of fish, mammals, birds, and other animal species. The project area includes a portion of the Pacific Flyway, a major corridor for migratory birds. The project area also supports regional movements of mesocarnivores such as the San Joaquin kit fox, a State and federally listed species that covers a large territory while hunting for prey. Larger mammals, including deer and elk may move through the area as well, particularly in the northern potion of the project area. Lastly, anadromous fish, including chinook salmon, use movement corridors (rivers and streams) to travel from the Pacific Ocean through the Sacramento-San Joaquin Delta to freshwater streams in the project area.

Regulatory Setting

Federal

Federal Endangered Species Act

U.S. Fish and Wildlife Service (USFWS) (plants, wildlife, and resident fish) and the National Marine Fisheries Service (NMFS) (anadromous fish and marine fish and mammals) oversee the federal Endangered Species Act (ESA). Section 7 of the ESA mandates that all federal agencies consult with USFWS and NMFS to ensure that the federal agencies' actions do not jeopardize the continued existence of a listed species or destroy or adversely modify critical habitat for listed species. A federal lead agency under the National Environmental Policy Act (NEPA) is required to consult with USFWS or NMFS if it determines that the proposed action "may affect" a listed species. This determination is made through preparation of a biological assessment. USFWS or NMFS will subsequently provide a Biological Opinion on wildlife species that are federally listed, proposed, or candidates for listing as threatened or endangered.

Section 9 of the federal ESA prohibits the take of any wildlife species listed as endangered, including the destruction of habitat that prevents species recovery, without an incidental take permit. "Take" is defined as harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, collecting, or attempting to engage in any such conduct. Wildlife federally listed as threatened are protected from take under Section 4 of the ESA.

The take prohibitions under Section 9 of the federal ESA apply to only fish and wildlife species; however, Section 9 does prohibit the unlawful removal, collecting, or malicious damage or destruction of any endangered plant from federal land. Section 9 prohibits acts to remove, cut, dig up, damage, or destroy any endangered plant in nonfederal areas in knowing violation of any State law or in the course of criminal trespass. Candidate species and species that are proposed or under petition for listing receive no protection under Section 9 of the federal ESA.

Clean Water Act, Section 404

The U.S. Army Corps of Engineers (Corps) and the U.S. Environmental Protection Agency (EPA) regulate the discharge of fill into “waters of the United States” under Section 404 of the Clean Water Act. Waters of the United States include lakes, rivers, streams and their tributaries, and wetlands. Wetlands are defined for regulatory purposes as areas inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (33 CFR §328.3, 40 CFR §230.3). Project proponents must obtain a permit from the Corps for all discharges of fill material into waters of the United States, including wetlands, before proceeding with a proposed action.

The Corps may either issue individual permits on a case-by-case basis or general permits for activities that are expected to cause only minimal adverse environmental effects. Nationwide permits (NWPs) are a type of general permit that have been issued to cover particular fill activities. NWPs have a set of general conditions that must be met for the permits to apply to a particular project, as well as specific conditions that apply to each NWP.

Federal Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) of 1918 makes it unlawful to take or attempt to take any migratory bird, any part, nest, or egg of any such bird except under the terms of a permit issued by the U. S. Department of the Interior. In total, 836 bird species are protected by the MBTA, 58 of which are currently legally hunted as game birds. A migratory bird is any species or family of birds that live, reproduce or migrate within or across international borders at some point during their annual life cycle.

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c) prohibits anyone, without a permit issued by the Secretary of the Interior, from “taking” bald eagles, including their parts, nests, or eggs. The Act defines “take” as “pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb.” In addition to immediate impacts, this definition also covers impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that interferes with or interrupts normal breeding, feeding, or sheltering habits, and causes injury, death or nest abandonment.

Fish and Wildlife Coordination Act (16 USC 661-667e)

The Fish and Wildlife Coordination Act requires coordination with USFWS, NMFS, and the California Department of Fish and Game when the waters of any stream or other body of water are proposed, authorized, permitted, or licensed to be impounded, diverted, or otherwise controlled or modified under a federal permit or license (16 USC 661–667[e]). USFWS typically prepares a Coordination Act Report (CAR) with recommendations to address impacts on fish and wildlife resources. The recommendations in the CAR are advisory only.

State

California Environmental Quality Act

A project will be deemed to have a significant environmental impact on biological resources if it substantially reduces the number or restricts the range of a rare, threatened, or endangered species or the habitat of that species; substantially interferes with the movement of resident or migratory fish or wildlife; or substantially diminishes habitat for fish, wildlife, or plants. (Specific significance criteria for this project are described in a separate section below.) The State CEQA Guidelines define rare, threatened, or endangered species as those listed under the California Endangered Species Act (CESA) and the ESA, as well as other species that meet the criteria of the resource agencies or local agencies—for example, DFG-designated species of special concern and some CNPS-listed species.

California Endangered Species Act

The CESA requires State agencies to seek and conserve threatened and endangered species (Section 2055) and restricts all persons from taking listed species. DFG administers the act and authorizes take under Section 2081 agreements (except for designated “fully protected species”). The CESA defers to the California Native Plant Protection Act of 1977, which prohibits importing of rare and endangered plants into California, taking of rare and endangered plants, and selling of rare and endangered plants. State-listed species are protected mainly in cases where State agencies are involved in projects under CEQA. In this case, plants listed as rare under the California Native Plant Protection Act are not protected under the CESA but can be protected under CEQA. The following activities are exempt from the California Native Plant Protection Act:

- agricultural operations;
- fire control measures;
- timber harvest operations;
- mining assessment work;
- removal of plants by private landowners on private land for construction of
- canals, ditches, buildings, roads, or other rights-of-way; and
- removal of plants for performance of a public service by a public agency or a publicly or privately owned public utility.

Clean Water Act, Section 401

The State Water Resources Control Board (SWRCB) has authority over wetlands through Section 401 of the CWA, which requires that an application for a Section 404 permit (to discharge dredged or fill material into waters of the U.S.) first obtain certification from the appropriate State agency, stating that the fill is consistent with the State’s water quality standards and criteria. In California, the authority to either grant certification or waive the requirements for permits is delegated by the SWRQB to the nine Regional Water Quality Control Boards (RWQCB). The Central Valley Water Board is the appointed authority for Section 401 compliance in the project area. A request for certification or waiver is submitted to the regional board at the same time that an application is filed with the Corps. The regional board has 60 days to review the application and act on it.

Porter-Cologne Water Quality Control Act

Under State law, anybody discharging “waste” (including clean fill, riprap or other revetment, excavation sidecasting, dredge spoils, soil displaced while clearing vegetation, etc.) where it could affect waters of the State (any surface or sub-surface water) must first file a Report of Waste Discharge with the appropriate RWQCB, which will regulate the discharge as necessary to protect the beneficial uses of the waters. This is completed during the Section 401 process for those waters of the State also covered under the CWA. For waters of the State not covered under the CWA, the RWQCB regulates discharges using the Porter-Cologne Water Quality Control Act.

CDFG Lake and Streambed Alteration Agreements

Under Section 1600-1616 of the California Fish and Game Code, the CDFG prohibits activities that would “substantially divert or obstruct the natural flow of, or substantially change or use material of the bed, channel, or bank of any river, stream, and lake, or deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake” without consulting with CDFG. Notification is required prior to any such activities and CDFG will issue an Agreement with any necessary mitigation to ensure protection of the State’s fish and wildlife resources.

9.2 Impacts and Mitigation Measures

Approach and Methods

The evaluation was performed in light of current conditions in the project area, applicable regulations and guidelines, and typical construction activities and operations of dairy digester and co-digester facilities. In determining the level of significance, the analysis assumed that the dairy digester and co-digester facilities would comply with relevant federal, State, and local ordinances and regulations.

Dairy digester and co-digester facilities could be constructed in a variety of agricultural locations within the project area, and specific locations and details are unknown at this time. For this reason, detailed site- and species-specific effects of dairy digester and co-digester facilities on native plants and wildlife are not evaluated; the following discussion focuses on general impacts to biological resources and the regulatory consequences of dairy digester and co-digester facilities.

Thresholds of Significance

CEQA defines a significant effect on the environment as a substantial, or potentially substantial, adverse change in the physical conditions of the area affected by the project. An impact related to biological resources, would be considered significant if it would result in any of the following, which are adapted from Appendix G of the CEQA *Guidelines*:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service.
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service.
- Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.

The following discussion of environmental impacts is limited to those potential impacts that could result in some level of potentially significant environmental change, as defined by CEQA.

Because facilities development would not conflict with adopted conservation plans, the project would have a less-than-significant impact on the provisions of adopted Habitat Conservation Plans, Natural Community Conservation Plans, or other approved local, regional, or State habitat conservation plans. Therefore this issue is not discussed further within this chapter.

Impact 9.1: The project could impact special-status plant or wildlife species or their habitats. (Significant)

Most dairy digesters and co-digesters facilities (especially those on individual dairies) would be constructed on existing developed agricultural lands that are unlikely to support special-status plant and wildlife species. In general, previous agricultural activities in these areas have altered the physical and biological environment such that habitat for special-status plant and animal species has been eliminated. Facilities associated with centralized locations could be constructed on land that has experienced fewer agricultural disturbances and supports special-status species or their habitats; therefore, these facilities have a greater potential to affect special-status species. Additionally, pipelines that could connect dairy digester and co-digester facilities with individual dairy farms could cross undisturbed land. Land application of dairy digester and co-digester digestate could also indirectly affect special-status species habitats such as wetlands, streams, and ditches if not properly applied.

Dairy digester and co-digester facilities, as well as pipelines and centralized facilities, could result in the loss of habitat for special-status plant or wildlife species if they are constructed on undisturbed land (such as annual grasslands adjacent to agricultural lands) or any agricultural lands that have been fallow for more than 1 year. Construction activities could also result in the direct loss of special-status species (species mortality) if present within the project footprint at the time of construction. Special-status species that could use these areas and therefore be affected by facilities development include, but are not limited to, California tiger salamander, white-tailed kite, San Joaquin kit fox, Swainson's hawk, and kangaroo rats. Special-status fish species such as steelhead and salmonids may be impacted if pipelines need to cross larger streams that support these species. Construction across streams is likely to occur using jack and bore drilling, which would limit direct disturbance to special-status fish species. The direct loss of special-status species or their habitats due to facilities construction (including dairy digester and co-digester facilities and connecting pipelines) within fallow agricultural areas and adjacent annual grasslands would be a significant impact.

Most dairy digester and co-digester facilities would be constructed in the Central Valley, a portion of the state that also supports some of the state's few remaining vernal pool habitats. As much as 90% of vernal pool habitat has been lost in much of the state, due to the conversion of land for urban and agricultural purposes. These features are often protected as wetlands under the federal Clean Water Act and the State Porter-Cologne Act. In addition to wetland habitat, these features support a unique group of plant and wildlife species, many of which are also State and/or federally listed, including Orcutt grasses, vernal pool fairy shrimp, and California tiger salamander, as shown in Table 9-1. These species could also be found in seasonal wetland habitat. The USFWS has listed critical habitat for many of these species within the project area, and has also identified areas for species recovery. Therefore, loss of vernal pool and seasonal wetland habitats due to facilities development would be a significant impact.

Habitat for other aquatic species, such as giant garter snake, tricolor blackbird, Sanford's arrowhead, and salmonids could be indirectly affected by facilities development or the application of dairy digestate, if not properly protected. These habitats include freshwater marsh, streams, and irrigation ditches that are not regularly maintained. Potential indirect effects could include discharges of sediments from nearby construction activities or the leaching of nutrients into aquatic habitats after the application of digestate. Degradation of suitable habitat for these species would be a significant impact.

If the dairy digester and co-digester facilities construction would affect State or federally listed species, the applicant would need to consult with the USFWS, CDFG or NMFS, depending on the species. Consultation with the federal agencies could occur either under Section 7 of the federal ESA, if a federal nexus is present (often a 404 permit from the Corps), or Section 10 of the federal ESA. Consultation under Section 7 would require the preparation of a biological assessment, after which a biological opinion would be issued. Consultation under Section 10 would require the preparation of a habitat conservation plan after which an incidental take permit would be issued. If state-listed species would be affected, the project applicant would need to consult with CDFG and obtain a 2081 permit. CDFG cannot authorize take of fully protected species.

As described above, implementation of the project could impact special-status species within the project area. Implementation of Mitigation Measures 9.1a and 9.1b would reduce this impact to a less-than-significant level.

Mitigation Measures

> **Measure 9.1a:** The project applicant or agency(s) responsible shall submit, as part of the NOI, a site assessment report for dairy digester and co-digester facilities to be constructed (including the location of digestate application) in areas that contain undisturbed land and/or any agricultural fields that have been fallow for more than 1 year. This report shall be prepared by a qualified biologist. It shall evaluate the project site's potential to support special-status plant and wildlife species (including critical habitat) and whether special-status species could be affected by dairy digester and co-digester development, including construction and operations. If there are no special-status species or critical habitat present, no additional mitigation would be required.
>
> **Measure 9.1b:** If the site assessment determines that special-status species could be affected by facilities development, the project would not be eligible as part of the project (for the Central Valley Water Board discharge permit) unless the applicant submits a plan, prepared by a qualified biologist, to mitigate or avoid any significant impacts on special-status species. This plan must be forwarded to the appropriate regional office of the CDFG, the Endangered Species Unit of the USFWS in Sacramento, and/or NMFS for review and approval of the mitigation strategy, when appropriate. If the site assessment determines that a State or federally listed species would be affected by facilities development, the project applicant shall consult with CDFG, the Endangered Species Unit of the USFWS in Sacramento, and/or NMFS, as appropriate.
>
> **Impact Significance After Mitigation:** Less than Significant
>
> Implementation of Mitigation Measures 9.1a would reduce the project's potential impact on special-status species to a less-than-significant level by first determining if special-status species or critical habitat occur in the project area and could be affected by dairy digester and co-digester development. If special-status species or their habitat does occur, Mitigation Measure 9.1b requires the preparation of an impact avoidance and minimization plan, subject to review and approval by the CDFG and/or USFWS, to mitigate for impacts on special-status species.

Impact 9.2: The project could result in impacts on biologically unique or sensitive natural communities. (Significant)

As shown in Table 9-1, the project has the potential to directly or indirectly affect biologically unique or sensitive natural communities, including seasonal wetlands, vernal pools, and freshwater marsh. Dairy digester and co-digester facilities constructed on cultivated or otherwise developed agricultural lands would likely not have an impact on biologically unique or sensitive natural communities, because cultivation and development would have removed any previously existing vegetation. However, construction of facilities off of cultivated or developed agricultural lands (potentially including centralized facilities and pipelines, as well as the application of digestate on undisturbed lands), could have a significant impact on sensitive natural communities. Implementation of Mitigation Measures 9.2a and 9.2b would reduce this impact to a less-than-significant level.

Mitigation Measures

Measure 9.2a: The project applicant or agency(s) responsible shall submit, with the NOI, a site assessment report prepared by a qualified biologist that determines if the project is likely to affect biologically unique or sensitive natural communities. This information could be included in the report prepared under Mitigation Measure 9.1a. If there are no biologically unique or sensitive natural communities present, no further mitigation is required.

Measure 9.2b: If biologically unique or sensitive natural communities are present and would be disturbed, the project would not be authorized under the project unless the applicant or agency(s) responsible submits a plan to avoid or mitigate for any significant impacts on biologically unique or sensitive natural communities and agrees to implement the mitigation. This report must be forwarded to the appropriate regional office of the CDFG and/or the Endangered Species Unit of the USFWS in Sacramento (as appropriate) for review and approval of the mitigation strategy. As described above, this portion of the report could be incorporated into the report prepared under Mitigation Measure 9.1a.

Impact Significance After Mitigation: Less than Significant

Implementation of Mitigation Measure 9.2a would reduce the project’s potential impact to a less-than-significant level by first determining if biologically unique or sensitive natural communities are likely to be affected by the project. If biologically unique or sensitive natural communities do occur, Mitigation Measure 9.2b requires preparation of an avoidance and mitigation plan, subject to review and approval by the CDFG and/or USFWS.

Impact 9.3: The project could result in impacts on waters of the State and/or the U.S., including wetlands. (Significant)

As discussed above, it is anticipated that most dairy digester and co-digester facilities would be constructed on existing dairies and/or in areas that have already been altered by agricultural activities. Some facilities, such as centralized facilities and gas collection pipelines, have a greater potential to affect waters of the State and/or U.S. because they have the potential to occur in areas that are not disturbed by agricultural activities. In particular, pipelines constructed to connect centralized facilities with existing dairies could cross drainage features such as streams, flood channels, and irrigation ditches. Furthermore, runoff from fields that receive digestate application could indirectly affect waters of the State and/or U.S. The direct loss of or reduction in water quality of waters of the State and/or U.S. would be a potentially significant impact. Implementation of Mitigation Measures 9.3a and 9.3b would reduce this impact to a less-than-significant level.

Mitigation Measures

Measure 9.3a: The project applicant or agency(s) responsible shall submit, with the NOI, a site assessment report prepared by a qualified biologist that evaluates if the project is likely to affect waters of the State and/or U.S., including wetlands. This information could be included in the report prepared under Mitigation Measure 9.1a. If there are no waters present, no further mitigation would be required.

Measure 9.3b: If waters of the State and/or U.S. are present in the project area, the project applicant or agency(s) responsible shall either re-design the project to avoid affecting the waters, or obtain the appropriate permits to allow for the impact. For waters that cannot be avoided, the permit process shall start with the preparation of a jurisdictional wetland delineation, prepared by a qualified biologist that will be submitted to the Corps for verification. Following verification, if jurisdictional waters occur within the project site, the project applicant or agency(s) responsible shall obtain and comply with federal and State permit requirements. This could include obtaining a Clean Water Act Section 404 permit, Section 401 Water Quality Certification or Waiver, a Section 1602 Streambed Alteration Agreement, and any other applicable permits.

Impact Significance After Mitigation: Less than Significant

Implementation of Mitigation Measure 9.3a would reduce the project's potential impact to a less-than-significant level by first determining if waters of the State or U.S. occur in the project area. If waters of the State or U.S do occur, Mitigation Measure 9.3b requires completion of the appropriate regulatory permit process, including the assurance of a no-net-loss of the value and function of affected features. These measures would reduce this impact to a less-than-significant level.

Impact 9.4: The project would not result in impacts on migratory corridors or native wildlife nursery sites. (Less than Significant)

Dairy digester and co-digester facilities would likely be constructed on lands previously altered by agricultural disturbance, including existing dairies. However, some facilities (including centralized facilities and gas collection pipelines) could be constructed on land that is not currently in active agricultural uses. It is anticipated that these facilities would have a relatively small project footprint (less than an acre for individual dairies and up to 3 acres for centralized facilities, relative to dairies over 150 acres in size) and therefore would not limit migration through an area; wildlife species would be able to move around the constructed facilities. Limited lighting and power lines could be required for dairy digesters, but would not constitute a significant increase over that lighting power lines used at dairies and other agricultural operations in the area. Therefore, it is unlikely that any increase in lighting or power lines would affect migratory birds. The facilities also would not require major new transportation networks that would affect species movement, nor would result in a substantial increase in human presence. Furthermore, pipelines would be buried and would not create a barrier to migration. Digesters are unlikely to be sited in or near native wildlife nursery sites; therefore, the project would have a less-than-significant impact on migratory corridors or nursery sites.

Mitigation: None required.

Impact 9.5: Dairy digester and co-digester facilities would not conflict with local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance. (Less than Significant)

Dairy digester and co-digester facilities and centralized facilities would be constructed primarily on or near active agricultural sites. Any construction of new facilities would be required to comply with local ordinances, including those that protect biological resources, such as tree preservation policies and ordinances. The project would not preclude project applicants from complying with local ordinances; therefore this impact would be less than significant and no mitigation would be required.

Mitigation: None required.

Impact 9.6: Development of dairy digester and co-digester facilities could contribute to cumulative impacts to biological resources. (Significant)

Development over the last 150 years in the project area has resulted in the conversion of native habitats to agricultural and urban uses. An effort has been made in the past 20 years to protect habitat in the project area (and the rest of the state) through the development of large-scale habitat conservation plans that mitigate for habitat loss at broad scales. While it is not expected that implementation of the project would lead to conversion of habitat to dairy farms, the project could facilitate additional development near dairies that would incrementally deplete native habitats and other biological resources. Most of the dairy digester and co-digester facilities would be constructed on, or in proximity to, existing dairies, on land that is unlikely to support sensitive biological resources. However, facilities that could be constructed on land not currently in active agricultural use could affect biological resources. In combination with other development in the project area, this conversion of potential habitat land represents a significant cumulative impact. Implementation of Mitigation Measures 9.1a, 9.1b, 9.2a, 9.2b, 9.3a and 9.3b would reduce this cumulative impact to a less-than-significant level.

Mitigation Measures

Measure 9.6: Implement Measures 9.1a, 9.1b, 9.2a, 9.2b, 9.3a, and 9.3b.

Impact Significance After Mitigation: Less than Significant

Implementation of Mitigation Measures 9.1a, 9.1b, 9.2a, 9.2b, 9.3a, and 9.3b would ensure that potential cumulative effects to biological resources would be minimized.

The project includes mitigation measures that would reduce potential impacts on biological resources to less-than-significant levels. These measures, when combined with the limited potential for the project to broadly affect sensitive biological resources, significantly reduces the project's potential contribution towards a cumulative adverse effect. In addition, the project area includes several existing and planned large-scale Habitat Conservation Plans that mitigate for habitat loss at broad scales. Therefore, the incremental effects of the project and other projects, after mitigation, would be less than significant.

9.3 References

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CHAPTER 10
Hazards and Hazardous Materials

10.1 Setting

Environmental Setting

For the purposes of this analysis, the term “hazardous materials” refers to both hazardous materials and hazardous wastes. Under federal and State laws, any material, including wastes, may be considered hazardous if it is specifically listed by statute as such or if it is toxic (causes adverse human health effects), ignitable (has the ability to burn), corrosive (causes severe burns or damage to materials), or reactive (causes explosions or generates toxic gases). The term “hazardous material” is defined as any material that, because of quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment.[1]

Potential Presence of Hazardous Materials in Soil and Groundwater

Hazardous materials, including but not limited to pesticides and herbicides, heavy metals, volatile organic compounds, oil and gas, may be present in soil and groundwater in areas where land uses have resulted in leaking fuel or chemical storage tanks or other releases of hazardous materials have occurred. Land uses that typically involve the handling of hazardous materials include commercial or industrial operations, as well as agricultural areas where soils may contain pesticides and herbicides.

Various federal, State, and local regulatory agencies maintain lists of hazardous materials sites where soil and/or groundwater contamination is known or suspected to have occurred, typically as a result of leaking storage tanks or other spills. These facilities are readily identified through regulatory agency database searches, such as the State Water Board GeoTracker online database, the California Environmental Protection Agency (Cal/EPA) Department of Toxic Substances Control (DTSC) Envirostor online database, and several other federal, State and local regulatory agency databases. **Table 10-1** includes these, and other database references.

For this project, a search of the GeoTracker database was conducted. The search identified numerous of cleanup sites within the Central Valley Water Board’s jurisdictional boundaries (Region 5), as shown in **Table 10-2**. These facilities included, but were not limited to, hazardous materials cleanup sites, leaking underground storage tank (LUST) cleanup sites, land disposal cleanup sites, and cleanups on military properties.

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[1] State of California, Health and Safety Code, Chapter 6.95, Section 25501(o).

TABLE 10-1
DESCRIPTION OF REGULATORY AGENCY DATABASES

Acronym	Name and Description of Database
US Brownfields	Maintained by the U.S. Environmental Protection Agency (EPA), the U.S. Brownfields database lists abandoned sites that have known or suspected contamination that are currently underutilized.
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System. A U.S. EPA maintained database that contains information on hazardous waste sites, potentially hazardous waste sites and remedial activities, including sites on the National Priorities List (see below).
NPL	National Priorities List. Maintained by the U.S. EPA, the data base lists priority cleanup sites under the federal Superfund Program.
PPIS	Pesticide Product Information System. U.S. EPA maintained database that contains information concerning all pesticide products registered in the U.S.
RCRAInfo	Resource Conservation and Recovery Act Information. RCRA gives the U.S. EPA authority to control the generation, transportation, treatment, storage and disposal of hazardous waste. The information data base provides access to information about RCRA and the management of hazardous waste.
SCP	Site Cleanup Program (formerly the Spills, Leaks, Investigation, and Cleanup Cost Recovery Listing) is maintained by the State Water Board. Provides information on site investigation and corrective action on sites not overseen by the Underground Tank Program and the Well Investigation Program. Found on the Geotracker Database.
CALSITES	List of hazardous waste and substances sites from the DTSC Envirostor database.
CDO and CAO	Cease and Desist Orders and Cleanup and Abatement Orders that do not concern the discharge of wastes that are hazardous materials identified by the State Water Board.
CORTESE	Cortese Hazardous Waste and Substances Site List. An historical compilation of sites listed in the LUST, Solid Waste Information System (SWF/LF), and CALSITES databases. This database is no longer updated.
CORRACTS	List of hazardous waste facilities subject to corrective action identified by DTSC.
LUST	Leaking Underground Storage Tanks. Maintained by the State Water Board it includes a list of leaking USTs. Found on the Geotracker Database
DPR	California Department of Pesticide Regulation provides data and information related to pesticide registration, licensing, pesticide use, environmental effects, and enforcement.
SWIS	Solid waste facilities and landfills that are active, closed, or inactive, maintained by the California Department of Resources Recycling and Recovery.
Toxic Pits	Maintained by the State Water Board, the Toxic Pits database lists sites suspected of containing hazardous substances that have not yet been cleaned up.
VCP	Voluntary Cleanup Program Properties. Low-threat properties with either confirmed or unconfirmed releases, where the project proponents have requested that the DTSC oversee investigation and/or cleanup activities.

SOURCE: State Water Board, U.S. EPA, DTSC 2010

TABLE 10-2
CENTRAL VALLEY HAZARDOUS MATERIALS CLEANUP SITES

Organization Name	Cleanup Program Site	LUST Cleanup Site	Land Disposal Site	Military Cleanup Site	Military Privatized Site	Military UST Site
Central Valley Water Board (REGION 5, Fresno)	632	2918	713	60	0	49
Central Valley Water Board (REGION 5, Redding)	182	887	44	0	0	3
Central Valley Water Board (REGION 5, Sacramento)	1307	4511	307	789	50	540

SOURCE: State Water Board GeoTracker website, 2010

Potential Presence of Naturally Occurring Asbestos

Asbestos is a known carcinogen and inhalation of asbestos may result in the development of lung cancer or mesothelioma. The asbestos content of many manufactured products has been regulated in the United States for a number of years. For example, the California Air Resources Board (CARB) has regulated the amount of asbestos in crushed rock used in surfacing applications, such as for gravel on unpaved roads since 1990. In 1998, new concerns were raised about possible health hazards from activities that disturb rocks and soil containing asbestos and may result in the generation of asbestos laden dust. These concerns recently lead to CARB to revise their asbestos limit for crushed serpentinite and ultramafic rock in surfacing applications from 5 percent to less than 0.25 percent, and to adopt a new rule requiring best practices dust control measures for activities that disturb rock and soil containing naturally occurring asbestos. A map of areas more likely to contain naturally occurring asbestos in underlying soil or rock units published by the California Geological Survey indicates that asbestos-containing rocks and minerals are absent from the flat valley bottom of the Central Valley (CGS, 2000).

Biogas

Biogas is comprised primarily of methane, with small amounts of carbon dioxide, hydrogen sulfide and ammonia. Methane is not toxic, but is classified as a simple asphyxiate, possessing a slight inhalation hazard. If breathed in high concentration, oxygen deficiency can result in serious injury or death. Handling methane can be hazardous due to its health risk and flammability.

Fire Hazards

While all of California is subject to some degree of fire hazard, there are specific features that make certain areas more hazardous. The California Department of Forestry and Fire Protection (CAL FIRE) is required by law to map areas of significant fire hazards based on fuels, terrain, weather, and other relevant factors (PRC 4201-4204 and Govt. Code 51175-89). Factors that increase an area’s susceptibility to fire hazards include slope, vegetation type and condition, and atmospheric conditions. In regions of the Central Valley areas where the dairies are located, the terrain is typically flat to gently sloping, and is often surrounded by irrigated agricultural land. Many portions of the Central Valley are within Local Responsibility Areas (LRA) and have not been mapped for fire hazard zones; however, based on existing fire hazards maps prepared for the state of California, it is likely that most of the areas affected by the proposed regulatory program would fall within areas of moderate risk (this is the lowest level of risk assigned by CAL FIRE) (CAL FIRE, 2007).

Regulatory Setting

Hazardous materials and hazardous wastes are subject to numerous federal, State, and local laws, regulations, ordinances and guidance intended to protect public health and safety and the environment. The U.S. Environmental Protection Agency (U.S. EPA), Cal-EPA, DTSC, RWQCB, CARB, and the county Air Pollution Control Districts and regional Air Quality Management Districts that CARB oversees are the major federal, State, and regional agencies that enforce these regulations. The main focus of the federal and California Occupational Safety and Health Administration (OSHA) are to prevent work-related injuries and illnesses, including from exposures to hazardous materials; CAL FIRE implements fire safety regulations. In accordance with Chapter 6.11 of the California Health and Safety Code (§ 25404, et seq.), local regulatory agencies enforce many federal and state regulatory programs through the Certified Unified Program Agency (CUPA) program, including:

- Hazardous materials business plans (Chapter 6.95 of the Health and Safety Code, §25501 et seq.).
- State Uniform Fire Code requirements (§80.103 of the Uniform Fire Code as adopted by the state fire marshal pursuant to Health and Safety Code §13143.9).
- Underground storage tanks (Chapter 6.7 of the Health and Safety Code, §25280 et seq.).
- Aboveground storage tanks (Health and Safety Code §25270.5[c]).
- Hazardous waste generator requirements (Chapter 6.5 of the Health and Safety Code, §25100 et seq.).

The following is a summary of how hazardous materials are regulated by applicable topic. Within each summary is a discussion of the relevant federal, State and local regulatory structure.

Soil and Groundwater Contamination

Remediation of contaminated sites is generally performed under the oversight of the local CUPA, or in some instances, the RWQCB and/or DTSC. At sites where contamination is suspected or known to have occurred, the site owner is required to perform a site investigation and perform site remediation, if necessary. Site remediation or development may also be subject to regulation by other agencies. For example, if a project required dewatering near a hazardous waste site, the project sponsor might be required to obtain a permit from the municipal sewer agency before discharging the water to the sewer system, or a National Pollutant Discharge Elimination System (NPDES) permit from the RWQCB before discharging to the storm water collection system.

Worker Safety Requirements

The federal Occupational Safety and Health Administration (Fed-OSHA) and the California Occupational Safety and Health Administration (Cal-OSHA) are the agencies responsible for assuring worker safety in the handling and use of chemicals in the workplace. The federal regulations pertaining to worker safety are contained in Title 29 of the Code of Federal Regulations (CFR), as authorized in the Occupational Safety and Health Act of 1970. They provide standards for safe workplaces and work practices, including standards relating to hazardous materials handling. In California, Cal-OSHA assumes primary responsibility for developing and enforcing workplace safety regulations; Cal-OSHA standards are generally more stringent than federal regulations.

The state regulations concerning the use of hazardous materials in the workplace are included in Title 8 of the California Code of Regulations, which contain requirements for safety training, availability of safety equipment, accident and illness prevention programs, hazardous substance exposure warnings, and emergency action and fire prevention plan preparation. Cal-OSHA also enforces hazard communication program regulations, which contain worker safety training and hazard information requirements, such as procedures for identifying and labeling hazardous substances, communicating hazard information related to hazardous substances and their handling, and preparation of health and safety plans to protect workers and employees.

At sites known or suspected to have soil or groundwater contamination, construction workers must receive training in hazardous materials operations and a site health and safety plan must be prepared. The health and safety plan establishes policies and procedures to protect workers and the public from exposure to potential hazards at the contaminated site.

Hazardous Materials Business Plans

State and federal laws require detailed planning to ensure that hazardous materials are properly handled, used, stored, and disposed of, and, in the event that such materials are accidentally released, to prevent or to mitigate injury to health or the environment. California's Hazardous Materials Release Response Plans and Inventory Law, sometimes called the "Business Plan Act," aims to minimize the potential for accidents involving hazardous materials and to facilitate an appropriate response to possible hazardous materials emergencies. The law requires businesses that use hazardous materials to provide inventories of those materials to designated emergency response agencies, to illustrate on a diagram where the materials are stored on-site, to prepare an emergency response plan, and to train employees to use the materials safely.

Use and Storage of Hazardous Materials

State and federal laws require detailed planning and management to ensure that hazardous materials are properly handled, used, stored, and disposed of, and, in the event that such materials are accidentally released, to reduce risks to human health and the environment. Hazardous waste regulations establish criteria for identifying, packaging, and labeling hazardous wastes; dictate the management of hazardous waste; establish permit requirements for hazardous waste treatment, storage, disposal, and transportation; and identify hazardous wastes that cannot be disposed of in landfills.

Underground Storage Tanks

State laws governing underground storage tanks (USTs) specify requirements for permitting, monitoring, closure, and cleanup of these facilities. Regulations set forth construction and monitoring standards for existing tanks, release reporting requirements, and closure requirements. In general, the local CUPA has regulatory authority for permitting, inspection, and removal of USTs. Any entity proposing to remove a UST must submit a closure plan to the CUPA prior to tank removal. Upon approval of the UST closure plan, the CUPA would issue a permit, oversee removal of the UST, require additional subsurface sampling if necessary, and issue a site closure letter when the appropriate removal and/or remediation has been completed. There are no USTs associated with typical dairy digester facilities; however, these regulations are relevant due to the potential of leaking USTs to affect subsurface conditions at potential project sites.

Aboveground Storage of Petroleum Products

The Aboveground Petroleum Storage Act of 1990 requires facilities storing petroleum products in a single tank greater than 1,320 gallons, or facilities storing petroleum in aboveground tanks or containers with a cumulative storage capacity of greater than 1,320 gallons to file a storage statement with the State Water Board and prepare a spill prevention, control, and countermeasure plan. The plan must identify appropriate spill containment or equipment for diverting spills from sensitive areas, as well as discuss facility-specific requirements for the storage system, inspections, recordkeeping, security, and personnel training.

The State Water Board requires registration of an aboveground fuel storage tank at a construction site only if the tank is 20,000 gallons or larger, or if the aggregate volume of aboveground petroleum storage is over 100,000 gallons. For smaller temporary tanks used during construction, methods for controlling a release and measures to clean up an accidental release and prevent degradation of water quality are addressed in the construction stormwater pollution prevention plan (SWPPP) prepared for project construction, as described in Section 5, Hydrology and Water Quality.

Transport of Hazardous Materials

The United States Department of Transportation (DOT) regulates hazardous materials transportation on all interstate roads. Within California, the state agencies with primary responsibility for enforcing federal and State regulations and for responding to transportation emergencies are the CHP and Caltrans. Together, federal and State agencies determine driver-training requirements, load labeling procedures, and container specifications. Although special requirements apply to transporting hazardous materials, requirements for transporting hazardous waste are more stringent, and hazardous waste haulers must be licensed to transport hazardous waste on public roads.

Emergency Response

California has developed an emergency response plan to coordinate emergency services provided by federal, State, and local government and private agencies. Responding to hazardous materials incidents is one part of this plan. The plan is administered by the State Office of Emergency Services (OES), which coordinates the responses of other agencies. The local Emergency Response Team (ERT) coordinates response to hazardous materials emergencies within the project area. ERT members respond and work with local fire and police agencies, emergency medical providers, California Highway Patrol (CHP), California Department of Fish and Game, and California Department of Transportation (Caltrans).

Natural Gas Pipelines

The DOT also provides oversight for the nation's natural gas pipeline transportation system. Its responsibilities are promulgated under Title 49, United States Code (USC) Chapter 601. The Pipeline and Hazardous Materials Safety Administration (PHMSA), Office of Pipeline Safety (OPS), administers the national regulatory program to ensure the safe transportation of gas and other hazardous materials by pipeline.

The OPS shares portions of this responsibility with State agency partners and others at the federal, State, and local levels. The State of California is certified under 49 USC Subtitle VIII, Chapter 601, §60105. The State has the authority to regulate intrastate natural and other gas pipeline facilities.

The California Public Utilities Commission has rules governing design construction, testing, operation, and maintenance of gas gathering, transmission, and distribution piping systems (General Order No. 112-E). The State requirements for designing, constructing, testing, operating, and maintaining gas piping systems are stated in CPUC General Order Number 112. These rules incorporate the federal regulations by reference, but for natural gas pipelines, they do not impose any additional requirements affecting public safety. The federal pipeline regulations are published in Title 49 CFR, Parts 190 through 199. 49 CFR 192 specifically addresses natural and other gas pipelines. These regulations include specific standards for material selection and qualification, design requirements, protection from corrosion, worker training, safety and provisions for safety standards specific to the location of the pipeline relative to population densities and sensitive land uses.

Fire Hazards

The California Uniform Fire Code and local building codes establish requirements for the construction and maintenance of structures for fire safety. The National Fire Protection Association (NFPA) develops and publishes consensus codes and standards intended to minimize the possibility and effects of fire and other risks. While not regulations, these codes and standards are industry-accepted guidelines for construction and fire protection systems. NFPA Code 820 establishes the standard for fire protection in waste water treatment and collection facilities, which would be applicable to dairy digester facilities. Additional relevant codes include a fuel gas code, standard on explosion prevention systems, standards for fire prevention during welding, etc.

The California Public Resources Code (PRC) includes fire safety regulations that restrict the use of equipment that may produce a spark, flame, or fire; require the use of spark arrestors[2] on construction equipment that use an internal combustion engine; specify requirements for the safe use of gasoline-powered tools in fire hazard areas; and specify fire suppression equipment that must be provided onsite for various types of work in fire-prone areas during the time of high fire danger to reduce the risk of wildland fires.

10.2 Impacts and Mitigation Measures

Approach and Methods

The evaluation was performed in light of current conditions in the project area, applicable laws, regulations and guidelines, and typical construction activities and operations of dairy digester and co-digester facilities. In many cases, compliance with laws, regulations, and mandatory regulatory permits prescribe actions that would reduce the adverse effects of implementation of future dairy digester and co-digester facilities. Should potential impacts remain significant or potentially significant under CEQA, even after compliance with legal requirements, mitigation measures are proposed to reduce project impacts to less-than-significant levels.

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[2] A spark arrestor is a device that prohibits exhaust gases from an internal combustion engine from passing through the impeller blades where they could cause a spark. A carbon trap is commonly used to retain carbon particles from the exhaust.

Thresholds of Significance

CEQA defines a significant effect on the environment as a substantial, or potentially substantial, adverse change in the physical conditions of the area affected by the project. An impact related to hazards and hazardous materials, including fire hazards, would be considered significant if it would result in any of the following, which are adapted from Appendix G of the CEQA *Guidelines*:

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials;
- Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment;
- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one quarter mile of an existing or proposed school;
- Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code §65962.5 and, as a result, would create a significant hazard to the public or the environment;
- Be located within an area covered by an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, and would result in a safety hazard for people residing or working in the project area;
- Be located within the vicinity of a private airstrip and would result in a safety hazard for people residing or working in the project area;
- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; or
- Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

Implementation of the program would not result in the construction of facilities that would result in a safety hazard at public airports or private airstrips, therefore, these issues are not discussed further within this section.

Impact 10.1: Construction of dairy digester and co-digester facilities could result in the potential exposure of construction workers, the public and the environment to preexisting soil and/or groundwater contamination. (Significant)

Construction activities associated with development of projects could involve excavation and trenching to install dairy digester or co-digester facilities and pipelines. If hazardous materials, such as pesticides or herbicides, VOC or other hazardous materials are present in excavated soil or groundwater, hazardous materials could be released to the environment resulting in exposing construction workers or the public to potential health risks depending on the nature and extent of any contamination encountered. Contaminated soil or groundwater could also require disposal as a hazardous waste. This is considered a significant impact.

The greatest potential for encountering contaminated soil and groundwater during project construction would be in areas where past or current land uses have resulted in leaks from fuel or chemical storage tanks or other releases of hazardous materials have occurred. Federal, State and local agencies maintain databases of hazardous materials sites including those listed in **Table 10-1.** As shown in **Table 10-2**, the GeoTracker database identified thousands of hazardous materials sites within the Central Valley Water Board. If sites with soil and/or groundwater contamination are located at or in close proximity to proposed project facilities, hazardous materials could be encountered in the subsurface during excavation and grading activities. Encountering hazardous materials in soil or groundwater during construction could further disperse existing contamination into the environment and expose construction workers or the public to contaminants, potentially resulting in health and safety risks to workers and the public.

Hazardous materials in soil and groundwater, if identified, could be managed appropriately according to applicable laws and regulations to reduce the risks associated with exposure of individuals or releases to the environment. Cal/OSHA regulations require the preparation and implementation of a site health and safety plan to protect workers who could encounter hazardous materials, ensure that construction workers have specialized training and appropriate personal protective equipment. Regulations also require that excavated materials suspected of contamination be segregated, sampled and hauled to a landfill licensed for this type of waste. If groundwater dewatering is required for excavation of subsurface facilities, the groundwater may require treatment prior to discharge, in accordance with regulations.

Mitigation Measure

> **Mitigation Measure 10.1:** Prior to final project design and any earth disturbing activities, the applicant or agency(s) responsible shall conduct a Phase I Site Assessment. The Phase I Environmental Site Assessment (ESA) shall be prepared by a Registered Environmental Assessor (REA) or other qualified professional to assess the potential for contaminated soil or groundwater conditions at the project site; specifically in the area proposed for construction of dairy digester or co-digester facilities. The Phase I ESA shall include a review of appropriate federal and State hazardous materials databases, as well as relevant local hazardous material site databases for hazardous waste on-site and off-site locations within a one quarter mile radius of the project site. This Phase I ESA shall also include a review of existing or past land uses and areal photographs, summary of results of reconnaissance site visit(s), and review of other relevant existing information that could identify the potential existence of contaminated soil or groundwater.
>
> If no contaminated soil or groundwater is identified or if the Phase I ESA does not recommend any further investigation then the project applicant or agency(s) responsible shall proceed with final project design and construction.
>
> OR
>
> If existing soil or groundwater contamination is identified and if the Phase 1 ESA recommends further review, the applicant or agency(s) responsible shall retain a REA to conduct follow-up sampling to characterize the contamination and to identify any required remediation that shall be conducted consistent with applicable regulations prior to any earth disturbing activities. The environmental professional shall prepare a report that includes, but is not limited to, activities performed for the assessment, summary of anticipated contaminants and contaminant concentrations at the proposed construction site, and recommendations for appropriate handling of any contaminated materials during construction.

Impact Significance After Mitigation: Less than Significant

Mitigation Measure 10.1 requires preparation of a Phase I ESA to identify the potential for known soil or groundwater contamination on or in the vicinity of proposed construction of dairy digester or co-digester facilities. If no contamination is identified, then construction can proceed. If contaminated sites are identified that could affect construction, then the applicant shall conduct follow-up sampling to characterize soil and groundwater contamination and would conduct any remediation consistent with applicable laws, regulations, ordinances and guidance. With implementation of Mitigation Measure 10.1, and regulatory compliance, the potential for exposure to hazardous materials during construction activities would be reduced to a less-than-significant level.

Impact 10.2: Transportation, use, disposal or accidental spill of hazardous materials during construction of dairy digester and co-digester facilities would not result in the potential exposure of construction workers, the public and the environment to hazardous materials. (Less than Significant)

Construction activities would likely require use of limited quantities of hazardous materials such as fuels for construction equipment, oils, lubricants glues. The types and quantities of hazardous materials would vary at each proposed dairy digester and co-digester facility. The improper use, storage, handling, transport or disposal of hazardous materials could result in accidental release of hazardous materials, thereby exposing construction workers, the public and the environment, including soil and/or ground or surface water, to hazardous materials contamination.

As discussed in Section 10.1.2, Regulatory Setting, numerous laws and regulations govern the transport, use, storage, handling and disposal of hazardous materials to reduce the potential hazards associated with these activities. Cal/OSHA is responsible for developing and enforcing workplace safety standards, including the handling and use of hazardous materials. Transportation of hazardous materials is regulated by the DOT and Caltrans. Together, federal and State agencies determine driver-training requirements, load labeling procedures, and container specifications designed to minimize the risk of accidental release. Construction activities would also be required to comply with the California fire code to reduce the risk of potential fire hazards. The local fire agency would be responsible for enforcing the provisions of the fire code.

As described in Chapter 5, the federal Clean Water Act prohibits discharges of stormwater from construction projects unless the discharge is in compliance with an NPDES permit. The State Water Board is the permitting authority in California and has adopted a Statewide General Permit for Stormwater Discharges Associated with Construction Activity (Construction General Permit, Order No. 99-08) that encompasses one or more acres of soil disturbance. The permit requires, among other actions, implementation of mandatory Best Management Practices (BMPs) including, implementation of pollution/sediment/spill control plans, training, sampling and monitoring for non-visible pollutants

Because numerous laws and regulations govern the transport, use, storage, handling and disposal of hazardous materials to reduce the potential hazards associated with these activities this impact would be less than significant.

Mitigation: None required.

Impact 10.3: Transportation, use, disposal or accidental spill of hazardous materials during the operation and maintenance of dairy digester and co-digester facilities would not result in the potential exposure of the public or the environment to hazardous materials. (Less than Significant)

Operation and maintenance of dairy digester and co-digester facilities would involve the transport, use, storage and disposal of small quantities of hazardous materials such as fuels, lubricants, hydraulic fluids. Handling of hazardous materials is covered by federal and State laws which minimize worker safety risks from both physical and chemical hazards in the workplace. Cal/OSHA is responsible for developing and enforcing workplace safety standards, including the handling and use of hazardous materials. Businesses that use hazardous materials are required to submit a Hazardous Materials Business Plan to the local CUPA, which performs inspections to ensure compliance with hazardous materials labeling, training, and storage regulations. For example, hazardous materials must be stored in containers according to the manufacturer's guidelines and appropriately labeled. The Material Safety Data Sheet for each chemical must be available for review. Employers must inform workers of the hazards associated with the materials they handle and maintain records documenting training.

In addition, if scrubber facilities are needed for cleaning the biogas to remove hydrogen sulfide, flushing of the scrubbers would produce sulfur biogas scrubber effluent. Discharge of the effluent stream into a wastewater treatment system would be subject to requirements contained in a Waste Discharge Requirements (WDR) permit issued by the Central Valley Water Board. Another possible use for the effluent would be for a soil amendment. If classified as a soil amendment, it would be subject to the California Department of Food and Agriculture Code covering fertilizing materials (Food and Agricultural Code Division 7, Chapter 5).

Transportation of hazardous materials is regulated by the DOT and Caltrans. Together, federal and State agencies determine driver-training requirements, load labeling procedures, and container specifications designed to minimize the risk of accidental release.

Because numerous laws and regulations govern the transport, use, storage, handling and disposal of hazardous materials to reduce the potential hazards associated with these activities, this impact would be less than significant.

Mitigation: None required

Impact 10.4 Operation of dairy digester and co-digester facilities would not result in the release of biogas which could increase the risk of fire hazards. (Less than Significant)

The proposed program involves the production of biogas generated through the anerobic digestion process. The biogas would be captured and could be combusted in a flare, used directly in internal combustion engines to produce electricity and heat, or upgraded to biomethane through the removal of hydrogen sulfide, carbon dioxide (CO_2), and moisture. Biomethane could be used in place of natural gas for various processes, including use by utility companies. The biomethane would be transported through low-pressure gas pipelines (likely 6-inch diameter or smaller) to centralized digester facilities or biogas cleanup facilities. As described in the environmental setting, biogas is comprised primarily of methane. Methane is not toxic, but handling methane can be hazardous. In addition, methane can be flammable. Methane has an ignition temperature of 1,000 degrees Fahrenheit (°F) and is flammable at concentrations between 5 percent and 15 percent in air. Unconfined mixtures of methane in air are not explosive; however, a flammable concentration within an enclosed space in the presence of an ignition source can explode. Methane is buoyant at atmospheric temperatures and disperses rapidly in air.

Unintentional releases of biogas from dairy digester facilities or pipelines could pose risks to human health and safety. For example, biogas could be released from a leak or rupture of the digester facility or one of the pipe segments. If the gas reaches a combustible mixture and an ignition source is present, a fire and/or explosion could occur, resulting in possible injuries and/or deaths.

Compliance with existing safety regulations and widely-accepted industry standards would minimize the hazard to the public and the environment. With respect to the flaring of biogas and potential fire hazards associated with the storage and transport of methane and small quantities of other materials used in operations, the NFPA has established standards for fire protection which would be applicable to the construction of dairy digester and co-digester facilities. These standards have been successfully implemented by numerous waste water treatment facilities across the country. Construction and operation of facilities would comply with the California fire code, local building codes (including requirements for the installation of fire suppression systems), and gas pipeline regulations. The local fire agency would be responsible for enforcing the provisions of the fire code. The OPS and CPUC regulate the safety of gas transmission pipelines. Standard safety measures for anaerobic treatment facilities that would minimize the potential for exposure to biogas include leak detection systems, warning signals, and safety flares to reduce excess gas capacity. If released to the environment, methane would be dispersed rapidly in air, minimizing the hazards of exposure.

Any biogas transmission pipelines would be designed, constructed and operated consistent with State and federal regulations to minimize the risk of rupture and accidental release. As described in the Regulatory Setting, the CPUC has rules governing design construction, testing, operation, and maintenance of gas gathering, transmission, and distribution piping systems. These rules incorporate the federal regulations by reference, but for natural gas pipelines, they do not impose any additional requirements affecting public safety. The federal pipeline regulations include specific standards for material selection and qualification, design requirements, protection from corrosion, worker training, safety and provisions for safety standards specific to the location of the pipeline relative to population densities and sensitive land uses.

Dairies in the Central Valley Water Board region are predominantly located in agricultural areas that are not within high wildfire hazard zones. In addition, due to odor and other siting considerations, dairy digester and co-digester facilities would not be constructed immediately adjacent to residential structures Compliance with existing laws and regulations would reduce the potential for fires and explosions associated with digester and co-digester facilities, however, in the unlikely event of a fire, the potential to expose people or structures to a significant risk involving fires is low. Therefore, this impact would be less than significant.

Mitigation: None required

Impact 10.5 Dairy digester and co-digester facilities could be located within a one quarter mile of a school resulting in potential hazards associated with accidental release of hazardous materials, including biogas. (Less than Significant)

Existing dairies are typically not sited within close proximity to schools, therefore, dairy digesters and co-digesters located at existing dairies would be unlikely to be located within one quarter mile of a school. As the location of central processing facilities and pipelines that could be constructed under this program have not been identified, it is possible that facilities could be located within one quarter mile of a school.

As discussed above under Impacts 10.2 and 10.3, small quantities of hazardous materials could be used in the construction and operation dairy digester and co-digester facilities. Compliance with environmental laws and regulations would reduce the potential for an accidental release of those materials to affect nearby schools. Anaerobic digesters and biogas transmission pipelines would not emit hazardous emissions, such as biogas, under normal operating conditions and biogas transmission pipelines and ancillary facilities would be designed, constructed, operated, and maintained in accordance with State and federal regulations. Although leak detection systems would minimize the potential for substantial biogas releases, any such releases would mix readily in the air and would not present a health risk at nearby properties. As a result, odor concerns and potential fire hazards associated with siting dairy digester and co-digester facilities within one quarter mile of a school would be less than significant.

Although not required, to further reduce the magnitude of this less-than-significant impact, Mitigation Measure 10.5 recommends that dairy digester and co-digester facilities not be constructed and operated within ¼-mile of existing or proposed schools and other sensitive land uses.

Mitigation Measure

> **Mitigation Measure 10.5:** Dairy digester and co-digester facilities shall be sited at least one quarter mile from existing or proposed schools, daycare facilities, hospitals and other sensitive land uses.

Impact Significance After Mitigation: Less than Significant

Implementation of Mitigation Measure 10.5 would ensure that dairy digester facilities, co-digester facilities and centralized processing facilities would be located more than one quarter mile from sensitive land uses; therefore, further reducing the potential for exposure to hazardous materials and fire hazards.

Impact 10.6: Installation of biogas pipelines in public rights-of-way could impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. (Significant)

Construction and operation of individual dairy digester and co-digester facilities at existing dairies or other private properties would take place within these properties and would be unlikely to affect public roadways that could be designated on adopted emergency response or evacuation plans. Biogas pipelines associated with future digester and co-digester facilities could be installed within public right-of-ways. Construction and installation of pipelines could result in temporary road or lane closures that might impair implementation of emergency response and evacuation plans if proper precautions were not taken. This would be a potentially significant impact.

Mitigation Measure

Mitigation Measure 10.6: Implement Mitigation Measure 8.1.

Impact Significance After Mitigation: Less than Significant

The potential for interference with emergency response or evacuation plans would be less than significant with implementation of Mitigation Measure 8.1 which requires that contractor(s) obtain any necessary road encroachment permits prior to installation of pipelines within the existing roadway right-of-way. As part of the road encroachment permit process, the contractor(s) will submit a traffic safety / traffic management plan (for work in the public right-of-way) to the agencies having jurisdiction over the affected roads. Elements of the plan would require advance coordination with police, fire stations and hospitals to ensure that provisions are made for emergency response and evacuation.

Impact 10.7: Development of dairy digester and co-digester facilities could contribute to cumulative impacts related to hazardous materials. (Less than Significant)

The context for potential cumulative hazards and hazardous materials impacts is projects that could result in an increased risk of exposure due to a release of hazardous materials in the project area. The potential for cumulative projects to result in a release resulting in an increased risk of exposure and the project's contribution would be limited. Exposure to existing soil and groundwater contamination is generally site-specific and depends on past, present, and future uses and existing soil, sediment, and groundwater conditions. Any hazardous materials uncovered during construction activities would be managed consistent with applicable federal, State and local laws to limit exposure and clean up the contamination. In addition, the storage, handling and transport of hazardous materials are also regulated by federal, State and local regulatory agencies to limit risk of exposure.

The contribution of the project to cumulative risk of exposure would not be considerable. While construction and operational activities could result in accidental spills or leaks in the vicinity, the extent of the contamination is not likely to extend beyond the project site boundaries due to the type and limited quantities of hazardous materials likely to be used (for example, motor fuels, hydraulic oils, paint, and lubricants). Furthermore, as identified above, all proposed project activities associated with the use, storage and transportation of hazardous materials would be required to adhere to all applicable laws and regulations. Operation of dairy digester and co-digester facilities would capture and use biogas for energy production. Handling of biogas could be hazardous due to its health risk and flammability. Compliance with existing laws and regulations regarding health and safety and fire safety would minimize the potential for harmful exposures and fires associated with the handling of biogas.

In sum, the construction and operation of the project in combination with other projects in the project area would not create a significant hazard to the public or the environment through the routine transport, use, disposal or accidental release of hazardous materials due to the site-specific nature of the potential impacts and existing laws and regulations that minimize the risk of exposure. Therefore, this is considered a less-than-significant cumulative impact.

Although not required, to further reduce the magnitude of the project’s contribution to this less-than-significant cumulative impact, Mitigation Measure 10.1 recommends preparation of a Phase I ESA to identify the potential for known soil or groundwater contamination and Mitigation Measure 10.5 recommends that dairy digester and co-digester facilities not be constructed and operated within ¼-mile of existing or proposed schools and other sensitive land uses.

Mitigation Measure 10.7: Implement Mitigation Measures 10.1 and 10.5.

Impact Significance After Mitigation: Less than Significant

Mitigation Measure 10.1 recommends preparation of a Phase I ESA to identify the potential for known soil or groundwater contamination on or in the vicinity of proposed facilities. If contaminated sites are identified follow-up sampling would be conducted to characterize soil and groundwater contamination and appropriate remediation would occur consistent with applicable laws, regulations, ordinances and guidance. Mitigation Measure 10.5 would ensure that dairy digester facilities, co-digester facilities and centralized processing facilities would be located more than one quarter mile from sensitive land uses; therefore, further reducing the potential for exposure to hazardous materials and fire hazards.

10.3 References

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CHAPTER 11
Aesthetic Resources

11.1 Setting

Environmental Setting

Visual and aesthetic resources within the project area, the jurisdictional boundaries of the Central Valley Region (Region 5), include a mix of urban, rural, and remote landscapes. The project would primarily result in potential impacts to areas dominated by agricultural uses and landscapes. These areas typically afford open views with few trees and little topographical relief. Agricultural structures, such as barns, silos, fences, and farm equipment are common, as well as agricultural products, such as row crops and livestock. Dairies are a common site in these areas; the counties with the largest portion of dairies within the project area include Tulare, Merced, Stanislaus and Kings Counties.

Physical settings may vary widely with respect to dairies. Such physical setting variables may include, but are not limited to:

- distances to nearby rural residences, rural subdivisions, and urban areas;
- distances to sensitive receptors such as recreation or assembly areas, high-traffic streets or roads, restaurants, hospitals, and schools;
- prevailing wind conditions; and
- available access routes and near-site development along such routes.

Typical agricultural sites are level areas with relatively large landholdings that are separate from urban centers. Development throughout the Central Valley region during the late 19th and early 20th centuries centered along waterways and railroad lines, with towns and cities developing along these linear features. Agricultural sites, such as dairies, are frequently located in the general vicinity of a more populous urban area, but zoning and land use restrictions typically prevent dairies from being directly adjacent to urban areas. Dairies are generally accessed by two-lane county roads with relatively low traffic volumes. The potential for visual impact of most dairy properties is limited because they are typically located away from urban centers and major highways. In terms of dairies with digester facilities, their visual and aesthetical characteristics are generally consistent with dairy operations that do not contain these facilities, in that dairy digester facilities are not out of character for the agricultural landscape.

A typical dairy includes structures and buildings similar in scale, form and materials to existing agricultural and residential buildings in agricultural areas. Dairy structures include the main dairy barns, residences and offices, shaded corrals, water tanks, ponds, lagoons, and other barns. The addition of dairy digester facilities would result in the potential addition of covered lagoons, flares, above and below ground digester tank structures, storage tanks, and structures to house the biogas post-processing equipment (**Figures 11-1** through **11-6**) and other smaller miscellaneous equipment or structures. Photographs and descriptions of typical dairy digester facilities are provided in the Program Description (see Chapter 3, Program Description).

The Central Valley is a generally flat region, consisting of approximately 60,000 square miles extending from Kern County in the south to Shasta County in the north. Viewpoints of the Central Valley typically include long stretches of irrigated agricultural land, aqueducts transporting water throughout the state, concentrated pockets of urban development, and views of either the Coastal or Sierra Nevada mountain ranges. Agricultural development ranges from small farms to enterprises of several thousand acres, with most agricultural operations ranging from small to medium sized. Broad views of the Central Valley would not be impacted by the presence of dairy digesters, as digester facilities would result in a comparatively minor addition to the view shed.

Scenic Roadways

Many state highways are located in areas of outstanding natural beauty. California's Scenic Highway Program was created by the Legislature in 1963 to preserve and protect scenic highway corridors from change which would diminish the aesthetic value of lands adjacent to highways (Caltrans, nd). A highway may be designated scenic depending upon how much of the natural landscape can be seen by travelers, the scenic quality of the landscape, and the extent to which development intrudes upon the traveler's enjoyment of the view. The corridor protection program does not preclude development, but seeks to encourage quality development that does not degrade the scenic value of the corridor. Scenic Highways are identified as either eligible (E) for listing or officially designated (OD), and those located within the project area are described in **Table 11-1** below.

TABLE 11-1
DESIGNATED AND ELIGIBLE SCENIC HIGHWAYS WITHIN THE PROJECT AREA

Route	County	Location (From/To)	Designation
4	Alpine	Calaveras County line/SR 89	OD
4	Calaveras / Alpine	SR 49 near Angel's Camp/SR 89	E
4	Calaveras	East of Arnold/Alpine County line	OD
16	Colusa / Yolo	SR 20/Capay	E
4	Contra Costa	SR 160 near Antioch/SR 84 near Brentwood	E
14	Kern	SR 58 near Mojave/SR 395 near Little Lake	E
20	Mendocino / Lake / Colusa	SR 101 near Calpella/SR 16	E
5	Merced / San Joaquin	SR 152 west of Los Banos/I-580 near Vernalis	E
5	Merced	SR 152/Stanislaus County line	OD
20	Nevada	SR 49 near Grass Valley/I-80 near Emigrant Gap	E
20	Nevada	Skillman Flat campground/0.5 miles east of Lowell Hill Rd	OD
5	San Joaquin	Stanislaus County line/I-580	OD
5	Shasta	SR 44 near Redding/Shasta Reservoir	E
5	Siskiyou	SR 89 near Mt Shasta/SR 97 near Weed	E
5	Siskiyou	SR 3 near Yreka/Oregon State Line near Hilt	E
5	Stanislaus	Merced County line/San Joaquin County line	OD
3	Trinity / Siskiyou	SR 299 near Weaverville/Montague	E
3	Trinity	SR 36 near Peanut/SR 299 near Douglas City	E

SOURCE: Caltrans, 2010

SOURCE: ESA, 2010

Dairy Digester and Co-Digestion Facilities. 209481

Figure 11-1
Flare and Shaded Corrals

SOURCE: ESA, 2010

Dairy Digester and Co-Digestion Facilities. 209481

Figure 11-2
Complete Mix Digester Tanks

SOURCE: ESA, 2010

Dairy Digester and Co-Digestion Facilities. 209481

Figure 11-3
Covered Lagoon Digester

SOURCE: ESA, 2010

Dairy Digester and Co-Digestion Facilities. 209481

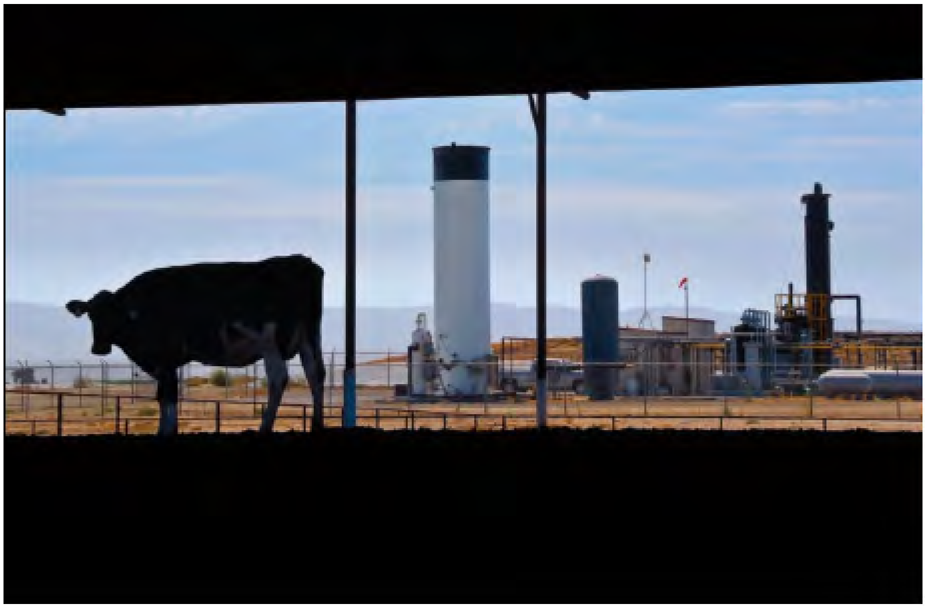
Figure 11-4
Biogas Processing and Electrical Generation Engine Room

SOURCE: ESA, 2010

Dairy Digester and Co-Digestion Facilities. 209481

Figure 11-5

Corral and Barn Facilities



SOURCE: Werblow, 2010

Dairy Digester and Co-Digestion Facilities. 209481

Figure 11-6

Centralized Facility Example, Vintage Dairy, Riverdale, California

Sensitive Receptors

Sensitive receptors subject to the potential effects of visual changes resulting from the project include travelers along local roadways and regional highways as well as residents living along or in the vicinity of areas subject to the development of new dairy digester facilities. Given the programmatic nature of this analysis, specific locations of potential receptors cannot be identified at this time.

Regulatory Setting

Federal

There are no federal aesthetic regulations applicable to this program.

State

California Department of Transportation – California Scenic Highways Program

California's Scenic Highway Program, run by Caltrans, was created by the Legislature in 1963 (Caltrans, nd). Its purpose is to protect and enhance the natural scenic beauty of California highways and adjacent corridors, through special conservation treatment. The State laws governing the Scenic Highway Program are found in the Streets and Highways Code, §260 through §263. Responsibility for the development of scenic highways, and the establishment and application of specific planning and design standards and procedures falls to State and local agencies.

Local

Various cities and counties within the project area contain design and aesthetic regulations relating to agricultural and dairies. Some California counties, including Madera, Glenn, and Kings Counties, possess General Plans that include a Dairy Element, which provides guidance and policies regarding the management and setting of existing and new dairies within the counties. Such guidance includes buffer zones between dairies and sensitive receptors, and policies addressing light and glare issues from dairies.

11.2 Impacts and Mitigation Measures

Approach and Methods

The evaluation was performed in light of current conditions in the project area, applicable regulations and guidelines, and typical construction activities and operations of dairy digester and co-digester facilities. In determining the level of significance, the analysis assumed that the dairy digester and co-digester facilities would comply with relevant federal, State, and local ordinances and regulations.

ESA conducted a site visit to three dairies with anaerobic digestion facilities within the Central Valley region that lie within Central Valley Water Board boundaries on April 8, 2010 (ESA, 2010). These dairies included Fiscalini Dairy (Modesto), Castelanelli Brothers Dairy (Lodi), and

Tollenaar Holsteins Dairy (Elk Grove). Facility operators were present at each dairy to respond to questions regarding the facilities.

The impact analysis focuses on foreseeable changes to existing conditions in the project area attributable to the project. The assessment of visual resources is a qualitative review of the existing resources located within the project area and a determination of whether the project would result in an adverse impact to these resources. Various methodologies for the evaluation of impacts to visual resources are available and were reviewed in the development of aesthetics impact methodology. The Bureau of Land Management's Visual Resource Management design techniques, including guidance on scale, location and screening of structures, were reviewed, as well as the U.S. Forest Service's Visual Management System (Bureau of Land Management, nd; Bacon, 1979). In making determinations of the impact of increased development of dairy digesters, ESA considered the potential scenic quality of the project site and vicinity, viewing distances and degree to which project components or activities interact with existing landscape characteristics, and the extent the project feature or activities would block views of higher value landscape features.

Thresholds of Significance

An impact related to aesthetics would be considered significant if it would result in any of the following, which are adapted from Appendix G of the CEQA *Guidelines*:

- Have a substantial adverse effect on a scenic vista;
- Substantially damage scenic resources, including but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway;
- Substantially degrade the existing visual character or quality of the site and its surroundings; or
- Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

The following discussion of environmental impacts is limited to those potential impacts that could result in some level of potentially significant environmental change, as defined by CEQA. Dairy digesters are likely to be constructed at dairies or at central facilities in agricultural areas and they would be consistent with other major structures that are part of the visual character of agricultural areas. The visual effect of the digesters developed as a result of the project would not be likely to substantially degrade the visual character of the site and its surroundings, and would still be subject to potential discretionary review from local jurisdictions. Therefore, no impact would occur under this category, and this category is not discussed further within this section.

Impact 11.1: Implementation of the project, including operation of dairy digester and co-digestion facilities, could result in impacts to scenic highways and/or scenic vistas. (Significant)

The general height, scale, lighting, and design of typical dairy digester facilities that could be developed as a result of the project would be consistent with other dairy buildings in the agricultural zones of the project area. The scale of dairy digester facilities at a typical dairy would remain on a similar scale to other agricultural and residential buildings, and would not be out of character for the surrounding visual landscape. The project does not preempt or supersede the authority of local agencies to prohibit, restrict, or control the development along scenic highways, and therefore in the event that these facilities are located within sight of a scenic highway or vista, local regulations regarding development shall be adhered to.

Centralized facilities would be located either on dairies or on nearby similarly zoned parcels in order to minimize transportation costs for the movement of gas and manure from dairies. As the design and location of these facilities is unknown, there is the potential for the construction of these facilities to result in significant visual impact to sensitive receptors. Implementation of Mitigation Measure 11.1a through 11.1c would result in a less-than-significant impact.

Mitigation Measures

Measure 11.1a: Centralized biogas processing facilities shall be sited in locations that do not conflict with local polices for preservation of vistas or scenic views.

Measure 11.1b: When feasible considering the scale of the facilities and the site specific topography, site specific landscape design, including berms and/or tree rows, shall be constructed in order to minimize potentially sensitive views of both digester facilities at dairies or off dairies at centralized facilities.

Measure 11.1c: Centralized biogas processing facilities shall be designed similarly in massing and scale to other nearby agricultural buildings in agricultural areas, in order to retain the character of the surrounding visual landscape

Impact Significance After Mitigation: Less than Significant

Impact 11.2 Construction of the project could result in impacts to scenic highways and/or scenic vistas. (Significant)

Construction of dairy digester facilities would typically occur on a small scale, with development occurring alongside existing dairies or on similarly zoned parcels. The presence and activity of equipment during construction activities has the potential to present a short term impact to visual resources. As described above, the project does not preempt or supersede the authority of local agencies to prohibit, restrict, or control the development along scenic highways, and therefore in the event that these facilities are located within sight of a scenic highway or vista, local regulations regarding development shall be adhered to.

As the design and location of the dairy digester facilities is unknown, there is the potential for the construction of these facilities to result in significant visual impact to sensitive receptors. Implementation of Mitigation Measure 11.2 would result in a less-than-significant impact.

Mitigation Measure

Measure 11.2: The project shall incorporate into all construction contracts for the proposed project and ensure implementation of the following measures:

- Main construction staging areas and the storage of large equipment shall be situated on individual sites in such a manner to minimize visibility to nearby receptors. As feasible, staging areas and storage shall occur away from heavily traveled designated scenic roadways, in areas where it would be least visible from the surrounding roads.
- Construction staging areas shall be onsite and remain clear of all trash, weeds and debris, etc. Construction staging areas shall be located in areas that limit visibility from scenic roadways and sensitive receptors to the extent feasible.

Impact Significance After Mitigation: Less than Significant

Impact 11.3: Implementation of the project could result in substantial creation of or change in light or glare. (Significant)

New dairy digester facilities would typically include some night-time lighting of equipment or structures. Outdoor lighting may result in a slight loss of darkness in the night sky. Nearby residents may experience a slight brightening in the night sky due to project lighting. Lighting and glare impacts would not be considered significant to these homes, however, as the resultant lighting in itself would not constitute a significant increase over that lighting used at typical dairy operations and any other agricultural operations in the area.

However, the construction of dairy digesters would include flares, which provide for the destruction of air pollutants from releases for excess biogas, sometimes as a result of upset or emergency conditions. The flare burns minimal amounts of gas 24 hours a day, but flames could extend upwards of 10 feet in height during periods of excess gas production, when portions of the gas need to be released. Flames are not typically visible from a distance of over 100 feet during daytime hours; however, at night the emergency burning of excess gas can cause the flare to become visible to nearby sensitive receptors, including passing drivers along local and State roadways, depending on the location of the flare on the property and its design. This is a potentially significant impact. Implementation of Mitigation Measure 11.3 would result in a less-than-significant impact to light and glare.

Mitigation Measure

Measure 11.3: Whenever possible, flares shall be situated on individual sites in such a manner to minimize visibility to nearby receptors. Site specific design shall discourage placement of flares at higher elevations, or within the line of site of nearby residential buildings or scenic highways. In the event that site design does not provide adequate coverage, an enclosed flare design shall be used or landscaping, such as berms or tree rows, shall be constructed to minimize light impacts.

Impact Significance After Mitigation: Less than Significant

Implementation of Mitigation Measure 11.3 would reduce light and glare impacts from flares to a less-than-significant level.

Impact 11.4: Development of dairy digester and co-digester facilities could contribute to cumulative impacts to aesthetics. (Significant)

The geographic scope of the cumulative impacts to visual quality is the local viewsheds that could be affected by the views of dairy digester facilities from public roadways and residential areas.

Future agricultural development is guided by city and county General Plans, and other applicable planning and environmental documents. New development could be subject to the site specific City and County design review process. As described above, typical dairy digester facilities would be similar in massing and scale to other nearby agricultural buildings in agricultural areas, and would not be out of character for the surrounding visual landscape. In addition, in light of the size of the typical dairy, dairy digester facilities would be separated by large distances even when such facilities are located on adjacent dairies. In the event that multiple dairy digester facilities are located within the same local viewshed, impacts to visual resources may occur. It is not anticipated that future project development would result in significant impacts to broad views of the region, nor are future projects anticipated to result in extensive vegetation clearance, as the majority of facilities would be located either on dairy sites or on similar nearby parcels. However, as noted in Impact 11.1 and 11.2, above, mitigation is needed to reduce construction and operation impacts to aesthetics to less-than-significant levels. Therefore, development of dairy digester and co-digester facilities could contribute to cumulative aesthetics impacts. This impact is significant. Mitigation Measures 11.1a, 11.1b, 11.1c,11.2 and 11.3 would reduce cumulative visual impacts to a less-than-significant level

Mitigation Measure

> **Mitigation Measure 11.4:** Implement Mitigation Measures 11.1a, 11.1b, 11.1c, 11.2, and 11.3.
>
> **Significance After Mitigation:** Less than Significant

11.3 References

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CHAPTER 12
Cultural Resources

Cultural resources are defined as any object or specific location of past human activity, occupation, or use that is 50 years old and identifiable through historical documentation, inventory, or oral evidence. A wide variety of nonrenewable cultural resources is found throughout California that, if documented, makes a substantial contribution to our understanding of the state's culture, history, and heritage. Three categories are used to characterize cultural resources: archaeological, architectural (i.e., the built environment), and traditional or ethnographic. Within these three categories, historically or culturally significant resources may also achieve recognition as "historic properties" or "historical resources," as defined below.

Prehistoric and Historic Archaeological Resources

Archaeological resources include both prehistoric and historic remains of human activity. Prehistoric archaeological resources reflect the cultural complexity of ancient California and may include, but not be limited to, habitation sites, temporary camps, stone tool scatters, bedrock mortars, milling implements, roasting pits, subsistence remains, rock art, ceremonial sites, trails, and other traces of Native American behavior prior to the historic period. Historic archaeological resources are the physical evidence of activities by peoples who also left written records of their history and may include, but not be limited to, sites of former residential, ranching, farming, mining or industrial activities, foundations or other structural remnants, refuse deposits or scatters, historic objects, such as bottles and cans, shipwrecks, abandoned roadbeds, and other traces of the activities of California's diverse cultures. Both prehistoric and historic archaeological sites may include surface or subsurface deposits or features, buried or otherwise affected by natural geomorphic processes. Archaeological sites may also contain both prehistoric and historic-era components, and have the potential to contribute to our knowledge of local, regional or national prehistory or history, including the sequence of human occupation and temporal changes in climate and resource availability, creating a picture of former inhabitants and their environment.

Built Environment Resources

Built environment resources include an array of historic buildings, structures, and objects serving as a physical connection to California's past. Unlike structures, buildings are created to shelter human activity. Built environment resources may include, but not be limited to, Mission period adobes, Gold Rush-era buildings, Civilian Conservation Corps camps, Chinatowns, ghost towns, unique structures, monuments, canals, historic roads and trails, bridges, ditches, dams, stamp mills, rock walls, courthouses, churches, historic building districts in urban cores, and cemeteries. With the exception of some types of structures, such as tunnels, built environment resources are generally situated above ground. Similar to archaeological sites, built environment resources have the potential to contribute to our knowledge of local, regional or national history, showcasing the changes in architectural styles and function developed since California was initially colonized nearly 250 years ago.

Traditional or Ethnographic Resources

Traditional or ethnographic cultural resources may include, but are not limited to, Native American sacred sites and traditional resources of any ethnic community that are important for maintaining the cultural traditions of any group, including Native American, African, Asian, and European groups (Parker and King 1998). Following the discovery of gold in California, many different ethnic groups established communities in California. Such resources may include, but not be limited to, traditional landscapes, sacred mountains, buildings, ethnic neighborhoods, structures, objects, cemeteries, ceremonial use areas, or areas where plants are collected for food, medicine, or basket weaving. A traditional cultural property (TCP) is defined generally as one that is eligible for inclusion in the National Register of Historic Places because of its association with cultural practices or beliefs of a living community that (1) are rooted in that community's history, and (2) are important in maintaining the continuing cultural identity of the community. A potential TCP is a “riverscape” that has significant cultural value and includes a river and its associated features, including water, wildlife, fish, and topography (Gates 2003).

Historic Properties and Historical Resources

“Historic properties” and “historical resources” are terms with defined statutory meanings and include any prehistoric or historic archaeological site, district, built environment resource, or TCP recognized as historically or culturally significant. Under federal law, a historic property is “any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places [NRHP]” (36 CFR 800.16(l)(1)). Districts include the property types known as cultural landscapes (i.e., historic, rural, designed). Under California State law, a historical resource is “a resource listed in, or determined to be eligible for listing in, the California Register of Historical Resources [CRHR],” “a resource included in a local register of historical resources,” or “any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant” (California Public Resources Code [PRC] §21084.1; 14 California Code of Regulations [CCR] §15064.5(a)). As defined in PRC §5097.9 and 5097.993, Native American historic, cultural, or sacred sites may be listed or eligible for listing in the CRHR pursuant to PRC §5024.1. The criteria for listing resources on the CRHR were expressly developed to be in accordance with previously established criteria developed for listing on the NRHP (see below). Historic properties located in California are considered historical resources and automatically listed in the CRHR.

Paleontological Resources

Paleontological resources include fossils or imprints, the remains of prehistoric plants and animals, that are important scientific and educational resources due to their use in (1) documenting the presence and evolutionary history of particular extinct and extant organism groups, (2) reconstructing the environments in which these organisms lived, and (3) determining the relative ages of strata in which they occur and the geologic events that resulted in the deposition of the sediments that formed these strata. Specifically, paleontological resources may include, but are not limited to, mineralized, partially mineralized, or unmineralized bones and teeth, soft tissues, shells, wood, leaf impressions, footprints, burrows, and microscopic remains.

This chapter describes the general cultural setting of the Central Valley region, including prehistoric archaeological, ethnographic, historic archaeological and architectural, and paleontological descriptions.

This chapter further addresses applicable federal, State and local laws, ordinances, regulations, and standards enacted to protect cultural resources; determination if a cultural resource is significant; potential impacts; and recommends mitigation measures to reduce or eliminate significant impacts.

12.1 Environmental Setting

Prehistoric Setting

The jurisdictional boundaries of the Central Valley Region (Region 5) are situated within the northern interior, Central Valley, and Sierra Nevada regions of inland California. This extensive area, which stretches southward from Modoc County in the northern interior through the Sacramento Valley to Kern County in the southern San Joaquin Valley, was occupied by different prehistoric cultures dating to as early as 8,000 to 12,000 years ago. Characteristic artifacts representative of this early period are fluted Clovis or Folsom projectile points that are generally associated with the hunting of large game animals by relatively mobile groups of hunter-gatherers. Although evidence for the presence of humans prior to about 8,000 years ago is relatively sparse and scattered throughout the state, fluted points have been found at more than a dozen archaeological sites in the northern interior, Central Valley, and Sierra Nevada regions (Rondeau et al. 2007), including many associated with Pleistocene lakeshores, such as Buena Vista, Kern, and Tulare Lakes in today’s Kern and Kings Counties.

Approximately 8,000 years ago, regional subsistence strategies in the northern interior, Central Valley, and Sierra Nevada shifted to an increased emphasis on plant resources as a result of climatic changes and the drying of pluvial lakes. The abundance of milling implements in archaeological sites between 8,000 and 3,000 years ago attests to the addition of hard seeds, acorns, and pine nuts to a wide range of natural resources (game animals, wild plants, waterfowl, and fish) procured as part of a seasonal foraging pattern. Subsistence patterns varied somewhat as groups became better adapted to their regional or local environments. Examples of these distinct cultural patterns have been identified in stratified archaeological deposits as distant as Shasta County in the northern interior and the shores of Buena Vista Lake in Kern County in the southern San Joaquin Valley (Raven 1984; Rosenthal et al. 2007).

After approximately 3,000 years ago, the complexity of the prehistoric archaeological record within the vast Central Valley from Modoc and Shasta Counties southward to Kern and Tulare Counties reflects increases in specialized adaptations to locally available resources such as acorns and salmon, in permanently occupied settlements, and in the expansion of regional populations and trade networks.

The increase in sedentism and exchange networks was accompanied by the development of social stratification and craft specialization, as indicated by the variety of artifacts, including bone tools, basketry, obsidian tools, brownware ceramics in some parts of the Central Valley and northern interior, marine shell beads, the use of clamshell disk beads as a form of currency, and variation in burial types and associated grave goods (Hull 2007; McGuire 2007; Rosenthal et al. 2007).

Ethnographic Setting

At the time of European contact, California was the home of approximately 310,000 indigenous people with a complex of cultures distinguished by linguistic affiliation and territorial boundaries (Cook 1978; Mithun 2001). Population density among these mainly sedentary, complex hunter-gatherer native California groups varied, depending mainly on availability and dependability of local resources. Distinct native Californian cultural groups spoke approximately 74 languages plus a large number of dialects. Based on three volumes included in the *Handbook of North American Indians* (d'Azevedo 1986; Heizer 1978; Walker 1988), at least 19 groups, with even more subgroups, inhabited the lands within the Central Valley and Sierran foothills. An inventory of Native American groups in California (UCB 2002) indicates at least the following tribes may have aboriginal lands located within the vast Central Valley region: Achomawi, Atsugewi, Bay Miwok, Huchnom, Klamath, Konkow, Lake Miwok, Maidu, Modoc, Mono, Nisenan, Nomlake, Northern Paiute, Owens Valley Paiute, Patwin, Plains Miwok, Pomo/Kashaya Pomo, Shasta, Shoshone, Sierra Miwok, Wappo, Washo, Wintu, Yahi/Yana, Yokuts, and Yuki.

Like most native Californian groups, those inhabiting the Central Valley region shared similar subsistence practices, settlement patterns, technology, material culture, social organization, and religious beliefs (Heizer 1978; d'Azevedo 1986). The fundamental economy of these complex hunter-gatherer groups was one of subsistence fishing, hunting, and collecting plant foods. Similar to most California Native Americans, the majority relied on the acorn as a dietary staple. Contributions of the various plant, animal, waterfowl, and fish resources to the diet depended on seasonal availability and the geographic location of each group. Fall salmon runs, for example, were depended on by the northern and central interior groups.

Permanent villages were established by the various Native American groups along interior waterways and near lakes and wetlands. Although the social organization of indigenous Californians varied throughout the state, villages or political units were generally organized under a headman. For some groups, the headman also functioned as the religious ceremonial leader. The size of villages and satellite villages depended on local resource availability, including the distance traveled to temporary encampments to collect seasonally available resources, such as acorns or pine nuts. Village structures varied with locally available material, from conical plank or bark houses in the north and the Sierras to thatch or earth covered semi-subterranean dwellings in the Central Valley. Many groups had sweathouses and ceremonial chambers; many had separate cemetery areas depending if internment or cremation was their standard mortuary practice.

Material culture among the groups within the Central Valley region included a variety of utilitarian, ornamental, and ceremonial items. Utilitarian items included basketry, netting, stone and bone tools, milling implements, watercraft, fishing implements and weirs, and ceramics in parts of the Central Valley and northern interior. Ornamental and ceremonial items included marine shell beads and pendants, medicine tubes, effigies, pipes, charmstones, and musical instruments.

Trade and exchange networks were a significant part of the economy and social organization among California's Native American groups. Obsidian, steatite, beads, acorns, baskets, animal skins, and dried fish were among the variety of traded commodities. Inland groups supplied obsidian from sources along the Sierra Nevada and in the northeast corner of the state. Coastal groups supplied the marine shell beads and ornaments. In addition to trading specific items, clamshell disk beads were widely used as a form of currency.

Native American groups living along the California coast were the first to experience the effect of Spanish settlement and missionization, beginning in 1769. Some of the northern inland tribes had little or no contact with Europeans until at least the 1820s, but epidemics and the 1848 Gold Rush had a tragic effect on the lives of native peoples. Seventy-five percent of the population in the Central Valley is estimated to have perished from a series of epidemics that swept through the Sacramento Valley and San Joaquin Valley between 1830 and 1837 (Cook 1955). Although the Gold Rush resulted in an economic boom and statehood by 1850, the loss of hunting and gathering lands, introduction and concentration of diseases, violence, malnutrition, and starvation of native peoples accompanied the waves of immigrants. California's native population was reduced to only 50,000 people between 1845 and 1855; by 1900, there were only 20,000 or less than seven percent of the pre-contact number (Cook 1978).

Historic Setting

The Spanish were the earliest European explorers to claim and enter what would become the state of California. Although there were brief visits by Spanish, as well as Russian and British, Pacific coast explorers between 1529 and 1769, the official beginning of Spain's conquest and colonization of California began in 1769 with the establishment of a mission and settlement at San Diego. Between 1769 and 1823, the Spanish and the Franciscan Order established a series of 21 missions paralleling the coast along El Camino Real between San Diego and Sonoma. Spain also established four presidios and three pueblos during this period (Hoover et al. 2002; Schuyler 1978).

Large tracts of land fell under the jurisdiction of the Franciscan missions, and during the Spanish Period retired Spanish military had also been charged with running large cattle and agricultural ranchos. As Native American groups within these areas were converted to Christianity, they were removed from their traditional lands and settled at the missions, pueblos or ranchos and used as labor. The friars held title to the land in trust for the indigenous groups, to be repatriated once they learned Spanish laws and culture.

Following independence from Spain in 1822, Mexico awarded extensive land grants to Mexican citizens and opened California to exploration by American fur trappers and mountain men. In order to increase the population away from the more settled coastal areas where the Spanish settlements were concentrated, most of some 500 Mexican land grants were located in the interior (Grunsky

1989; Hoover et al. 2002). Captain John Sutter received the two largest land grants in the Sacramento Valley, and in 1839 he founded the trading and agricultural empire headquartered at Sutter's Fort near the divergence of the Sacramento and American Rivers in today's City of Sacramento.

The process of secularization of the Franciscan mission lands began shortly after the declaration of Mexican independence. Although Native American converts were freed from mission control, Mexican land policies did not adequately protect their interests (Castillo 1978). The lands and property were not divided among the Native American converts and clerical authorities as was originally intended. Most Native American converts returned to traditional lands that had not yet been colonized or found work with the large cattle ranchos being carved out of the mission lands. With the end of the mission system, the entire Mexican economy shifted to the owners of the large ranchos.

Jedediah Smith was the first American trapper to enter California; his party explored along the Sierra Nevada in 1826 and entered the Sacramento Valley in 1827, camping near modern-day Sacramento (Grunsky 1989). Other fur trappers and mountain men, some with the Hudson's Bay Company, entered California in the late 1820s and 1830s. A number of American settlers had arrived in California via overland routes by the mid-1840s.

With the signing of the Treaty of Guadalupe Hidalgo in 1848, 25 years of Mexican rule over California and the two-year Mexican–American War were ended. Lt. Colonel John C. Frémont of the U.S. Mounted Rifles had captured Sutter's Fort in Sacramento, made Sutter a prisoner, and encouraged an American uprising in 1846. The Bear Flag of the California Republic was raised in the town of Sonoma that same year, and in 1847 Frémont had captured the pueblo of Santa Barbara (Hoover et al. 2002). With its release of Mexico's northern lands, California became a territory of the United States.

In 1848 gold was discovered on the American River at Sutter's Mill not far from Sacramento in today's El Dorado County. The resulting Gold Rush era influenced the history of the state and the nation. Drawn by the tales of large nuggets and easy pickings, people traveled to the gold fields by sea or land from the eastern United States, Mexico, Europe, Chile, and China, among other countries. Prospects were established along the western slope of the Sierra Nevada from the Feather River south to the Tuolumne River drainage, and gold was also discovered in other parts of California.

California became the 31st state in 1850, largely as a result of the Gold Rush. By 1853, the population of the state exceeded 300,000 and in 1854, Sacramento became the state capital. Sacramento was a central location to the foothill mining districts, served as a river transportation hub, and had 12 stage lines by 1853. Sacramento was also the westernmost point of the Pony Express (1860–1861) and the terminal of the first California railroad, the Sacramento Valley line (Beck and Haase 1974). In San Joaquin County, a second supply and shipping center at the Port of Stockton also grew with the influx of gold miners.

Outside the city ports of Sacramento, Stockton and San Francisco, the increasing demand for food and commodities by the miners boosted the expansion and success of the agricultural industry, increased cattle and sheep ranching, and poultry production. Lumber production, the manufacture of clothing and dry goods, the ore processing industry, and the beginning of a fishing industry were also prompted during the Gold Rush era (Beck and Haase 1974). Thousands of settlers and immigrants continued to pour into the state, particularly after the completion of the transcontinental railroad in 1869. Subsequent settlement of the American West was also encouraged by the passage of the Swampland Acts of the mid 1800s-early 1900s and the Homestead Act of 1862, among others.

As gold mining declined, cattle and sheep ranching and agriculture assumed a more prominent role in the state's economy. The vast Central Valley's climate and fertile soil, plus the construction of extensive irrigation systems, combined to produce a variety of fruits, vegetables, nuts, and grains. Population growth and changes in the landscape within the Central Valley region reflect the importance of mining, the growth of agriculture and ranching, and the regional transportation network. The economy of the Central Valley is largely based on agriculture, and California remains a national leader in the production of agricultural products. A wealth of natural resources, such as lumber, minerals, fish, and petroleum deposits, also contribute to the region's continuing growth and development.

Paleontological Setting

Paleontological Assessment Standards

The Society of Vertebrate Paleontology (SVP) has established guidelines for the identification, assessment, and mitigation of adverse impacts on nonrenewable paleontological resources (SVP, 1995; 1996). Most practicing paleontologists in the nation adhere closely to the SVP's assessment, mitigation, and monitoring requirements as outlined in these guidelines, which were approved through a consensus of professional paleontologists. The SVP (1995) outlined criteria for screening the paleontological potential[1] of rock units and established assessment and mitigation procedures tailored to such potential. **Table 12-1** lists the criteria for high-potential, undetermined, and low-potential rock units.

TABLE 12-1
PALEONTOLOGICAL POTENTIAL CRITERIA

Paleontological Potential	Description
High	Geologic units from which vertebrate or significant invertebrate or plant fossils have been recovered. Only invertebrate fossils that provide new information on existing flora or fauna or on the age of a rock unit would be considered significant.
Undetermined	Geologic units for which little to no information are available.
Low	Geologic units that are not known to have produced a substantial body of significant paleontological material.

SOURCE: SVP 1995.

Paleontological Resource Potential

The majority of the project area lies within the Central Valley (or the Great Valley), which is an elongated depression that lies between the Coast Ranges and the Sierra Nevada. It is about 430

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[1] Paleontological potential refers to the likelihood that a rock unit will yield a unique or significant paleontological resource.

miles long and about 75 miles wide. At its extreme northern and southern ends, the elevation is about 400 feet. At its center, east of San Francisco Bay, it is slightly below sea level. Geologically, the Central Valley is a large sediment-filled basin, where interbedded mud, silt, sand and gravel thousands of feet deep overlie Sierran basement rocks that extend downward at an angle from the western slope of the Sierra Nevada.

The fossil yielding potential of a particular area is highly dependent on the geologic age and origin of the underlying rocks, and is best determined by identifying the aerial and stratigraphic extents of the local geology, and performing a site-specific search of fossil locality records and peer-reviewed literature. However, for the purpose of this regional-scale analysis, the fossil-yielding potential of the region can be classified based on the aerial and stratigraphic extents of several broad geologic categories. As detailed below, the paleontological potential of subsurface materials generally increases with depth beneath the surface, as well as proximity to valley margins and foothills. Soil and rock types are described below as having a low to high paleontological potential, based on SVP criteria (**Table 12-1**).

Disturbed soils and artificial fills

Urban and agricultural areas of the region have disturbed soils, reworked sediment, or artificial fills that are considered to have a *low paleontological potential*. In many urban locations, native soils have been heavily disturbed due to rough grading required for site developments, utility line installations and road construction. In agricultural areas, native soils have been greatly reworked due to historic plowing and crop-ripping. Such soils do not represent *in-situ* geologic deposits and it is highly unlikely that paleontological resources would be present. The depth of soil disturbances in urban areas is not uniform, but *in-situ* geologic deposits have generally been observed to occur at depths of about 6 feet below the ground surface (Dundas, 2010). The depth of historic-era disturbances in agricultural areas is also variable; typically the soils within the plow zone, for example, are disturbed to a depth of 2 feet or more below the ground surface.

Holocene-age sedimentary deposits

Holocene-age deposits (less than 10,000 years old) are considered to have a *low paleontological potential* because they are geologically immature and are unlikely to have fossilized the remains of organisms (fossilization processes take place over millions of years). Holocene-age deposits blanket the majority of the Central Valley floor and primarily consist of the following (Page, 1986):

- Flood-basin deposits of mud, muck, loam and sand, which occur during the flood-stages of major streams. These deposits are extensive along the long-axis of the central valley, and in the Sacramento-San Joaquin river delta.
- River deposits of gravel, sand and silt along channels, floodplains and natural levees of major streams. Typically, the widths of river floodplains are proportional to the size of their contributing watershed. Thus, these deposits range in width from several meters in the mountains to several kilometers near the delta.
- Younger (Holocene-age) alluvial fan deposits of gravel, sand and silt, typically located along the edges of the Central Valley, where streams exit the Sierra Nevada or Coast Range mountains. Alluvial fans form large lobes centered on a stream's outlet from the mountain, and develop due to the rapid deposition of their sediment load (triggered by the distinct break in stream gradient), and due to the lateral migration of steam channels over the land surface.

Generally, the maximum thickness of Holocene sediments in the Central Valley is estimated at 150 feet towards its center and in the bay delta regions, pinching out to near zero, along the valley margins (Page, 1986). The thickness of Holocene sediments is important because in almost all areas of the Central Valley, such sediments are underlain by Pleistocene or older sedimentary rocks with a high paleontological potential.

Pleistocene or older sedimentary rocks

Pleistocene or older (older than 10,000 years) continental sedimentary deposits are considered as having a *high paleontological potential*. Throughout California, such sedimentary formations have a history of yielding numerous vertebrate fossils of extinct mammals or other fauna. Examples of Pleistocene or older sedimentary rock units include the Tulare, Turlock Lake, Riverbank, Modesto, Kern River, San Joaquin, Etchegoin, Mehrten, Laguna, Temblor, Moreno and Tehama Formations. These formations have all yielded numerous vertebrate fossils (UCMP, 2010) and are mapped at the surface along the edges of the central valley and in many foothill areas, as well as underneath Holocene-age deposits closer to the valley's center (Page, 1986).

Metamorphic and igneous rocks

These rock units have a *low paleontological potential*, either because they formed beneath the surface of the earth (such as granite), or because they have been altered under high heat and pressures, chaotically mixed or severely fractured. Generally, the processes that form igneous and metamorphic rocks are too destructive to preserve identifiable fossil remains. The bulk of the Sierra Nevada range is formed by granitic intrusions and metamorphic rock complexes. The mountains in northern California and the Modoc Plateau area are composed primarily of volcanic rocks, and portions of the Coast Ranges are composed of metamorphic rock.

Regulatory Setting

Federal Regulations and Requirements

National Environmental Policy Act of 1969 (NEPA)

The National Environmental Policy Act (NEPA) addresses a wide range of environmental issues, and under NEPA federal agencies have broad responsibilities concerning the impacts of their activities on the environment, including resources of recognized archaeological or historic value (42 USC 4332; 40 CFR §1508.8, and 40 CFR §6.108[f]). Federal agencies are encouraged to coordinate compliance with Section 106 of the National Historic Preservation Act (NHPA) (see below) with the steps taken and documents prepared to meet the requirements of NEPA. The Advisory Council on Historic Preservation (ACHP) regulations (36 CFR 800.8.c) provide guidance on how the NEPA and Section 106 processes can be coordinated. The regulations also set forth the manner in which a federal agency can use the NEPA process and documentation to comply with Section 106.

National Historic Preservation Act (NHPA)

The National Historic Preservation Act (NHPA) of 1966 (16 USC §470), as amended, is the primary federal law governing the preservation of cultural and historic resources in the United States. The NHPA establishes the federal government policy on historic preservation and the programs through which this policy is implemented. Section 106 of NHPA (16 USC §470f) requires federal agencies to take into account the effects of their undertakings on any district, site, building, structure, or object that is included in or determined eligible for inclusion in the NRHP and to afford the ACHP a reasonable opportunity to comment on such undertakings (36 CFR §800.1). Under Section 106, the significance of any adversely affected cultural resource is assessed and mitigation measures are proposed to reduce any impacts to an acceptable level. Significant cultural resources (historic properties) are those resources that are listed in, or are eligible for listing on the NRHP per the criteria listed at 36 CFR §60.4. Section 101(d)(6)(A) of the NHPA allows properties of traditional religious and cultural importance to a Native American tribe to be determined eligible for inclusion on the NRHP. Section 106 also directs federal agencies to involve consulting parties, including the State Historic Preservation Officer (SHPO), Native American tribes, and local governments, and to provide an opportunity for public involvement during the compliance process (800 CFR §800.2(4)(c)).

To be eligible for the NRHP, cultural resources must possess integrity and meet at least one of the following four criteria delineated at 36 CFR §60.4:

- Are associated with events that have made a significant contribution to the broad patterns of our history (Criterion A);
- Are associated with the lives of persons significant in our past (Criterion B);
- Embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction (Criterion C), or
- Have yielded, or may be likely to yield, information important in prehistory or history (Criterion D).

Under Section 106, impacts of a project to historic properties that affect the characteristics that qualify a property for NRHP inclusion are considered a significant effect on the environment. Examples of adverse effects on historic properties are listed under 36 CFR §800.5(a)(2) and include, but are not limited to, physical destruction or damage to all or part of a property, change of the character of the use of the property or physical feature within the setting of the property that contribute to its significance, or introduction of visual, atmospheric, or audible elements that diminish the integrity of significant features of the property. If an adverse effect is found, the agency shall act pursuant to 36 CFR §800.6 (36 CFR §800.5[d][2]) to resolve the adverse effect by developing and evaluating alternatives or modifications to the undertaking that “could avoid, minimize or mitigate adverse effects on historic properties” (36 CFR §800.6[a]). Cultural resources that have been determined not eligible for the NRHP, in consultation with the SHPO and interested parties, require no further consideration unless new discoveries trigger re-evaluation.

Section 106 of the NHPA does not apply to paleontological resources unless they are found in a culturally-related context. In addition to the Antiquities Act (16 USC §431-433) of 1906, the preservation and salvage of fossils and other paleontological resources can be protected under the National Registry of Natural Landmarks (16 USC §461-467) and NEPA, which directs federal agencies to “preserve important historic, cultural, and natural aspects of our national heritage.”

Archeological Resources Protection Act of 1979 (ARPA)

The Archeological Resources Protection Act (ARPA) of 1979 (43 CFR §7) may impose additional requirements on an agency if federal or Indian lands are involved. ARPA: (1) prohibits unauthorized excavation on federal and Indian lands; (2) establishes standards for permissible excavation; (3) prescribes civil and criminal penalties; (4) requires agencies to identify archeological sites; and (5) encourages cooperation between federal agencies and private individuals.

American Indian Religious Freedom Act of 1978 (AIRFA)

The American Indian Religious Freedom Act (AIRFA) of 1978 (42 USC 1996 ad 1996a) affirms the right of Native Americans to have access to their sacred places. If a place of religious importance to American Indians may be affected by an undertaking, AIRFA promotes consultation with Indian religious practitioners, which may be coordinated with Section 106 consultation. Amendments to Section 101 of NHPA in 1992 strengthened the interface between AIRFA and NHPA by clarifying the following: (1) properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization may be determined to be eligible for inclusion in the NRHP; and (2) in carrying out its responsibilities under Section 106, a federal agency shall consult with any Indian tribe or Native Hawaiian organization that attaches religious and cultural significance to properties described under (1).

Native American Graves Protection and Repatriation Act of 1990 (NAGPRA)

For activities on federal lands, the Native American Graves Protection and Repatriation Act (NAGPRA) of 1990 (43 CFR §10) requires consultation with “appropriate” Indian tribes (including Alaska Native villages) or Native Hawaiian organizations prior to the intentional excavation, or removal after inadvertent discovery, of several kinds of cultural items, including human remains and objects of cultural patrimony. For activities on Native American or Native Hawaiian lands, which are defined in the statute, NAGPRA requires the consent of the Indian tribe or Native Hawaiian organization prior to the removal of cultural items. The law also provides for the repatriation of such items from federal agencies and federally assisted museums and other repositories.

The 1992 amendments to the NHPA strengthened NAGPRA by encouraging “protection of Native American cultural items...and of properties of religious or cultural importance to Indian tribes, Native Hawaiians, or other Native American groups” (§112[b][3]) and by stipulating that a federal “...agency’s procedures for compliance with Section 106...provide for the disposition of Native American cultural items from federal or tribal land in a manner consistent with §3(c) of the Native American Graves Protection and Repatriation Act....”

The final rule of the NAGPRA regulations, effective May 14, 2010, added procedures for the disposition of culturally unidentifiable Native American human remains in the possession or control of museums of federal agencies. The rule also amended sections of NAGPRA related to purpose and applicability of the regulations, definitions, inventories of human remains and related funerary objects, civil penalties, and limitations and remedies.

Executive Order 11593 (1971): Protection and Enhancement of the Cultural Environment

Under Executive Order 11593 (36 Federal Register (FR) 8921), the federal government shall provide leadership in preserving, restoring, and maintaining the historic and cultural environment of the Nation. This Executive Order addresses the NRHP and provides guidance to those involved with federally controlled or owned properties that should be inventoried and nominated for listing on the NRHP.

Executive Order 13007 (1996): Protection and Preservation of Native American Sacred Sites

Executive Order 13007 (61FR 26771–26772) provides direction to improve the management of Native American sacred sites on federal lands. The Executive Order strives to protect and preserve Indian religious practices by accommodating access to and ceremonial use of Indian sacred sites by Indian religious practitioners, and by avoiding adversely affecting the physical integrity of such sacred sites.

State Regulations and Requirements

California Environmental Quality Act (CEQA)

The California Environmental Quality Act (CEQA) of 1972 (PRC §21000, *et seq*.; California Environmental Quality Act Guidelines, California Code of Regulations (CCR), §1500, *et seq*.) is the principal regulatory control addressing impacts on historical and paleontological resources in California. Projects with the potential to adversely affect significant cultural resources must be reviewed through the CEQA process. As the designated CEQA lead agency for approval of the project, the Central Valley Water Board is responsible for complying with CEQA's requirements regarding the identification of feasible measures to mitigate significant adverse changes to historical and paleontological resources and ensuring that the measures are enforceable through permit conditions, agreements, or other measures.

Further direction on cultural resources can be found in the CEQA Guidelines (14 CCR §15064.5), "Determining the Significance of Impacts to Archaeological and Historical Resources." Subsection (a) defines the term "historical resources." Subsection (b) explains when a project may be deemed to have a significant effect on historical resources and defines terms used in describing those situations. Subsection (c) describes CEQA's applicability to archaeological sites and provides a bridge between the application of the terms "historical resource" and a "unique" archaeological resource.

The term "historical resource" is similar to but more inclusive than the NRHP criteria. Under CEQA, a historical resource includes, but is not limited to:

- A resource listed in, or determined to be eligible by the State Historical Resources Commission for listing in the CRHR (PRC §5024.1; 14 CCR §4852)
- A resource included in a local register of historical resources (as defined by PRC §5020.1[k]), or identified in a historical resource survey meeting the requirements of PRC §5024.1(g) (presumption of historical significance), and:
    - Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage (Criterion 1);
    - Is associated with the lives of persons important in our past (Criterion 2);
    - Embodies the distinctive characteristics of a type, period, region, or method of installation, represents the work of an important creative individual, or possesses high artistic values (Criterion 3); or
    - Has yielded, or may be likely to yield, information important in prehistory or history (Criterion 4).
- A resource that the lead agency otherwise determines is a historical resource as defined by PRC §5020(j) or §5024.1.

CEQA Guidelines (14 CCR §15064.7), "Thresholds of Significance," encourages agencies to develop thresholds of significance to be used in determining potential impacts and defines the term "cumulatively significant."

CEQA Guidelines (14 CCR §15065), "Mandatory Findings of Significance," state that a lead agency shall find that project may have a significant effect on the environment and thereby require an EIR (or, if applicable, an EIR/EIS) to be prepared in certain circumstances. Subsection (a) of §15065 is applicable to cultural resources, and states that the project has the potential to eliminate important examples of major periods of California history or prehistory.

CEQA Guidelines (14 CCR §15126.4), "Consideration and Discussion of Mitigation Measures Proposed to Minimize Significant Effects," subsection (b) discusses impacts of maintenance, repair, stabilization, restoration, conservation, or reconstruction of a historical resource. Subsection (b) also discusses mitigation through avoidance of damaging effects on any historical resource of an archaeological nature, preferably by preservation in place, or by data recovery through excavation if avoidance or preservation is not feasible. Data recovery must be conducted in accordance with an adopted data recovery plan.

In the case of projects that must consider both federal and State laws, regulations and standards, joint environmental documents, time limits for preparation, and cooperation with federal agencies on common documents is encouraged (14 CCR §15222, §15225).

California Public Resources Code

PRC §5024.1, establishes the CRHR; sets forth the criteria to determine significance (detailed above); defines eligible properties; and lists nomination procedures. As described in subsection (d), resources that are automatically listed in the CRHR include those listed in or formally determined eligible for listing in the NRHP and California Historical Landmarks from No. 770 onward.

PRC §5097.5 states that any unauthorized removal or destruction of archaeological or paleontological resources on sites located on public land is a misdemeanor. As used in this section, “public lands” is defined as “lands owned by, or under the jurisdiction of, the State, or any city, county, district, authority, or public corporation, or agency thereof.”

PRC §5097.9 prohibits the interference with the free expression of Native American religion as provided in the United States Constitution and the California Constitution; nor cause severe or irreparable damage to any Native American sanctified cemetery, place of worship, religious or ceremonial site, or sacred shrine on public property, except on a clear and convincing showing that the public interest and necessity so require.

PRC §5097.98 requires the Native American Heritage Commission (NAHC), upon notification by a county coroner, to notify the most likely descendants regarding the discovery of Native American human remains; enables the descendants, within 48 hours of the notification by the commission, to inspect the site of the discovery of Native American human remains and to recommend to the landowner or the person responsible for the excavation work means for treating or disposition, with appropriate dignity, the human remains and any associated grave goods; requires the owner of the land upon which Native American human remains were discovered, in the event that no descendant is identified, or the descendant fails to make a recommendation for disposition, or the landowner rejects the recommendation of the descendant, to reinter the remains and burial items with appropriate dignity of the property in a location not subject to further disturbance.

PRC §5097.99 prohibits obtaining or possessing Native American artifacts or human remains taken from a grave or cairn and sets penalties for those actions.

PRC §5097.991 states that it is the policy of the state that Native American remains and associated grave artifacts shall be repatriated.

PRC §21083.2 states that if a project may affect a resource that has not met with the definition of a historical resource set forth in §21084, then the lead agency may determine whether a project may have a significant effect on “unique” archaeological resources; if so an EIR (or, if applicable, an EIR/EIS) shall address these resources. If a potential for damage to unique archaeological resources can be demonstrated, such resources must be avoided; if they can not be avoided, mitigation measures shall be required. The law also discusses excavation as mitigation; discusses the costs of mitigation for several types of projects; sets time frames for excavation; defines unique and non-unique archaeological resources; provides for mitigation of unexpected resources; and sets financial limitations for this section.

PRC §21084.1 indicates that a project may have a significant effect on the environment if it causes a substantial adverse change in the significance of a historical resource; the section further defines a “historical resource” and describes what constitutes a “significant” historical resource.

California Administrative Code

California Administrative Code (14 Administrative Code §4307) states that no person shall remove, injure, deface, or destroy any object of paleontological, archaeological or historical interest or value.

California Penal Code

California Penal Code §622.5 establishes as a misdemeanor with willful injury, disfiguration, defacement, or destruction of any object or thing of archaeological or historical interest or value, whether situated on private or public lands.

California Health and Safety Code

California Health and Safety Code (HSC) §7050.5 requires that if human remains are discovered during construction outside of a dedicated cemetery, the project owner is required to contact the county coroner and further excavation or disturbance of land cease until the coroner has made a determination. If the coroner determines the remains are Native American, the procedures outlined in PRC §5097.98 must be followed.

Senate Bill 18 (SB 18) (Government Code §65352.3, §65352.4)

Signed into law in September 2004, and effective March 1, 2005, SB 18 permits California Native American tribes recognized by the NAHC to hold, on terms mutually satisfactory to the tribe and the landowner, conservation easements. The term “California Native American tribe” is defined as a federally recognized California Native American tribe or a non-federally recognized California Native American tribe that is on the contact list maintained by the NAHC.

SB 18 also requires that, prior to the adoption or amendment of a city or county’s general plan of the adoption of a Specific Plan, the city of county conduct consultations with California Native American tribes for the purpose of preserving specified places, features, and objects that are located within the city of county’s jurisdiction. Specifically, SB 18 requires public notice to be sent to tribes listed on the NAHC’s SB 18 Tribal Consultation list within the geographical areas affected by the proposed changes. Tribes must respond to a local government notice within 90 days (unless a shorter time frame has been agreed upon by the tribe), indicating whether or not they want to consult with the local government.

Local Ordinances and General Plans

Each local government has the authority to adopt a historic preservation ordinance which provides regulations for historical resources. Local historic preservation ordinances, which may address archaeological, cultural or historical resources, have been adopted by the Cities of Davis, Fresno, Napa, and Sacramento and by Tuolumne County (COHP 2009). In addition, some City and County General Plans also contain goals, policies and programs that promote the protection of cultural heritage within a Conservation and Open Space, Resources, or similarly titled Element. For instance, the Sacramento County General Plan includes a goal to inventory, protect and interpret the cultural heritage of the County, and the policies and programs that specifically address cultural resources of Native Americans (County of Sacramento 2007). Another example can be found in the San Joaquin County General Plan, which addresses historical, archaeological or cultural significance to the history of that County in the Heritage Resources section of the Resources Element (County of San Joaquin 2007).

Paleontological resources may not be included in General Plans for any local agency with jurisdiction within the Central Valley region. However, paleontological resources are included as significant cultural resources under CEQA.

12.2 Impacts and Mitigation Measures

Approach and Methods

This section describes the approach and methods used to determine the potential impacts on cultural resources of dairy digesters and discharges that may be authorized by the project. This analysis included a review of the location, cultural setting, and potential construction elements of the project. Potential direct, indirect and cumulative impact mechanisms for disturbing, materially altering, or demolishing cultural resources, including buried human remains, as a result of construction of dairy digester facilities and related ground-disturbing activities were considered.

Thresholds of Significance

As referenced under the Regulatory Setting section of this chapter, subsection (b) of CEQA Guidelines (14 CCR §15064.5) provides that a project with an effect that may cause a substantial adverse change in the significance of a historical resource is a project that may have a significant effect on the environment. Adverse impacts to cultural resources would be considered significant if the project would:

- Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5 of the CEQA Guidelines;
- Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5 of the CEQA Guidelines;
- Directly or indirectly destroy a unique paleontological resource or site; or
- Disturb any human remains, including those interred outside of formal cemeteries

§15064.5 provides that, in general, a resource not listed on State or local registers of historical resources shall be considered by the Lead agency to be historically significant if the resource meets the criteria for listing on the CRHR. This section also provides standards for determining what constitutes a “substantial adverse change” that must be considered a significant impact on archaeological or historical resources. For example, a “substantial adverse change in the significance of an historical resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired” (CEQA Guidelines, 14 CCR §15064.5 [b][1]).

§15064.5 of the CEQA Guidelines, pertains to the determination of the significance of impacts to archaeological and historical resources. Direct and indirect impacts may occur by:

- Physically damaging, destroying, or altering all or part of the resource;
- Altering characteristics of the surrounding environment that contribute to the resource's significance;
- Neglecting the resource to the extent that it deteriorates or is destroyed.
- The accidental discovery of cultural resources during construction.

In each of the following issues, potential significant impacts to cultural resources resulting from implementation of the project were identified and mitigation measures were developed. Adherence to established regulations, standards, and policies would avoid or minimize potential impacts.

Impact 12.1: Construction of dairy digester and co-digester facilities could result in the adverse change in the significance of a historical or archaeological resource, pursuant to §15064.5. (Significant)

At the program level of environmental review, it is not possible to determine if historical or archaeological resources would be impacted by the construction and installation of dairy digester facilities, including underground pipelines and utility infrastructure. Although cultural resource inventories and evaluations are typically conducted prior to preparation of a CEQA document, the size of the program area and the degree of uncertainty regarding the precise location of facilities renders program level inventories prior to release of this Program EIR untenable. Construction of dairy digester facilities could potentially cause direct damage to or destroy identified or undocumented historical resources of an architectural or archaeological nature, or to archaeological resources that may be historical resources or unique archaeological resources, by ground-disturbance or demolition activities at the surface or in the subsurface. Direct impacts to such resources may result from, but not be limited to, the immediate disturbance of the materials, features or deposits, whether from vegetation removal, compaction or vibrations resulting from vehicle travel over the surface, earth-moving activities, excavation, demolition of overlying structures, or emissions. Indirect operational impacts to identified or undocumented historical resources or significant archaeological resources would be related to potential alteration of the resource setting through the introduction of visual project elements (e.g., covered lagoons/ponds, aboveground digester tanks, on-site electrical production units, biogas processing facilities, maintenance activities, and/or ancillary facilities) that contrast with the setting of the historical or significant archaeological resource and could diminish the integrity of the resource's significant historic features. Other indirect impacts to consider include increased erosion due to clearance and preparation of the project area, or from inadvertent damage or outright vandalism to exposed resource materials due to improved accessibility.

Dairy digester facilities and infrastructure would located in the upper layer(s) of soil, but there is the potential that undocumented cultural resources, including human remains, may be encountered and disturbed or destroyed during construction or ground-disturbing activities, particularly during trenching for underground pipelines and utility infrastructure. Based on the cultural setting and knowledge of the occurrence and extent of known archaeological resources, the overall project area may be low to moderately sensitive for the discovery of subsurface prehistoric archaeological resources, ethnohistoric archaeological resources, historic-period archaeological resources, and human remains. The potential for discovery of prehistoric or ethnohistoric archaeological resources is considered highly sensitive within or near slope or topographic features or within natural resource collecting areas considered culturally sensitive for Native Americans, such as natural rivers and streams, springs, ponds/lakes, ecotones, ridgetops, mid-slope benches, flat benches, meadows, oak groves, and source areas for raw materials. Prehistoric or ethnohistoric materials might include chipped stone, stone milling tools, and soil darkened by cultural activities (midden); examples of significant discoveries would include villages or burials.

The potential for discovery of historic-period archaeological resources is considered highly sensitive within or near areas directly related to the region's transportation, industrial, commercial and agricultural past, traces of which, such as railroad grades and bridges, irrigation canals, houses, farm and ranch buildings, early lumber industry structures, cemeteries, and early mining operations, can occur in virtually any setting or landform. Historic materials might include metal, glass, or ceramic artifacts; examples of significant discoveries might include former privies or refuse pits.

Due to the possible presence within the project area of identified or undocumented historical resources or significant or unique archaeological resources that could be directly or indirectly disturbed, materially altered, or demolished by project implementation, construction-related impacts on cultural resources are potentially significant.

Mitigation Measures

> **Measure 12.1a:** In order to determine whether a project may cause a significant impact to cultural resources, and therefore, have an adverse effect on the environment, the Central Valley Water Board shall require a project-specific cultural resources inventory and evaluation with each application submitted to establish a digester or co-digester facility (COHP 2001).A project-level cultural resources inventory and evaluation shall be required prior to project implementation to provide a thorough assessment of the project's potential direct, indirect, and cumulative impacts on historical resources or significant archaeological resources during construction and installation, in adherence to established regulations, standards, and policies to avoid or minimize potential impacts.
>
> For projects that constitute federal undertakings, as described in the Federal Agencies section of the Introduction (Chapter 2), the cultural resources study shall be prepared in accordance with Section 106 of the NHPA. The cultural resources study and inclusive mitigation measures shall form the basis for the cultural resources component of the project-level environmental documentation prepared for the project under Section 106 (NPS 1991).
>
> Prior to ground-disturbing activities, the project applicant or agency(s) responsible shall retain a qualified professional archaeologist, who meets the Secretary of the Interior's professional qualifications standards for archaeology (36 CFR §61), to (1) conduct a research search at the appropriate information center of the California Historical Resources Information System (CHRIS) to determine whether the project area has been previously surveyed and whether cultural resources were identified within the project area, and if the project area is considered sensitive for the presence of cultural resources; (2) request a Sacred Lands search from the NAHC to determine whether known sacred sites or traditional cultural resources are situated within the project area; and (3) request a contact list from the NAHC of Native American

tribes, groups or individuals who may have information about the project area, and contact the listed parties requesting information and any concerns about the project.

In the event the CHRIS records search indicates that no previous survey has been conducted, the qualified archaeologist shall recommend whether a survey is warranted to satisfy the requirements of CEQA based on the sensitivity of the project area for cultural resources. As necessary, prior to the start of ground disturbance, the project applicant or agency(s) responsible shall retain a qualified archaeologist to conduct the recommended project-level survey in compliance with CEQA requirements (14 CCR §15064.5 and PRC §21083.2) and in accordance with the standards set by the Secretary of the Interior.

After completion of the survey, the qualified archaeologist shall complete a technical report documenting the results of all work, and any cultural resources identified during the survey shall be formally recorded on Department of Parks and Recreation series 523 forms. The report shall follow the Office of Historic Preservation's ARMR guidelines (*Archaeological Resource Management Reports: Recommended Contents and Format*) (COHP 1990). The report shall include assessment of the significance of identified resources according to the applicable local, State and federal significance criteria, assessment of the sensitivity of the project area for cultural resources, and recommend appropriate procedures to either further investigate, or mitigate adverse impacts in conformance with the protocols set forth in 14 CCR §15126.4. The final technical report shall be approved by the lead agency prior to the initiation of any ground-disturbing activities. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum, and not be made available for public disclosure. The final written report should be submitted to the appropriate CHRIS information center(s) within three (3) months after the work has been completed.

If cultural resources within a project area identified by the searches at the CHRIS or NAHC or during the survey are considered potentially significant, the project applicant or agency(s) responsible shall undertake additional studies to evaluate the resources' NRHP or CRHR eligibility and to recommend further mitigative treatment. Evaluations shall be based on surface remains, subsurface testing, archival and ethnographic resources, and in the framework of the historic context and important research questions of the project area.

If cultural resources within a project area identified by the searches at the CHRIS or NAHC, during the survey, or by the evaluation process are determined significant historical resources, the lead agency must review and approve treatment measures devised by the project applicant or agency(s) responsible, in concert with a qualified archaeologist, or architectural historian for built environmental resources, and other concerned parties, to ameliorate any "substantial adverse change" in the significance of each historical resource resulting from project implementation. When a project may impact historical resources on State lands, consultation with California's Office of Historic Preservation (OHP) is required pursuant to PRC §5024. The SHPO may also be consulted regarding appropriate treatment measures for historical resources.

Treatment measures for historical resources that are archaeological or ethnographic in nature may include preservation through avoidance or project redesign, incorporation within open space or conservation easements, covering with a layer of sterile soil, data recovery excavation, photodocumentation (including low-level aerial photography, video, and scale drawings), or similar measures. Treatment measures for historical resources that are architectural in nature may include Historic American Buildings Survey/Historic American Engineering Report (HABS/HAER) documentation to formally document historic resources through the use of large-format photography, measured drawings, written architectural descriptions, and historical narratives. Such documentation packages are entered into the Library of Congress, and a second copy is generally archived in the regional information centers of the CHRIS. In the event of building relocation, the Lead agency shall ensure that any alterations to significant buildings or structures conform to the *Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings* (Grimmer and Weeks 1992). All final documentation of mitigative treatment for historical resources of an archaeological or architectural nature to be impacted by the project will be approved by the Lead agency prior to the initiation of any project ground-disturbing activities.

If cultural resources identified within a project area are neither a historical resource nor unique archaeological resource, there would be no significant effect to the environment and no further treatment of those known resources would be required.

Measure 12.1b: Inadvertent discovery measures for cultural resources shall be implemented during all construction activities within the project area. Measures shall include procedures for discovery and protection of cultural resources, including human remains, during construction or earth-disturbing activities. If human remains are discovered during construction or earth-disturbing activities, the applicant shall halt all activities and contact the appropriate authorities in compliance with PRC §5097.98.

The project applicant or agency(s) responsible shall implement inadvertent discovery measures during all construction activities within the project area. Within project areas of identified archaeological sensitivity, measures would include: (1) a worker education course for all construction personnel; (2) monitoring of all earth-disturbing activities by a qualified archeologist; and (3) procedures for discovery of cultural resources, including human remains, during construction or ground-disturbing activities if an archaeological monitor is not present. If known traditional cultural resources are located within the project area or if the potential for discovery of buried traditional cultural resources is high, a culturally affiliated Native American, with knowledge in cultural resources, should also be retained to monitor all ground-disturbing activities. Monitoring within recent fill deposits would not be required.

The worker education course for all construction personnel will be conducted immediately prior to initiation of ground-disturbing activities. The course will explain the importance of, and legal basis for, the protection of significant archaeological resources. Each worker will also learn the proper procedures to follow in the event cultural resources or human remains/burials are uncovered during construction activities, including work curtailment or redirection and to immediately contact their supervisor and the archaeological monitor. The worker education session will include visuals of artifacts (prehistoric and historic) that might be found in the project vicinity, and may include handouts.

The project applicant or agency(s) responsible shall provide an on-site qualified archeological monitor during all earth-disturbing activities, including but not limited to grading, excavation, trenching, or removal of existing features of the subject property, within project areas considered sensitive for the discovery of buried archaeological resources. If an unknown cultural resource were discovered, the monitor(s) shall have the authority to halt all ground-disturbing activities within 100 feet of the find, and the resource should be immediately evaluated by the qualified archaeologist. If the find is determined to be a significant historical resource and the archaeological resource cannot be avoided, then applicable mitigation measures for significant resources will be completed (e.g., preservation in place, data recovery program pursuant to PRC §21083.2[i]). During evaluation or mitigative treatment, ground disturbance and construction work could continue on other parts of the project area.

In the event an archaeological monitor is not present when cultural resources, including human remains, are discovered during construction or ground-disturbing activities, the project applicant or agency(s) responsible shall halt all activities within 100 feet of the find until a qualified professional archaeologist can evaluate it. The archaeologist will examine the findings, assess their significance, and recommend appropriate procedures to either further investigate or mitigate adverse impacts (e.g., adverse effect on a significant historical resource) to the resources encountered in conformance with the protocols set forth in PRC §5097.98. Any human remains encountered during construction will be treated in accordance with HSC §7050.5.

Impact Significance After Mitigation: Less than Significant

Implementation of the Mitigation Measures 12.1a and 12.1b would ensure that any identified or undocumented historical resource or archaeological resource, or inadvertent discoveries of cultural resources during construction or ground-disturbing activities, would be properly recorded and the historical significance of the resources documented.

Impact 12.2: Construction of dairy digester and co-digester facilities could result in the disruption of human remains, including those interred outside formal cemeteries. (Significant)

Archaeological evidence indicates that humans have inhabited the Central Valley region as early as 8,000 to 12,000 years ago. It is not always possible to predict where human remains may occur outside of formal cemeteries, therefore the construction and installation, regardless of depth, of dairy digester facilities, including underground pipelines and utility infrastructure could potentially cause direct damage to or destroy undocumented human remains not interred in cemeteries or marked, formal burials. Direct impacts to human remains may result from the immediate disturbance of the materials, features or deposits, whether from vegetation removal, compaction or vibrations resulting from vehicle travel over the surface, earth-moving activities, excavation, trenching, or demolition of overlying structures. Indirect impacts to consider include increased erosion due to project area clearance and preparation, or from inadvertent damage or outright vandalism to exposed resource materials due to improved accessibility.

Due to the possible presence of undocumented human remains within the project area, construction-related impacts on cultural resources would be significant.

Mitigation Measure

Measure 12.2: Implement inadvertent discovery measures for the protection of cultural resources, including human remains (Measure 12.1b).

Impact Significance After Mitigation: Less than Significant

Implementation of the Mitigation Measure 12.1b would ensure that any undocumented cultural resources or inadvertent discoveries of cultural resources, including human remains, during construction or ground-disturbing activities would be properly recorded and the historical significance of the resources documented.

Impact 12.3: Construction of dairy digester and co-digester facilities could result in direct or indirect disturbance or destruction of a unique paleontological resource or site or unique geologic feature. (Significant)

The proposed regulatory program for dairy digesters could result in construction activities (excavation and earthwork) that have the potential to disturb or destroy significant paleontological resources. Rough grading and soil excavation may be required for site preparation, foundation excavations, on-site utility trenches and lagoons. Should pipelines be used to convey manure or biogas to off-site centralized facilities, additional cut and cover trenching would occur, and would likely be located along existing utility or road corridors.

In terms of potential effects on paleontological resources, the important aspects of the various construction scenarios include (1) the depth of excavation required for individual facilities, and (2) the degree to which various construction scenarios would affect previously undisturbed soil. The geographical extent of program effects would likely be within, near, or between dairies. As discussed in the setting, most agricultural lands have been disturbed, generally on the order of a depth 2 feet, and impacts on paleontological resources in shallow soils are unlikely. For these reasons, site preparation activities (rough grading) and construction of shallow foundations are unlikely to unearth paleontological resources.

However, construction activities that disturb *in-situ* geologic units of high paleontological potential could potentially affect unique and significant paleontological resources. As discussed in the setting, these include all geologic formations that may be classified as Pleistocene or older sedimentary rocks and deposits. These occur around the edges of the Central Valley and in many of the low foothills or the Sierra Nevada and Coast Ranges. These units also may exist within very short depths beneath areas mapped as Holocene alluvium. Generally, soil disturbances required for construction of dairy digester facilities would be shallow, would occur in previously disturbed soil, and would not encounter undisturbed Pleistocene or older sedimentary units. However, there are several notable exceptions:

Earthen ponds or lagoons: Construction of earthen ponds or lagoons has the greatest potential to adversely affect paleontological resources. Such facilities often require deep excavation of substantial volumes of soil, and such excavations may extend into *in-situ* geologic units. If the geologic unit has a high paleontological potential, construction could potentially disturb significant fossil resources. Similar projects in the Central Valley have a history of yielding significant paleontological materials (California State University 2008).

Utility installations in native soil: While most utility installations would occur in previously disturbed soil, pipeline installation, in certain cases, could occur deeply enough to disturb potentially sensitive geologic units. This effect is most likely to occur if off-site central facilities use pipelines to collect manure or biogas, because construction of pipelines across linear features (such as highways, busy intersections, railroads, creeks or drainages) may require the use of jack-and-bore tunneling or directional drilling methods. Such methods require excavation of receiving/launch pits which can be up to 20 feet deep, as well as horizontal boring of material in order to undershoot existing obstructions (drainages, utilities, highway underpasses, etc.). Such excavations may encounter *in situe* formations and could disturb significant paleontological resources.

Construction of covered earthen ponds or lagoons or pipelines within units of high paleontological potential may have a potentially significant impact on paleontological resources. However, most earthwork and rough grading that may indirectly occur as a result of the project is considered unlikely to disturb paleontologically-sensitive formations. As such, site preparation, rough grading and shallow foundation excavations on existing dairies are unlikely to disturb significant paleontological resources. While the probability of unearthing significant paleontological resources in such circumstances is low, any level of fossil disturbance is considered significant under CEQA.

Mitigation Measure

> **Measure 12.3:** If paleontological resources, such as fossilized bone, teeth, shell, tracks, trails, casts, molds, or impressions are discovered during ground-disturbing activities, all ground disturbing activities within 50 feet of the find shall be halted until a qualified paleontologist can assess the significance of the find and, if necessary, develop appropriate salvage measures in consultation with the lead agency and in conformance with Society of Vertebrate Paleontology Guidelines (SVP, 1995; SVP, 1996). Additional guidance may be found in *Standard Guidelines for the Assessment and Mitigation of Adverse Impacts to Nonrenewable Paleontologic Resources* (SVP 2010).
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> **Impact Significance After Mitigation:** Less than Significant
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> Implementation of the Mitigation Measure 12.3 would ensure that any inadvertent discoveries of paleontological resources during construction or ground-disturbing activities would be properly recorded and documented.

Impact 12.4: Development of dairy digester and co-digester facilities could contribute to cumulative impacts related to archaeological, historical, and/or paleontological resources. (Significant)

The geographic scope of the area potentially affected by cumulative cultural resources impacts is defined by the cultural setting and ethnographic territory of the prehistoric, ethnohistoric, and historic peoples who have occupied the project area — an extensive area within the northern interior, Central Valley, and Sierra Nevada regions of inland California. The preferred location for dairy digester and co-digester facilities would likely be at existing dairies or centralized locations in the vicinity of existing dairies, which may be connected with the agricultural facet of the region's historic transportation, industrial, commercial, and agricultural past.

Construction activities associated with development of dairy digester and co-digester facilities, combined with construction of other projects in the area and could contribute to the progressive loss of cultural resources or paleontological resources and result in significant cumulative impacts. The project includes mitigation that would reduce potential impacts to a less-than-significant level. Similar measures may also be implemented for other related projects that have the potential to affect cultural and paleontological resources. Consequently, the project's contribution to cumulative effects is significant. Mitigation measures noted below would reduce the impacts to less than significant levels.

Mitigation Measure

Measure 12.4: Implement Measures 12.1a, 12.1b, 12.2, and 12.3.

Impact Significance After Mitigation: Less than Significant

Implementation of the Mitigation Measures 12.1a, 12.1b, 12.2, and 12.3 would ensure that potential cumulative effects to cultural and paleontological resources would be minimized.

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CHAPTER 13
Geology, Soils, and Seismicity

13.1 Setting

Environmental Setting

Regional Physiography

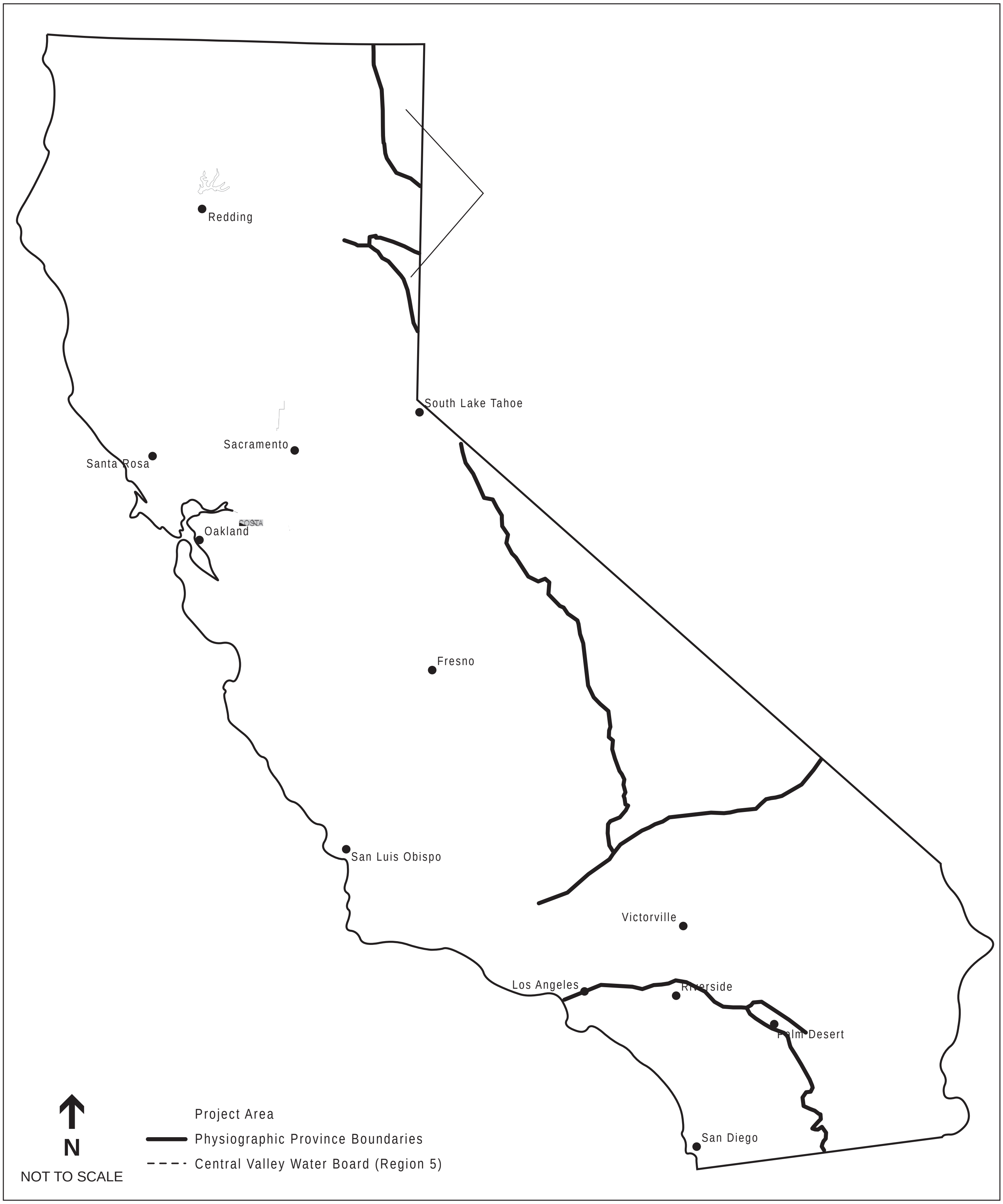
California has an extremely varied landscape and physiography, which ranges from broad, nearly flat valleys to jagged, glaciated mountains. To help distinguish between these areas, California is divided into 12 geomorphic provinces that are topographic-geologic groupings of convenience based primarily on landforms and geologic history (Norris and Webb, 1976). The project area is crosses seven geomorphic provinces of California which are described below and shown in **Figure 13-1**.

Coast Ranges

The Coast Ranges province extends approximately 600 miles from the Santa Ynez River in Santa Barbara County to the Oregon border in northern Humboldt County. The region consists of northwest-trending mountain ranges, broad basins, and elongated valleys generally parallel to the San Andreas fault. The Coast Ranges are generally divided in two sub-provinces, north and south of San Francisco Bay. In the Coast Ranges, older, consolidated rocks are characteristically exposed in the mountains but are buried beneath younger, unconsolidated alluvial fan and fluvial sediments in the valleys and lowlands (CGS, 2002). A small portion of the western edge of the Region 5 located in the Coast Ranges province.

Great Valley

The Great Valley province is an elongated depression that lies between the Coast Ranges and the Sierra Nevada. It is about 430 miles long and 75 miles wide. At its extreme northern and southern ends, the elevation is about 400 feet. At its center, east of San Francisco Bay, it is slightly below sea level. The Great Valley province is drained by the Sacramento and the San Joaquin Rivers. The confluence of these two rivers is east of San Francisco Bay. This area, the Sacramento–San Joaquin Delta, was formerly a massive wetland. It is now one of California's important agricultural areas. The Great Valley is a trough in which sediments have been deposited almost continuously since the Jurassic (about 160 million years ago). Sands and gravel over 30,000 feet deep lie upon Sierran basement rocks that extend downward at an angle from the western slope of the Sierra Nevada. Oil fields have been found in southernmost San Joaquin Valley and along its southwestern margin (CGS, 2002). The Great Valley province is located entirely within the jurisdictional boundaries of the Central Valley Region (Region 5).



SOURCE: Central Valley Water Board, 2009; USGS, 2010; and ESA, 2010

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Figure 13-1
California Physiographic Provinces

Sierra Nevada

The Sierra Nevada is a tilted fault block nearly 400 miles long. Its east face is a high, rugged multiple scarp, contrasting with the gentle western slope that disappears under sediments of the Great Valley. Deep river canyons are cut into the western slope. Their upper courses, especially in massive granites of the higher Sierra, are modified by glacial sculpturing, forming features such as Yosemite Valley. The high crest culminates in Mt. Whitney with an elevation of 14,495 feet above sea level near the eastern scarp. The metamorphic bedrock contains goldbearing veins in the northwest trending Mother Lode. The northern Sierra boundary is marked where bedrock disappears under the Cenozoic volcanic cover of the Cascade Range (CGS, 2002). The majority of the Sierra Nevada province is located in the eastern portion of Region 5.

Cascade Range

The Cascade Range, a chain of volcanic cones, extends through Washington and Oregon into California. It is dominated by Mt. Shasta, a glacier-mantled volcanic cone, rising 14,162 feet above sea level. The southern termination is Lassen Peak, which last erupted in the early 1900s. The Cascade Range is transected by deep canyons of the Pit River. The river flows through the range between these two major volcanic cones, after winding across interior Modoc Plateau on its way to the Sacramento River. All of the known historic eruptions in the contiguous United States have been from Cascade volcanoes. The two most recent were Lassen Peak in 1914 to 1921 (CGS, 2002). The Cascade Range province is almost entirely located within the northernmost portion of Region 5.

Klamath Mountains

The Klamath Mountains have rugged topography with prominent peaks and ridges reaching 6,000-8,000 feet above sea level. In the western Klamath, an irregular drainage is incised into an uplifted plateau called the Klamath peneplain. The uplift has left successive benches with gold-bearing gravels on the sides of the canyons. The Klamath River follows a circuitous course from the Cascade Range through the Klamath Mountains. The province is considered to be a northern extension of the Sierra Nevada (CGS, 2002). A small portion of the Klamath Mountains province is located in the northwest portion of Region 5.

Modoc Plateau

The Modoc Plateau is a volcanic table land (elevation 4,000- 6,000 feet above sea level) consisting of a thick accumulation of lava flows and tuff beds along with many small volcanic cones. Occasional lakes, marshes, and sluggishly flowing streams meander across the plateau. The plateau is cut by many north-south faults. The province is bound indefinitely by the Cascade Range on the west and the Basin and Range on the east and south (CGS, 2002). A small portion of the Modoc Plateau province is located in the northeast portion of Region 5.

Basin and Range

The Basin and Range is the westernmost part of the Great Basin. The province is characterized by interior drainage with lakes and playas, and the typical horst and graben structure (subparallel, fault-bounded ranges separated by down dropped basins). Death Valley, the lowest area in the United States (280 feet below sea level at Badwater), is one of these grabens. Another graben, Owens Valley, lies between the bold eastern fault scarp of the Sierra Nevada and Inyo Mountains (CGS, 2002). A small portion of the Basin and Range province is located in the northeastern most portion of Region 5.

Geologic and Seismic Hazards

As described above, the landscape is extremely varied within the project area. As a result, the project area is potentially prone to a range of geologic and seismic hazards such as slope failure, unstable soils, and seismic related ground shaking and failure. Potential geologic and seismic hazards that could occur in the project area are described below.

Geologic Hazards

Mass Wasting and Slope Failure

Slope failures (commonly referred to as landslides) include many phenomena that involve the downslope displacement and movement of material either triggered by static (i.e., gravity) or dynamic (i.e., earthquake) forces. Slope failures are categorized as falls, topples, spreads, slides, or flows. Falls are masses of soil or rock that dislodge from steep slopes and free-fall, bounce, or roll downslope. Topples move by the forward pivoting of a mass around an axis below the displaced mass. Lateral spreads, described in more detail below, are commonly induced by liquefaction of material in an earthquake and move by horizontal extension and shear or tensile fractures. Slides displace masses of material along one or more discrete planes. In rotational sliding the slide plane is curved and the mass rotates backwards around an axis parallel to the slope; in translational sliding the failure surface is more or less planar and the mass moves parallel to the ground surface. Flows mobilize as a deforming, viscous mass without a discrete failure plane (CGS, 2010a). Slope stability can depend on a number of complex variables, including the geology, structure, and amount of groundwater, as well as external processes such as climate, topography, slope geometry, and human activity. The factors that contribute to slope movements include those that decrease the resistance in the slope materials and those that increase the stresses on the slope.

Unsuitable Soils

The distribution of soil units is highly variable within the project area. The National Resources Conservation Service (NRCS) has published individual soil surveys for all Counties in California. Information contained in these soil surveys is typically used by farmers and ranchers to help determine whether a particular soil type is suited for crops or livestock and what type of soil management might be required. However, these surveys are also used by planners and engineers to determine soil suitability for construction activities. Because the precise location of the location of proposed dairy digesters is unknown, a general discussion of potentially unsuitable soil conditions including corrosive, expansive, and erodible soils is provided below.

Corrosive Soils

Corrosivity of soils is commonly related to several key parameters: soil resistivity, the presence of chlorides and sulfates; oxygen content; and pH. Typically, the most corrosive soils are those with the lowest pH and highest concentration of chlorides and sulfates. Wet/dry conditions can result in a concentration of chlorides and sulfates as well as movement in the soil that tends to break down protective corrosion films and coatings on the surface of building materials. High-sulfate soils are also corrosive to concrete and may prevent complete curing, reducing its strength considerably. Low pH and/or low-resistivity soils can corrode buried or partially buried metal structures (ESA, 2007).

Subsidence and Expansive Soils

Land subsidence is the loss of surface elevation due to removal of subsurface support. Subsidence has many causes, including seismically induced stresses and the extraction of mineral, liquid and/or gas deposits. Although mineral and gas extraction can and do result in subsidence, it is more common for subsidence to occur as a result of groundwater extraction in excess of groundwater recharge. For example, in areas of the San Joaquin Valley of California, the extensive pumping of groundwater for use in crop production has resulted in much of the valley floor subsiding over several generations.

Expansive soils have a significant amount of clay particles that can give up water (shrink) or take on water (swell). The change in volume exerts stress on buildings and other loads placed on these soils. The occurrence of these soils often is associated with geologic units having marginal stability. Expansive soils can be dispersed widely, found in hillside areas, as well as low-lying areas in alluvial basins. As a result, soils testing to identify expansive characteristics and appropriate remediation procedures are routinely required by current grading and building codes.

Erodible Soils

Erosion is the detachment and movement of soil materials through natural processes or human activities. In general, rates of erosion can vary depending on the soil resource’s capacity to drain water, slope angle and length, extent of groundcover, and human influence. Given the varied topography of the project area, areas with increased susceptibility to soil erosion would depend on the sediment or rock type, its porosity and permeability, the slope or grade of the land, the amount of existing ground cover from vegetation, amount of existing soil disturbance, and land use type.

Seismic Hazards

Seismic hazards are generally classified in two categories: primary seismic hazards (surface fault rupture and ground shaking) and secondary seismic hazards (liquefaction and other types of seismically induced ground failure, along with seismically induced landslides). Because periodic earthquakes accompanied by surface displacement can be expected to continue in the project area through the lifetime of the proposed project, the effects of strong groundshaking and fault rupture are of primary concern with respect to the safe operation of project facilities. **Figure 13-2** shows the principal active faults in California zoned under the Alquist-Priolo Earthquake Fault Zoning Act.

MAP SYMBOL	NAME OF PRINCIPAL FAULT
B	*Brawley
BS	Bartlett Springs
BV	*Buena Vista
C	*Calaveras
CA	Calico
CH	*Cleveland Hill
CM	Cedar Mtn.
CU	Cucamonga
DS	Deep Springs
DV	Death Valley
E	Elsinore
FS	*Fort Sage
G	*Garlock
GR	*Greenville
GV	*Green Valley and Concord
H	*Hayward
HA	Hat Creek
HC	*Hilton Creek & related
HE	Helendale
HL	Honey Lake
HU	Hunting Creek
I	*Imperial
J	*Johnson Valley & related
KF	*Kern Front & related
L	Lenwood
LA	Los Alamos
LL	*Little Lake
LO	Los Osos
LS	Little Salmon
M	*Manix
MA	*Maacama
MB	Malibu
MC	McArthur
ME	Mesquite Lake
MR	Mad River
N	*Nunez
ND	Northern Death Valley
NF	North Frontal
NI	*Newport-Inglewood
O	Ortigalita
OV	*Owens Valley
P	Pleito & Wheeler Ridge
PI	*Pisgah-Bullion
PM	Pinto Mountain
PV	Panamint Valley
R	Raymond Hill
RC	Rose Canyon
RH	Rodgers Creek-Healdsburg
RM	Red Mountain
SA	*San Andreas
SC	San Cayetano
SF	*San Fernando
SG	San Gregorio
SGA	San Gabriel
SH	*Superstition Hills
SJ	*San Jacinto
SN	Sierra Nevada (zone)
SS	San Simeon
SSR	Simi-Santa Rosa
SV	Surprise Valley
W	Whittier
WM	*White Mtns
WW	*White Wolf
V	Ventura

Faults zoned through August 2007

Approximate boundaries of work-plan regions and year studied

Note: Other faults may be zoned in the future and existing zones may be revised when warranted by new fault data

SOURCE: Alquist-Priolo Earthquake Fault Zoning Act, 1974-2007;
Central Valley Water Board, 2009; and ESA, 2010

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Figure 13-2
Principal Active Faults Zoned Under the Alquist-Priolo Earthquake Fault Zoning Act

Earthquake Groundshaking

An earthquake is classified by the amount of energy released, which traditionally has been quantified using the Richter scale. Seismologists have begun using a moment magnitude (M) scale because it provides a more accurate measurement of the size of major and great earthquakes. For earthquakes of less than M 7.0, the moment and Richter magnitude scales are nearly identical. For earthquake magnitudes greater than M 7.0, readings on the moment magnitude scale are slightly greater than a corresponding Richter magnitude (CGS, 1996).

The intensity of earthquake-induced ground motions can be described using peak ground accelerations, represented as a fraction of the acceleration of gravity (g).[1] The California Geological Survey (CGS) provides data to estimate peak ground accelerations in California. Taking into consideration the uncertainties regarding the size and location of earthquakes and the resulting ground motions that can affect a particular site, the map depicts peak ground accelerations with a 10 percent probability of being exceeded in 50 years, which equals an annual probability of 1 in 475 of being exceeded each year (CGS, 2010). **Figure 13-3** shows the potential shaking hazard for the project area.

Another commonly used measure of earthquake intensity is the Modified Mercalli Scale, which is a subjective measure of the strength of an earthquake at a particular place as determined by its effects on people, structures, and earth materials. **Table 13-1** presents the Modified Mercalli Scale for Earthquake Intensity, along with approximate earthquake magnitudes and average peak accelerations associated with each intensity value (Bolt, 1988).

The intensity of the seismic shaking, or strong ground motion, during an earthquake is dependent on the distance between the project area and the epicenter of the earthquake, the magnitude of the earthquake, and the geologic conditions underlying and surrounding the project area. Earthquakes occurring on faults closest to individual project related facilities would most likely generate the largest ground motions.

Surface Fault Rupture

Although future earthquakes could occur anywhere along the length of an active fault, only regional strike-slip earthquakes of magnitude 6.0 or greater are likely to be associated with surface fault rupture and offset (CGS, 1996). It is also important to note that earthquake activity and fault rupture due to unmapped subsurface fault traces is a possibility that is not predictable.

Liquefaction

Liquefaction is a phenomenon in which saturated granular sediments temporarily lose their shear strength during periods of earthquake-induced, strong groundshaking. The susceptibility of soils to liquefaction is a function of the depth, density, and water content of the granular sediments and the magnitude of earthquakes. Saturated, unconsolidated silts, sands, silty sands, and gravels within 50 feet of the ground surface are most susceptible to liquefaction. Liquefaction-related phenomena include vertical settlement from densification, lateral spreading, ground oscillation, flow failures, loss of bearing strength, subsidence, and buoyancy effects (USGS, 2000).

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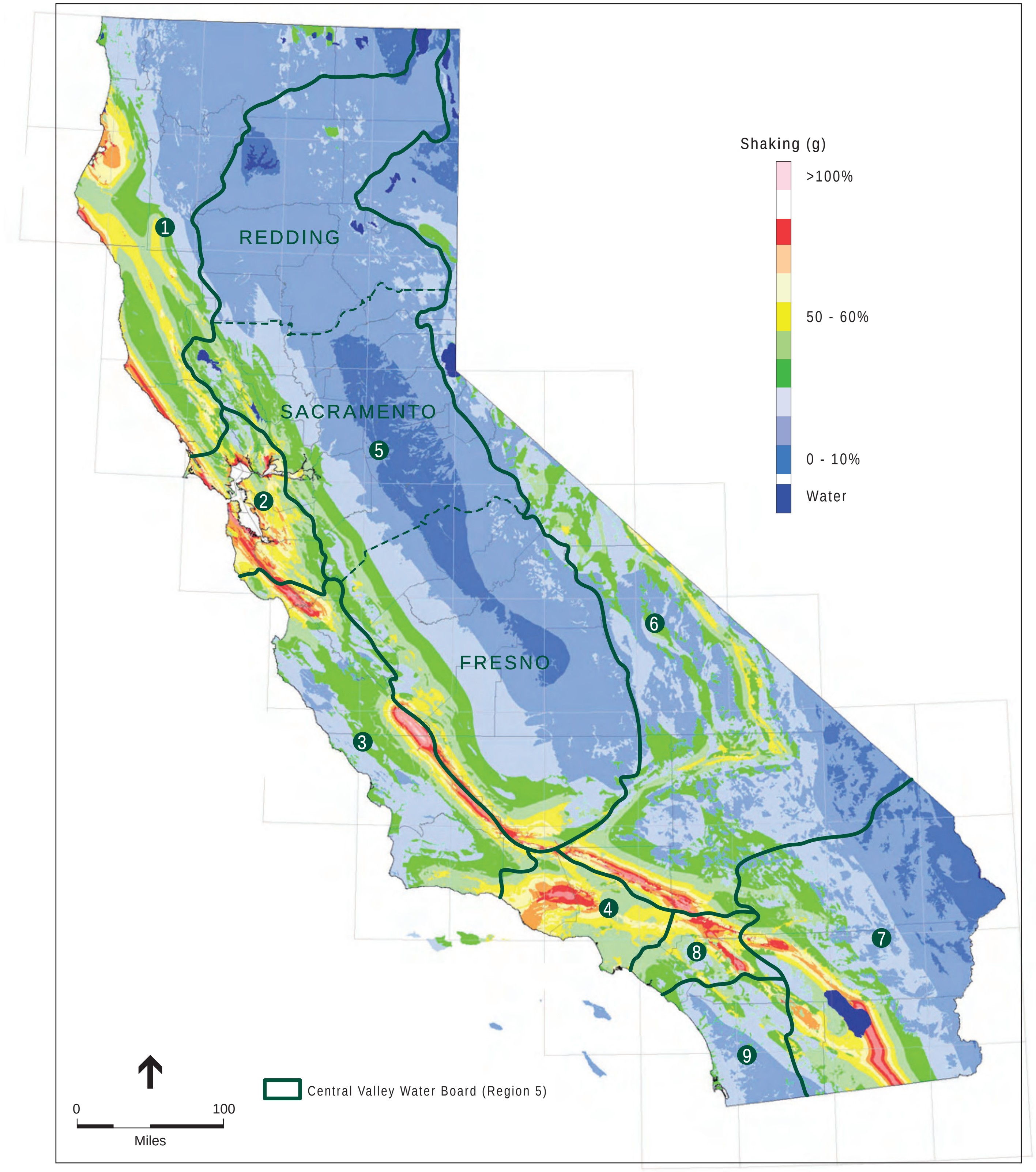
[1] Acceleration of gravity (g) = 980 centimeters per second squared. 1.0 g of acceleration is a rate of increase in speed equivalent to a car traveling 328 feet from rest in 4.5 seconds.



SOURCE: California Geological Society, 2007; Central Valley Water Board, 2009; and ESA, 2010

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Figure 13-3
Potential Shaking Hazard for the Project Area

TABLE 13-1
MODIFIED MERCALLI SCALE FOR EARTHQUAKE INTENSITY

Intensity Value	Intensity Description	Approximate Earthquake Magnitude (Richter)	Average Peak Acceleration
I	Not felt except by a very few persons under especially favorable circumstances.	1.0–3.0	<0.015 g
II	Felt only by a few persons at rest, especially on upper floors on buildings. Delicately suspended objects may swing.	3.0–3.9	
III	Felt noticeably indoors, especially on upper floors of buildings, but many people do not recognize it as an earthquake. Standing motor cars may rock slightly, vibration similar to a passing truck. Duration estimated.		
IV	During the day felt indoors by many, outdoors by few. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.	4.0–4.9	0.015–0.03 g
V	Felt by nearly everyone, many awakened. Some dishes and windows broken; a few instances of cracked plaster; unstable objects overturned. Disturbances of trees, poles may be noticed. Pendulum clocks may stop.		0.03–0.08 g
VI	Felt by all, many frightened and run outdoors. Some heavy furniture moved; and fallen plaster or damaged chimneys. Damage slight.	5.0–5.9	0.08–0.15 g
VII	Everybody runs outdoors. Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable in poorly built or badly designed structures; some chimneys broken. Noticed by persons driving motor cars.		0.15–0.25 g
VIII	Damage slight in specially designed structures; considerable in ordinary substantial buildings, with partial collapse; great in poorly built structures. Panel walls thrown out of frame structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. Sand and mud ejected in small amounts. Changes in well water. Persons driving motor cars disturbed.	6.0–6.9	0.25–0.45 g
IX	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb; great in substantial buildings, with partial collapse. Buildings shifted off foundations. Ground cracked conspicuously. Underground pipes broken.		0.45–0.60 g
X	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations; ground badly cracked. Rails bent. Landslides considerable from riverbanks and steep slopes. Shifted sand and mud. Water splashed (slopped) over banks.	7.0 and higher	0.60–0.80 g
XI	Few, if any, masonry structures remain standing. Bridges destroyed. Broad fissures in ground. Underground pipelines completely out of service. Earth slumps and land slips in soft ground. Rails bent greatly.		0.80–0.90 g
XII	Damage total. Practically all works of construction are damaged greatly or destroyed. Waves seen on ground surface. Lines of sight and level are distorted. Objects are thrown upward into the air.		>0.90 g

SOURCE: Bolt, 1988.

Holocene-age alluvial sediments are especially prone to liquefaction. Older alluvial sediments deposited during the Pleistocene epoch are generally not liquefiable because they are more consolidated. Artificial fills are also highly prone to liquefaction (USGS, 2000).

Lateral Spreading

Of the liquefaction hazards, lateral spreading generally causes the most damage. This is a phenomenon where large blocks of intact, nonliquefied soil move downslope on a liquefied substrate of large aerial extent (Youd et al., 1978). The mass moves toward an unconfined area, such as a descending slope or stream-cut bluff, and can occur on slope gradients as gentle as 1 degree. Drainages and swales between hill slopes are generally filled by alluvium,[2] colluvium,[3] landslide debris, and slope wash. Unconsolidated deposits often develop soils along steep and shallow slopes in these areas. Risk of lateral spreading in the project area is typically limited to slopes of 0.3 to 5% that are underlain by loose sands and a shallow water table (Bartlett et al. 1992).

Earthquake-Induced Settlement

Settlement of the ground surface can be accelerated and accentuated by earthquakes. During an earthquake, settlement can occur as a result of the relatively rapid rearrangement, compaction, and settling of subsurface materials (particularly loose, noncompacted, and variable sandy sediments). Settlement can occur both uniformly and differentially (i.e., where adjoining areas settle at different rates). Areas are susceptible to differential settlement if underlain by compressible sediments, such as poorly engineered artificial fill.

Seismic Slope Instability/Ground Cracking

Earthquake motions can also induce substantial stresses in slopes, causing earthquake-induced landslides or ground cracking when the slope fails. Earthquake-induced landslides can occur in areas with steep slopes that are susceptible to strong ground motion during an earthquake. The 1989 Loma Prieta earthquake, which occurred on the San Andreas Fault, triggered thousands of landslides over an area of 770 square miles (USGS, 1997).

Regulatory Setting

Federal

Earthquake Hazards Reduction Act

The Earthquake Hazards Reduction Act was enacted in 1997 to “reduce the risks to life and property from future earthquakes in the United States through the establishment and maintenance of an effective earthquake hazards and reduction program.” To accomplish this, the act established the National Earthquake Hazards Reduction Program (NEHRP). This program was significantly amended in November 1990 by the National Earthquake Hazards Reduction Program Act (NEHRPA), which refined the description of agency responsibilities, program goals, and objectives.

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[2] Alluvium consists of unconsolidated mixtures of gravel, sand, clay, and silt typically deposited by streams.

[3] Colluvium is a loose deposit of rock debris accumulated through the action of gravity at the base of a cliff or slope.

NEHRP's mission includes improved understanding, characterization, and prediction of hazards and vulnerabilities; improvement of building codes and land use practices; risk reduction through post earthquake investigations and education; development and improvement of design and construction techniques; improvement of mitigation capacity; and accelerated application of research results. The NEHRPA designates the Federal Emergency Management Agency (FEMA) as the lead agency of the program and assigns it several planning, coordinating, and reporting responsibilities. Other NEHRPA agencies include the National Institute of Standards and Technology, National Science Foundation, and the USGS.

State

Alquist-Priolo Earthquake Fault Zoning Act

The purpose of Alquist-Priolo Earthquake Fault Zoning is to prohibit the location of most structures for human occupancy across the traces of active faults and to mitigate the hazard of fault rupture. Under the act, the State Geologist is required to delineate earthquake fault zones (EFZs) along known active faults in California. Cities and counties affected by the zones must regulate certain development projects within the zones. They must withhold development permits for sites within the zones until geologic investigations demonstrate that the sites are not threatened by surface displacement from future faulting (CGS, 2010b)

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act was developed to protect the public from the effects of strong ground shaking, liquefaction, landslides, or other ground failure, and from other hazards caused by earthquakes. This act requires the State Geologist to delineate various seismic hazard zones and requires cities, counties, and other local permitting agencies to regulate certain development projects within these zones. Before a development permit is granted for a site within a seismic hazard zone, a geotechnical investigation of the site has to be conducted and appropriate mitigation measures incorporated into the project design.

California Building Standards Code

The California Building Code (CBC) has been codified in the California Code of Regulations (CCR) as Title 24, Part 2. Title 24 is administered by the California Building Standards Commission, which, by law, is responsible for coordinating all building standards. Under State law, all building standards must be centralized in Title 24 or they are not enforceable. The purpose of the CBC is to establish minimum standards to safeguard the public health, safety and general welfare through structural strength, means of egress, and general stability by regulating and controlling the design, construction, quality of materials, use and occupancy, location, and maintenance of all building and structures within its jurisdiction. The CBC is based on the International Building Code. The CBC is based on the International Building Code (IBC) published by the International Code Conference. In addition, the CBC contains necessary California amendments which are based on the American Society of Civil Engineers (ASCE) Minimum Design Standards 7-05. ASCE 7-05 provides requirements for general structural design and includes means for determining earthquake loads as well as other loads (flood, snow, wind, etc.) for inclusion into building codes. The provisions of the CBC apply to the construction, alteration, movement, replacement, and demolition of every building or structure or any appurtenances connected or attached to such buildings or structures throughout California.

The earthquake design requirements take into account the occupancy category of the structure, site class, soil classifications, and various seismic coefficients which are used to determine a Seismic Design Category (SDC) for a project. The SDC is a classification system that combines the occupancy categories with the level of expected ground motions at the site and ranges from SDC A (very small seismic vulnerability) to SDC E/F (very high seismic vulnerability and near a major fault). Design specifications are then determined according to the SDC.

Local

County Land Use Regulations and Ordinances

Local regulations and ordinances vary widely in the project area. Typically, local jurisdictions in the project area will have adopted General Plan Safety Elements, building, grading, and erosion control ordinances, but no specific ordinances for dairy digester facilities. The safety element, building, grading, and erosion control ordinances are intended to ensure safe building construction and control erosion and sedimentation caused by construction activities. Specifically, public Resources Code §2699 directs cities and counties to "take into account the information provided in available seismic hazard maps" when it adopts or revises the safety element of the general plan and any land-use planning or permitting ordinances (CGS, 2008). A building permit typically requires that new construction be inspected during and after completion to ensure compliance with national, regional, and local building codes. A grading permit is typically required for prior to initiating the construction phase of a project. As part of the permit, applicants usually must submit a grading and erosion control plan, vicinity and site maps, and other supplemental information. Standard conditions in the grading permit include a description of Best Management Practices (BMP) similar to those contained in a Stormwater Pollution Prevention Program (SWPPP).

13.2 Impacts and Mitigation Measures

Approach and Methods

The evaluation was performed in light of current conditions in the project area, applicable regulations and guidelines, and typical construction activities and operations of dairy digester and co-digester facilities. In determining the level of significance, the analysis assumed that the dairy digester and co-digester facilities would comply with relevant federal, State, and local ordinances and regulations.

Due to the geographic scale of the project area and the range of actions that fall within the scope of potential future dairy manure digester projects, this impact analysis was conducted at a programmatic level. Evaluation of potential geologic, soil, and seismic related impacts was based on a review of documents pertaining to the project area including CGS geologic maps and published geologic literature. It is assumed that project level analysis of geologic, soil, and seismic related hazards would be required for site specific digester and co-digester facilities.

Thresholds of Significance

CEQA defines a significant effect on the environment as a substantial, or potentially substantial, adverse change in the physical conditions of the area affected by the project. An impact related to soils, seismicity, and geology would be considered significant if it would result in any of the following, which are adapted from Appendix G of the CEQA *Guidelines*:

- Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:
    - Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the state geologist for the area or based on other substantial evidence of a known fault (refer to Division of Mines and Geology Special Publication 42),
    - Strong seismic groundshaking,
    - Seismic-related ground failure
    - Landslides
- Result in substantial soil erosion or the loss of topsoil
- Be located on a geologic or soil unit that is unstable, or that would become unstable as a result of the project, and potentially result in on-site or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse
- Be located on expansive or corrosive soil, creating substantial risks to life or property
- Substantially change the topography or any unique geologic or physical features of the site

The following discussion of environmental impacts is limited to those potential impacts that could result in some level of potentially significant environmental change, as defined by CEQA. The development of future dairy digester facilities would not include the addition, removal, or use of septic tanks or alternative wastewater disposal systems. This issue will not be analyzed further in this section.

Impact 13.1: The project could expose people to injury and structures to damage resulting from seismic activity. (Significant)

The State of California is susceptible to seismic activity, including earthquakes and ground-shaking events. Numerous active faults are known to exist in and around the project area that could potentially generate seismic events capable of injuring people and damaging structures associated with future digester and co-digester facilities. Ground shaking associated with seismic events could also cause secondary geologic hazards such as slope failures and seismically-induced settlement. This is considered a potentially significant impact.

Mitigation Measure

Measure 13.1: Prior to construction, project applicants or agency(s) responsible shall ensure that dairy digester facilities are designed and construction techniques are used that comply with relevant local, State and federal regulations and building code requirements. Requirements could include, but might not be limited to:

- Preparation of site-specific soil and geotechnical engineering studies performed by a licensed professional including, but not limited to, a geologist, engineering geologist, certified soil scientist, certified agronomist, registered agricultural engineer, registered civil or structural engineer, and/or certified professional erosion and sediment control specialist with expertise in geotechnical engineering issues who is registered and/or certified in the State of California, to determine site specific impacts and to recommend site specific mitigations. The site specific soil and geotechnical engineering studies shall be submitted to the all appropriate State and local regulatory agencies including, but not limited to, the CVRWQCB and the city or county engineering department for review and approval. The project applicant or agency(s) responsible shall implement all feasible recommendations addressing potential seismic hazards and soil constraints; and
- Implementation of CBC design requirements.

Impact Significance After Mitigation: Less than Significant

Implementation of Mitigation Measure 13.1 would ensure that future digester and co-digester facilities and centralized facilities would comply with local, State and federal requirements for developing structures to minimize hazards associated with seismic hazards. Completion of site specific geotechnical engineering studies would identify potential constraints and recommend methods to construct, install and design structures, including foundations, tanks and pipelines to minimize risks. Compliance with CBC would further ensure that facilities would be designed consistent with design standards that address seismically active areas which would reduce the risks associated with seismic activity.

Impact 13.2: The project could expose people to injury and structures to damage resulting from unstable soil conditions. (Significant)

Future digester and co-digester facilities could be located in areas with hazardous soil conditions including corrosive and expansive soils that could potentially cause damage to surface and subsurface structures. Depending on the degree of corrosivity of the subsurface soils, building materials such as concrete, reinforcing steel in concrete structures, and bare-metal structures exposed to these soils could deteriorate, eventually leading to structural failures. Expansion and contraction of expansive soils in response to changes in moisture content could lead to differential and cyclical movements that could cause damage and/or distress to structures and equipment. In addition, there are soils and topography in the project area that could be subject to landslides. The potential for the project to expose people to injury and structures to damage as a result of construction facilities in areas subject to unstable soil conditions is considered a potentially significant impact.

Mitigation Measure

Measure 13.2: Implement Mitigation Measure 13.1.

Impact Significance After Mitigation: Less than Significant

> Implementation of Mitigation Measure 13.2 would ensure that future digester and co-digester facilities and centralized facilities would comply with local, State and federal requirements for developing structures to minimize hazards associated with unstable soil conditions. Completion of site specific geotechnical engineering studies would identify potential constraints and recommend methods to construct, install and design structures, including foundations, tanks and pipelines to minimize risks. Compliance with CBC would further ensure that facilities would be designed consistent with design standards that address unstable soil conditions.

Impact 13.3: Construction of project facilities would not result in an increase in the erosion of soils which could result in a loss of top soil. (Less than Significant)

High erosion potential in soils is primarily caused by loose soils and steep slopes. The potential for erosion generally increases as a result of human activity, as a result of grading and other site preparation activities, including the removal of vegetative cover. Although large scale grading and site preparation activities are not anticipated, it is possible that future on site digester and co-digester facilities and centralized facilities developed in currently undeveloped land with exposed soils in areas of high erosion potential could result in an increase in soil erosion and a loss of top soil. However, as described in Section 5, Hydrology and Water Quality, Impact 5.1, implementation of standard BMPs and the monitoring program outlined through a required Stormwater Pollution Prevention Program (SWPPP), where necessary, and incorporated into a National Pollutant Discharge Elimination System (NPDES) permit would ensure that future dairy development would have a less-than-significant impact relating to soil erosion during construction activities.

Mitigation: None required.

Impact 13.4: Development of dairy digester and co-digester facilities would not contribute to cumulative impacts related to geology, soils and seismicity. (Less than Significant)

Other development proposed in the project area would be subject to the same types of geology, soils, and seismicity impacts as the project. However, these types of impacts represent hazards to people and property on a site-specific basis. For example, liquefaction potential at two separate developments do not result in a greater combined impact than the individual impacts do separately. Additionally, mitigation measures, described above, would reduce project related impacts associated with geologic and seismic hazards to less than significant. As a result, there is little, if any, cumulative relationship between the development of the project and past, present or anticipated future development. Therefore, there would be no cumulative effects related to geology, soils and seismicity. This is considered a less-than-significant impact.

Mitigation: None required.

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CHAPTER 14
Noise

14.1 Setting

Environmental Setting

Environmental Noise Fundamentals

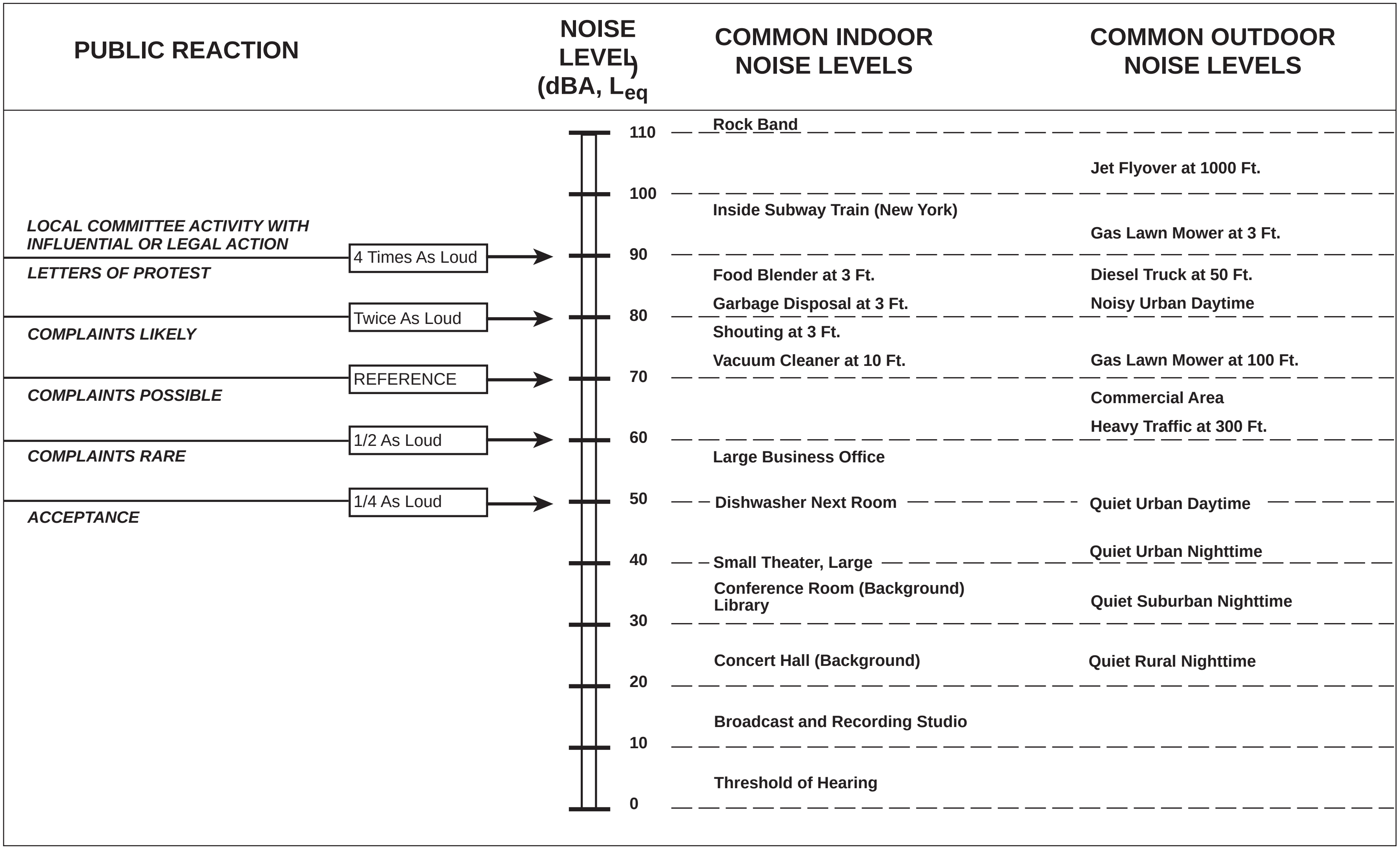
Noise is defined as unwanted sound. Sound, traveling in the form of waves from a source, exerts a sound pressure level (referred to as sound level) which is measured in decibels (dB), with zero dB corresponding roughly to the threshold of human hearing, and 120 to 140 dB corresponding to the threshold of pain. Pressure waves traveling through air exert a force registered by the human ear as sound.

Sound pressure fluctuations can be measured in units of hertz (Hz), which correspond to the frequency of a particular sound. Typically, sound does not consist of a single frequency, but rather a broad band of frequencies varying in levels of magnitude (sound power). When all the audible frequencies of a sound are measured, a sound spectrum is plotted consisting of a range of frequencies spanning 20 to 20,000 Hz. The sound pressure level, therefore, constitutes the additive force exerted by a sound corresponding to the sound frequency/sound power level spectrum.

The typical human ear is not equally sensitive to all frequencies of the audible sound spectrum. As a consequence, when assessing potential noise impacts, sound is measured using an electronic filter that de-emphasizes the frequencies below 1,000 Hz and above 5,000 Hz in a manner corresponding to the human ear's decreased sensitivity to extremely low and extremely high frequencies. This method of frequency weighting is referred to as A-weighting and is expressed in units of A-weighted decibels (dBA). Frequency A-weighting follows an international standard methodology of frequency de-emphasis and is typically applied to community noise measurements. Some representative noise sources and their corresponding A-weighted noise levels are shown in **Figure 14-1**.

Noise Exposure and Community Noise

An individual's noise exposure is a measure of noise over a period of time. A noise level is a measure of noise at a given instant in time. The noise levels presented in **Figure 14-1** are representative of measured noise at a given instant in time, however, they rarely persist consistently over a long period of time. Rather, community noise varies continuously over a period of time with respect to the contributing sound sources of the community noise environment. Community noise is primarily the product of many distant noise sources, which constitute a relatively stable background noise exposure, with the individual contributors unidentifiable.



SOURCE: ESA, 2010

Figure 14-1
Effect of Noise on People

The background noise level changes throughout a typical day, but does so gradually, corresponding with the addition and subtraction of distant noise sources such as traffic and atmospheric conditions. What makes community noise constantly variable throughout a day, besides the slowly changing background noise, is the addition of short duration single event noise sources (e.g., aircraft flyovers, motor vehicles, sirens), which are readily identifiable to the individual.

These successive additions of sound to the community noise environment varies the community noise level from instant to instant requiring the measurement of noise exposure over a period of time to legitimately characterize a community noise environment and evaluate cumulative noise impacts. This time-varying characteristic of environmental noise is described using statistical noise descriptors. The most frequently used noise descriptors are summarized below:

Leq	the equivalent sound level is used to describe noise over a specified period of time, typically one hour, in terms of a single numerical value. The Leq is the constant sound level which would contain the same acoustic energy as the varying sound level, during the same time period (i.e., the average noise exposure level for the given time period).
Lmax	the instantaneous maximum noise level for a specified period of time.
L50	the noise level that is equaled or exceeded 50 percent of the specified time period. The L50 represents the median sound level.
L90	the noise level that is equaled or exceeded 90 percent of the specified time period. The L90 is sometimes used to represent the background sound level.
Ldn	24-hour day and night A-weighted noise exposure level which accounts for the greater sensitivity of most people to nighttime noise by weighting noise levels at night (“penalizing” nighttime noises). Noise between 10:00 PM and 7:00 AM is weighted (penalized) by adding 10 dBA to take into account the greater annoyance of nighttime noises.
CNEL	similar to the Ldn, the Community Noise Equivalent Level (CNEL) adds a 5-dBA penalty during the evening hours between 7:00 PM and 10:00 PM in addition to a 10-dBA penalty between the hours of 10:00 PM and 7:00 AM

As a general rule, in areas where the noise environment is dominated by traffic, the Leq during the peak-hour is generally equivalent to the Ldn at that location (within +/- 2 dBA) (Caltrans, 1998).

Effects of Noise on People

The effects of noise on people can be placed into three categories:

- subjective effects of annoyance, nuisance, dissatisfaction;
- interference with activities such as speech, sleep, learning; and
- physiological effects such as hearing loss or sudden startling.

Environmental noise typically produces effects in the first two categories. Workers in industrial plants can experience noise in the last category. There is no completely satisfactory way to measure the subjective effects of noise, or the corresponding reactions of annoyance and dissatisfaction. A

wide variation in individual thresholds of annoyance exists, and different tolerances to noise tend to develop based on an individual's past experiences with noise.

Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted: the so called "ambient noise" level. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged by those hearing it. With regard to increases in A-weighted noise level, the following relationships occur (Caltrans, 1998):

- except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived;
- outside of the laboratory, a 3 dBA change is considered a just-perceivable difference;
- a change in level of at least 5 dBA is required before any noticeable change in human response would be expected; and
- a 10 dBA change is subjectively heard as approximately a doubling in loudness, and can cause adverse response.

These relationships occur in part because of the logarithmic nature of sound and the decibel system. The human ear perceives sound in a non-linear fashion, hence the decibel scale was developed. Because the decibel scale is based on logarithms, two noise sources do not combine in a simple additive fashion, rather logarithmically. For example, if two identical noise sources produce noise levels of 50 dBA the combined sound level would be 53 dBA, not 100 dBA.

Noise Attenuation

Stationary point sources of noise, including stationary mobile sources such as idling vehicles, attenuate (lessen) at a rate between 6 dBA for hard sites and 7.5 dBA for soft sites for each doubling of distance from the reference measurement. Hard sites are those with a reflective surface between the source and the receiver such as parking lots or smooth bodies of water. No excess ground attenuation is assumed for hard sites and the changes in noise levels with distance (drop-off rate) is simply the geometric spreading of the noise from the source. Soft sites have an absorptive ground surface such as soft dirt, grass or scattered bushes and trees. In addition to geometric spreading, an excess ground attenuation value of 1.5 dBA (per doubling distance) is normally assumed for soft sites. Line sources (such at traffic noise from vehicles) attenuate at a rate between 3 dBA for hard sites and 4.5 dBA for soft sites for each doubling of distance from the reference measurement (Caltrans, 1998).

Sensitive Receptors

Some land uses are considered more sensitive to ambient noise levels than others because of the amount of noise exposure (in terms of both exposure duration and insulation from noise) and the types of activities typically involved. Residences, health care facilities, schools and parks are typically considered sensitive to noise. Because the location of dairies, manure digester and co-digester facilities, and centralized facilities would typically be in rural or semirural areas, the primary land use potentially affected would be residences, however, noise-sensitive land uses along the delivery routes may include health care facilities, schools and parks.

Existing Noise Environment

The noise near dairy digester or co-digester facilities would be expected to be typical of agricultural areas and rural residences. The predominant sources of noise would include roadway traffic and equipment noise from existing agricultural operations. Average daily noise levels in these types of environments (away from specific noise sources) typically are in the range of 40-50 Ldn, dBA (U.S. EPA, 1978).

A Metrosonics Model db3080 sound level meter was used to measure the existing ambient noise levels at various locations around dairies with operating dairy digesters. The meter was calibrated to ensure the accuracy of the measurements. Short-term noise level measurements were taken at eleven locations at three dairies with digesters and on-site electrical generation facilities. The noise measurement results are presented below in **Table 14-1**.

TABLE 14-1
EXISTING NOISE ENVIRONMENTS AT PROJECT LOCATION

Location #: Description	Length of Measurement	Average Noise Level Leq (dBA)	Noise Sources (dBA)
1: Fiscalini Dairy ~ 40 feet from milk parlor	5 minutes	67	Cows, parlor equipment, tractor in distance
2: Fiscalini Dairy ~ 20 feet from Dairy Stall	Spot Measurement	75	Cows, people talking in distance
3: Fiscalini Dairy ~ 20 feet from digester heater and pumps	5 minutes	66	Heater and Pump hum
4: Fiscalini Dairy ~ 15 feet from Auger	4 minutes	73	Auger and bulldozer in distance
5: Fiscalini Dairy ~ 10 feet from small enclosed pump, measurement taken from inside enclosure	1 minute	81	Pump, people talking
6: Fiscalini Dairy ~ 15 feet from electric generator with door open	2 minutes	88	Electricity Generator
7: Fiscalini Dairy ~ 15 feet from electric generator with door closed	1 minute	82	Electricity Generator
8: Fiscalini Dairy ~ at driveway with door closed	2 minutes	68	Electricity Generator
9: Castelanelli Brothers Dairy ~ 10 feet from generator with door open	5 minutes	87	Electricity Generator
10: Castelanelli Brothers Dairy ~ 10 feet from generator with door closed	Spot Measurement	72	Electricity Generator
11: Tollenaar Holstein Dairy~ 15 feet from generator (no doors)	5 minutes	86	Electricity Generator

All measurements were on Thursday April 8, 2010. Weather conditions were sunny and calm.

SOURCE: ESA Noise Measurement Results, 2010.

Regulatory Setting

Federal

Federal regulations establish noise limits for medium and heavy trucks (more than 4.5 tons, gross vehicle weight rating) under 40 Code of Federal Regulations (CFR), Part 205, Subpart B. The federal truck pass-by noise standard is 80 dBA at 15 meters from the vehicle pathway centerline. These controls are implemented through regulatory controls on truck manufacturers. Federal OSHA regulations also protect workers from excessive occupational noise exposure (29 CFR § 1910.95, Code of Federal Regulations).

State

The California Department of Health Services' Office of Noise Control studied the correlation of noise levels and their effects on various land uses and published land use compatibility guidelines for the noise elements of local general plans. The guidelines are the basis for most noise element land use compatibility guidelines in California.

The land use compatibility for community noise environment chart identifies the normally acceptable range for several different land uses, as shown in **Figure 14-2** below. Persons in low-density residential settings are most sensitive to noise intrusion, with noise levels of 60 dBA CNEL and below considered "acceptable". For land uses such as schools, libraries, churches, hospitals, and parks, acceptable noise levels go up to 70 dBA CNEL.

The State of California also establishes noise limits for vehicles licensed to operate on public roads. For heavy trucks, the State pass-by standard is consistent with the federal limit of 80 dB at 15 meters.

The State pass-by standard for light trucks and passenger cars (less than 4.5 tons, gross vehicle rating) is also 80 dBA at 15 meters from the centerline. These standards are implemented through controls on vehicle manufacturers and by legal sanction of vehicle operators by State and local law enforcement officials.

The State has also established noise insulation standards for new multi-family residential units, hotels, and motels that would be subject to relatively high levels of transportation-related noise. These requirements are collectively known as the California Noise Insulation Standards (Title 24, California Code of Regulations). The noise insulation standards set forth an interior standard of DNL 45 dBA in any habitable room. They require an acoustical analysis demonstrating how dwelling units have been designed to meet this interior standard where such units are proposed in areas subject to noise levels greater than DNL 60 dBA. Title 24 standards are typically enforced by local jurisdictions through the building permit application process.

Local

In California most cities and counties have adopted noise ordinances, which serve as enforcement mechanisms for controlling noise, and general plan noise elements, which are used as planning guidelines to ensure that long-term noise generated by a source is compatible with adjacent land uses.

14.2 Impacts and Mitigation Measures

Approach and Methods

The evaluation was performed in light of current conditions in the project area, applicable regulations and guidelines, and typical construction activities and operations of dairy digester and co-digester facilities. In determining the level of significance, the analysis assumed that the dairy digester and co-digester facilities would comply with relevant federal, State, and local ordinances and regulations.

Noise impacts associated with implementation of the project have been evaluated at a program level of detail using standard acoustical modeling techniques that consider typical noise levels from various equipment and noise attenuation levels with distance. Potential noise levels were then compared to typical noise ordinance standards and incompatible noise levels (see Figure 14-2).

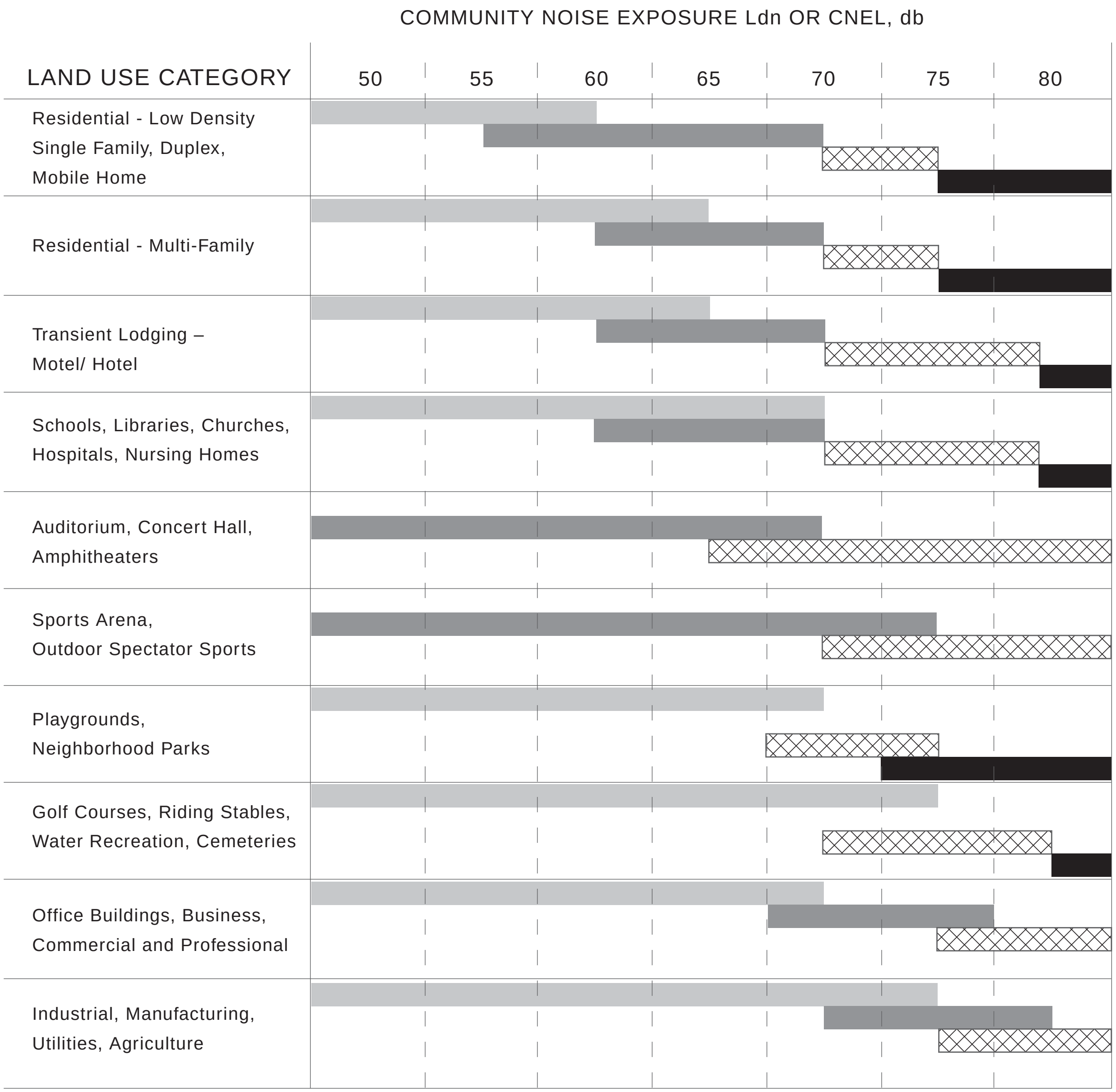
Thresholds of Significance

CEQA defines a significant effect on the environment as a substantial, or potentially substantial, adverse change in the physical conditions of the area affected by the project. An impact related to hydrology and water quality, including drainage and flooding, would be considered significant if it would result in any of the following, which are adapted from Appendix G of the CEQA *Guidelines*:

- Exposure of persons to or generation of noise levels in excess of standards established in any applicable plan or noise ordinance, or applicable standards of other agencies;
- Exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels;
- A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;
- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above existing levels existing without the project;
- Exposure of people residing or working in the project area to excessive noise levels, for a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport; or
- Expose people residing or working in the project area to excessive noise levels if the project is located in the vicinity of a private airstrip.

The following does not discuss the second, fifth or sixth criteria. The initial study deemed these impacts as less than significant, and will not be discussed further.

Some guidance as to the significance of changes in ambient noise levels is provided by the 1992 findings of the Federal Interagency Committee on Noise (FICON), which assessed the annoyance effects of changes in ambient noise levels resulting from aircraft operations. The recommendations are based upon studies that relate aircraft noise levels to the percentage of persons highly annoyed by the noise. Annoyance is a summary measure of the general adverse reaction of people to noise that generates speech interference, sleep disturbance, or interference with the desire for a tranquil



INTERPRETATION

░ NORMALLY ACCEPTABLE
Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

▒ CONDITIONALLY ACCEPTABLE
New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.

▨ NORMALLY UNACCEPTABLE
New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirement must be made and needed noise insulation features included in the design.

█ CLEARLY UNACCEPTABLE
New construction or development should generally not be undertaken.

SOURCE: State of California General Plan Guidelines, Office of Planning and Research, 1998; and ESA, 2008

Figure 14-2
Land Use Compatibility for Community Noise Environment

environment. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, it has been asserted that they are applicable to all sources of noise described in terms of cumulative noise exposure metrics such as the Ldn, as shown in **Table 14-2**.

TABLE 14-2
MEASURES OF SUBSTANTIAL INCREASE FOR NOISE EXPOSURE

Ambient Noise Level without Project (Ldn)	Significant Impact Assumed to Occur if the Project Increases Ambient Noise Levels By:
<60 dB	+ 5.0 dB or more
60-65 dB	+ 3.0 dB or more
>65 dB	+ 1.5 dB or more

SOURCE: Federal Interagency Committee on Noise (FICON), 1992.

The rationale for the **Table 14-2** criteria is that the quieter the ambient noise level is, the more the dBA can increase before it causes significant annoyance.

For the purposes of this Program EIR, building off the concepts in Table 14-2, and in consideration of the typical low noise level in agricultural areas, the following noise levels would constitute substantial increases in noise levels and result in a significant impact:

- An increase of 5 dBA, Ldn at sensitive receptors for noise generated from the dairy digester facility on-site sources or dairy digester-related traffic.
- Nighttime construction activity that would affect sensitive receptors.
- Nighttime operations from continuous equipment that have decibel levels above 45 dBA at residences.

Impact 14.1: Construction of dairy digester and co-digester facilities could temporarily increase noise levels at nearby sensitive receptor locations or result in noise levels in excess of standards in local general plans, noise ordinance, or other applicable standards. (Significant)

Construction of facilities could generate noise at sensitive receptors that exceed local regulations and codes. The construction-related noise levels may be from, but not necessarily limited to, the use of heavy equipment at the site or pipeline construction area, or vehicles transporting material to or from the construction site. Noise levels may fluctuate depending on the distance of the sensitive receptor from the construction activity and the particular type, number, and duration of uses of various pieces of construction equipment. Construction-related material haul trips would raise ambient noise levels along haul routes, depending on the number of haul trips made and types of vehicles used. **Table 14-3** shows typical noise levels during different construction stages and **Table 14-4** shows noise levels produced by various types of construction equipment.

Residential land uses near construction sites are the most concern. Usually such residences would be located on, or immediately adjacent to, a dairy or central facility location or along the route of a pipeline construction project (which would likely be on a dairy or in a roadway right of way.

Some counties possess General Plans that include a Dairy Element, which include buffer zones between dairies and sensitive receptors. For example Madera County has a 1 mile (5,280 feet) buffer zone to sensitive receptors, and Kings County has a ¼ mile (1,320 feet) buffer zone to residences and a ½ mile (2,640 feet) buffer zone to schools (Madera 2007, Kings 2002).

Although construction activities would likely occur during daytime hours, construction noise could still be considered substantially disruptive to residents. However, periods of intensive noise exposure would be temporary, and noise generated by project construction would be partially masked by other background noise such as traffic noise. Note that construction noise often varies significantly on a day-to-day basis, and the noise levels shown in **Table 14-3** represent a worst-case scenario. Such worst-case scenarios would likely exist only for short periods at any particular residence on a given day. During these times, outdoor activities at the affected residences would be negatively affected by noise and indoor activities (typically 20 to 20 dBA quieter than outdoor noise levels) could be negatively affected. These construction noise levels, especially if they were to occur during the nighttime hours, could cause sleep disturbance to nearby residences. Construction noise on typical days off including Sundays and Holidays could also be annoying to nearby residences and therefore this impact would be potentially significant.

TABLE 14-3
TYPICAL NOISE LEVELS FROM CONSTRUCTION ACTIVITIES AND CONSTRUCTION EQUIPMENT

Construction Phase	Noise Level[a] (dBA, Leq)
Ground clearing	84
Excavation	89
Foundations	78
Erection	85
Finishing	89

[a] Average noise levels correspond to a distance of 50 feet from the noisiest piece of equipment associated with a given phase of construction and 200 feet from the rest of the equipment associated with that phase.

SOURCE: Bolt, Baranek, and Newman, 1971; Cunniff, 1977.

TABLE 14-4
TYPICAL NOISE LEVELS FROM CONSTRUCTION ACTIVITIES AND CONSTRUCTION EQUIPMENT

Construction Equipment	Noise Level[a] (dBA, Leq at 50 Feet)
Dump truck	88
Portable air compressor	81
Concrete mixer (truck)	85
Scraper	88
Jackhammer	88
Dozer	87
Paver	89
Generator	76
Backhoe	85
Rock Drilling	98

[a] Average noise levels correspond to a distance of 50 feet from the noisiest piece of equipment associated with a given phase of construction and 200 feet from the rest of the equipment associated with that phase.

SOURCE: Bolt, Baranek, and Newman, 1971; Cunniff, 1977.

Mitigation Measures

Measure 14.1a: Construction activities shall be limited to daytime hours, between 7 a.m. and 6 p.m., Monday through Saturday, or an alternative schedule established by the local jurisdiction.

Measure 14.1b: Construction equipment noise shall be minimized by muffling and shielding intakes and exhaust on construction equipment to a level no less effective than the manufacture's specifications, and by shrouding or shielding impact tools.

Measure 14.1c: Construction contractors within 750 feet of sensitive receptors shall locate fixed construction equipment, such as compressors and generators, and construction staging areas as far as possible from nearby sensitive receptors.

Measure 14.1d: Construction contractors shall comply with all local noise ordinances and regulations.

Impact Significance After Mitigation: Less than Significant

Implementation of the mitigation measures listed 14.1a-d would significantly reduce construction-related noise impacts by locating staging areas away from adjacent residences when necessary, and prohibiting construction activities during the most noise-sensitive hours of the day. Implementation of these mitigation measures would reduce this impact to less than significant.

Impact 14.2: Noise from operation of dairy digester and co-digester facilities or centralized facilities could substantially increase ambient noise levels at nearby land uses or result in noise levels in excess of standards in local general plans, local noise ordinances, or other applicable standards. (Significant)

Stationary Noise

Operations of facilities could generate noise at sensitive receptors that exceed local regulations and codes. Operational activities associated with the project that would generate noise include maintenance vehicle circulation and the operation of certain mechanical equipment such as stationary pumps, motors, compressors, fans, generators, and other equipment. Operation of pipelines would not result in any discernible noise. Noise impacts would be limited to inspection of pipelines during daytime hours and would be temporary.

For equipment such as an electrical generator that runs 24-hous a day, the significance threshold used in the Program EIR is 45 dBA at the location of the nearest residence. In areas with local general plans, ordinances, or other applicable standards are available, they shall apply to project operations. For electrical generator noise, the loudest equipment expected, to be below 45 dBA at a location, would have to occur at an approximate distance of 1,000 feet if it is not enclosed, or approximately 350 feet if the generator is enclosed. Other sensitive receptors located further away from the generator would be exposed to generator noise at incrementally lower levels. Because an electricity generator on agricultural land would emit noise levels similar to those of existing agricultural equipment (depending on the distances involved), generator noise would be similar to noise from existing agricultural operations. One distinguishing feature would be the continuous operation of the electrical generator.

Some counties possess General Plans that include a Dairy Element, which include buffer zones between dairies and sensitive receptors. For example Madera County has a 1 mile (5,280 feet) buffer zone to sensitive receptors, and Kings County has a ¼ mile (1,320 feet) buffer zone to residences and a ½ mile (2,640 feet) buffer zone to schools (Madera 2007, Kings 2002). Based on site measurement of existing dairy digester electrical generators and standard noise attenuation factors, electrical generator noise levels would be less than significant if the distance to the nearest sensitive receptor would be 1,000 feet or more. If the distance from the electrical generator is less than 1,000 feet from the nearest sensitive receptor (resulting in noise level above 45 dBA at the sensitive receptor) this would be a potentially significant impact.

TABLE 14-5
MEASURED NOISE LEVELS FROM DAIRY AND DIGESTER EQUIPMENT

Digester Equipment	Noise Level[a] (dBA, Leq at 50 Feet)
Milk Parlor	65
Dozer	87
Digester Heater and Pump	58
Digester Auger	60
Digester Pump	56
Electricity Generator 1	
-door open	75
-door closed	65
Electricity Generator 2	
-door open	70
-door closed	55
Electricity Generator 3	
-no doors	73

SOURCE: Cunniff, 1977, ESA 2010

Mitigation Measure

Measure 14.2: Any continuous equipment operating at night within 1,000 feet of a sensitive receptor must be enclosed. Furthermore, an acoustic study and follow-up measurements must be performed (after construction) to prove that the noise from any continuous equipment operating at night would comply with all local noise regulations. If no local regulations are available, noise levels must be below 45 dBA at the nearest sensitive receptor. If the sound level exceeds local regulations, or 45 dBA if applicable, additional sound-proofing shall be installed to meet the required sound level.

Impact Significance After Mitigation: Less than Significant

> Implementation of the mitigation measure listed 14.2 would reduce operation-related noise to below local regulations, or 45 dBA. Implementation of these mitigation measures would reduce this impact to less than significant.

Impact 14.3: Project operational activities associated with transportation would not increase ambient noise levels at nearby land uses. (Less than Significant)

Transportation Noise

It is not anticipated that implementation of the project would result in large numbers of new employees or truck trips. Therefore operational vehicle trip increases would be minimal and would not generate a substantial increase in noise along local roadways. Because of the low number of trips associated with the dairy digester facilities noise levels on roadways would not be expected to increase by more than 1 dBA. This impact would be less than significant.

Mitigation: None required.

Cumulative Impacts

Impact 14.4: Development of dairy digester and co-digester facilities could result in a cumulative increase in noise levels. (Significant)

Cumulative impact refer to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts (CEQA Guidelines §15355).

The scope of cumulative construction noise impacts is construction noise from dairy digester, co-digester facilities, and pipelines combined with construction noise from other projects in the project area. This combination of noise could affect existing ambient noise conditions at or near the construction site. If construction of the project coincides with and affects the same sensitive receptors as construction noise from other projects, this cumulative impact could be significant. Mitigation Measure 14.4 would restrict construction activities to daytime hours for dairy digester facilities, and would reduce the cumulative construction noise impact to less than significant.

The scope of cumulative operational noise impacts is operational noise from dairy digester and co-digester facilities combined with operational noise from other stationary or mobile sources in the project area. These other sources may contribute considerably to unacceptable ambient noise levels. However, with implementation of Mitigation Measure 14.2, operation of dairy digester and co-digester facilities would not result in significant increases in operational noise. Therefore, the contribution of noise from dairy digestion facilities would not contribute to any cumulative operational noise impact and would be less than significant.

Mitigation Measure

> **Measure 14.4a:** Implement Mitigation Measures 14.1a through Measure 14.1d and Measure 14.2, above.
>
> **Impact Significance After Mitigation:** Less than Significant

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CHAPTER 15
Public Services and Utilities

15.1 Setting

Environmental Setting

Water Supply

Potable water and non-potable water within the Central Valley are supplied by many purveyors. Agricultural operations, including dairies, are not typically supplied by municipal water systems but may receive reclaimed water or irrigation water from a municipal system or from an irrigation district. Agricultural operations are primarily served by private systems which utilize either groundwater or surface water. Dairies within the Central Valley may also utilize process wastewater as flush water or applied to cropland consistent with the dairy's Nutrient Management Plan as discussed under the Wastewater section, below.

Wastewater

Wastewater service within the Central Valley may be provided by either a public or private system. Agricultural operations, including dairies, typically use on-site septic systems for domestic wastewater (such as restroom facilities). Process wastewater is directed to wastewater lagoons or ponds. Process wastewater at a dairy can be defined as "water directly or indirectly used in the operation of a milk cow dairy for any or all of the following: spillage or overflow from animal watering systems; washing, cleaning, or flushing pens, barns, manure pits, or other dairy facilities; washing or spray cooling of animals; or dust control…and includes any water or precipitation and precipitation runoff which comes into contact with any raw materials, products, or byproducts including manure, feed, milk, or bedding" (CVRWQCB, 2007). Process wastewater for a digester can be defined as solid and liquid digestate, or water that has directly or indirectly come into contact with co-digestion substrate.

Stormwater Drainage

Within the Central Valley region, urban areas contain linked storm drain systems where stormwater is aggregated and treated by the local jurisdiction. Rural areas are not typically connected to public storm drain systems and thus handle stormwater in accordance with local ordinances and the requirements of the Central Valley Water Board.

Where applicable, drainage from existing dairies must comply with specific WDRs, as defined in the General Order for Existing Milk Cow Dairies. Specifically, the General Order requires a Waste Management Plan to be submitted to the Central Valley Water Board which addresses flood protection and containment of waste, among other considerations. Stormwater drainage, if it comes into contact with any raw materials, products, or byproducts on a dairy, including manure, feed, milk, or bedding is considered process wastewater and must be handled accordingly.

Natural Gas

Pacific Gas and Electric (PG&E) and Southern California Gas (SoCal Gas) provide natural gas service within the Central Valley (CEC, 2008). Most properties in rural areas of the Central Valley do not utilize natural gas, as they are not connected to a distribution network, though they may be located in proximity to a larger transmission pipeline. The California Energy Commission (CEC) publishes an updated map of major natural gas transmission pipelines in California on its website (CEC, 2010a).

Electricity

There are several electricity providers within the Central Valley that serve both urban and rural areas. Providers in the central and southern portion of the Central Valley Region include Sacramento Municipal Utilities District, PG&E, Southern California Edison, Roseville Electric, Lodi Electric Utility, Merced Irrigation District, Modesto Irrigation District, and Turlock Irrigation District (CEC, 2010b). Additional providers in the northern portion of the Central Valley Region include PacifiCorp, Surprise Valley Electrification Corporation, Lassen Municipal Utilities District, and Plumas-Sierra Rural Electric Cooperative (CEC, 2010). Existing dairies that already have digester facilities may generate electricity, in the process of converting biogas in a generator, and sell the power back to these providers.

Fire Protection

Local fire protection services are provided by many agencies within the Central Valley, including municipal fire departments, California Department of Forestry and Fire, fire districts, and volunteer departments. Services provided by fire protection services include building inspections during construction, fire suppression, emergency medical response, and hazardous materials response (CSFM, 2010).

Regulatory Setting

California Public Utilities Commission

The California Public Utilities Commission (CPUC) primarily regulates the provision of investor owned utilities in California. These utilities include privately owned telecommunications, electric, natural gas, water, railroad, rail transit, and passenger transportation companies. The CPUC is responsible for assuring that California utility customers have safe, reliable utility services at reasonable rates, protecting utility customers from fraud, and promoting the health of California's economy (CPUC, 2010). General Order No. 112-E includes the State rules on Testing, Operation and Maintenance of Gas Gathering, Transmission and Distribution Piping Systems.

Local

Local agencies that regulate public services and publicly owned utility systems for dairy digester and co-digester facilities include county fire departments and fire districts, county water departments and water districts, county environmental health departments for wells and septic systems, and county flood management departments and drainage districts for flood protection and drainage services. Local agencies regulate facilities within their jurisdiction by enforcing State and local laws and ordinances. Local agencies currently adopt and enforce the 2007 California Fire Code (Title 24 California Code of Regulations Part 9; CBSC, 2010). Local jurisdictions also provide goals, objectives and policies related to public services and utilities in the jurisdiction's general plan.

15.2 Impacts and Mitigation Measures

Approach and Methods

The evaluation was performed in light of current conditions in the project area, the jurisdictional boundaries of the Central Valley Region (Region 5), applicable regulations and guidelines, and typical construction activities and operations of dairy digester and co-digester facilities. In determining the level of significance, the analysis assumed that the dairy digester and co-digester facilities would comply with relevant federal, State, and local laws, regulations, ordinances and guidance.

ESA conducted a site visit to three dairies with anaerobic digestion facilities within the Central Valley Water Board region on April 8, 2010. This provided an opportunity to assess the potential for impacts on public services and utilities (ESA, 2010). These dairies included Fiscalini Dairy (an above ground complete mix digester in Modesto), Castelanelli Brothers Dairy (a covered lagoon digester in Lodi), and Tollenaar Holsteins Dairy (a subsurface complete mix digester in Elk Grove). Facility operators were present at each dairy to respond to questions regarding the facilities. In addition, any planning documents, environmental documents and other relevant literature which were reviewed to assess potential impacts are listed at the end of this chapter.

Thresholds of Significance

An impact related to public services and utilities would be considered significant if it would result in any of the following, which are adapted from Appendix G of the CEQA *Guidelines*:

- Result in substantial adverse physical impacts associated with the provision of, or the need for, new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for fire protection or other public facilities

- Conflict with wastewater treatment requirements of the applicable Central Valley Water Board
- Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects
- Require or result in the construction of new storm water drainage facilities, or expansion of existing facilities, the construction of which could cause significant environmental effects
- Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed
- Result in a determination by the wastewater treatment provider that would serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments
- Require or result in the construction of new sources of energy supplies or additional energy infrastructure capacity the construction of which could cause significant environmental effects
- Conflict with applicable energy policies or standards

The discussion of environmental impacts is limited to those potential impacts that could result in some level of potentially significant environmental change, as defined by CEQA Guidelines (§15382).

As discussed in the Initial Study (Appendix B), the project would not impact solid waste facilities, police protection, schools, or parks and would not conflict with existing solid waste regulations; thus, these issues are not discussed within this Program EIR.

This chapter discusses the impacts to water, wastewater treatment and stormwater treatment facilities and utility requirements from a utilities capacity perspective. The anticipated impacts upon surface water quality and groundwater quality from digester and co-digester facilities are discussed within Chapter 5, Hydrology and Water Quality.

Impact 15.1: The project would not substantially increase demands on fire protection services. (Less than Significant)

As described previously, the project would facilitate the construction and operation of dairy digester and co-digester facilities throughout the Central Valley within the jurisdiction of the Central Valley Water Board. Construction and operation of digester and co-digester facilities at dairies and centralized locations would adhere to the building code and the fire code adopted by the relevant local jurisdiction. Building and fire inspections would be conducted during construction of dairy digester and co-digester facilities to ensure code compliance and thereby reduce the risk of fire hazards associated with new facilities. Hazardous issues associated with biogas production and delivery are addressed in Chapter 10, Hazards and Hazardous Materials.

Facilities constructed at dairies or centralized locations would not substantially increase demands on fire protection services. The on-site flare periodically required for burning excess gas may be visible at night from off-site areas leading to increased calls to the local fire district/department from concern of a potential fire; however, it does not require a response from the fire department, as noted at Castelanelli Brothers Dairy (ESA, 2010). Because the project is not likely to require a substantial need for additional response from local fire service providers, this impact is considered less than significant. However, calls to local fire agencies can be reduced through implementation of Mitigation Measure 11.3 as discussed below.

Mitigation: None required.

While no mitigation is required, Mitigation Measure 11.3 recommends that flares for digester facilities be located in a manner which minimizes visibility to nearby receptors, which would reduce the likelihood of calls from the general public related to the flare. After implementation of Measure 11.3 this would remain a less-than-significant impact.

Impact 15.2: The project would not conflict with wastewater treatment requirements of the Central Valley Water Board. (Less than Significant)

The project consists of the development of a waste discharge regulatory program for dairy digester and co-digester facilities. As such, facilities operating under this program must comply with the terms and conditions of General Orders, Individual WDRs, or Conditional Waivers issued under this regulatory program or any discharges of liquid or solid waste that may affect surface water or groundwater. Because the project includes the development of wastewater treatment requirements under the regulatory program which must be adhered to prior to any discharges, this impact is less than significant.

Mitigation: None required.

Impact 15.3: The project could result in significant environmental effects from the construction and operation of new water and wastewater treatment facilities or expansion of existing facilities. (Significant)

Development of digester facilities, co-digester facilities, or centralized facilities at dairies would not increase water or wastewater treatment demands substantially above those levels already needed for dairy operations. Potential new sources of water and wastewater treatment demands include the following:

- Water for Feedstock – Water needed to increase the liquid content of feedstock would be provided by process wastewater from settling ponds or lagoons which would be available at the dairy and would not require additional treatment capacity.
- Wastewater Treatment/Dilution for Digestate – The digestate (liquid and solid waste) produced from the digester or co-digester facility would receive anaerobic treatment and would not typically require additional treatment. The effluent from co-digester facilities may need water for dilution prior to land application.

- Domestic Water and Wastewater Demands for Employee Facilities (such as restrooms) – Due to the limited number of employees, these demands could be satisfied by the facilities needed for dairy operations and would not require additional treatment capacity.
- Water for Fire Suppression – Fire suppression demands could be satisfied by water already needed for dairy operations including water supplied by agricultural wells or irrigation water. The water could be non-potable and does not require additional treatment capacity.

As there would be no increased water or wastewater treatment demands directly related to projects at dairies, this impact would be less than significant.

The development of off-site centralized facilities could require new water and wastewater treatment facilities or connection to a municipal system. It should be noted that industrial wastewater discharge to a wastewater treatment provider is not covered under this waste discharge regulatory program. Potential new sources of water and wastewater treatment demands include the following:

- Water for Feedstock – There would be a demand for water needed to increase the liquid content of feedstock; this water could be non-potable if available. The demand could be supplied from development of an on-site groundwater well or water from an irrigation district. Projects located in industrial areas or the urban fringe may be able to connect to a municipal system.
- Wastewater Treatment/Dilution for Digestate – The digestate (liquid and solid waste) produced from the digester or co-digester facility would receive anaerobic treatment and would not typically require additional treatment. The effluent from co-digester facilities may need water for dilution prior to land application.
- Domestic Water and Wastewater Demands for Employee Facilities (such as restrooms) – The demand could be supplied from development of an on-site groundwater well and septic system. Projects located in industrial areas or the urban fringe may be able to connect to a municipal system. The water and wastewater demands are considered relatively low due to the limited number of employees needed to operate the facilities.
- Water for Fire Suppression – Fire suppression demands could be satisfied by non-potable water if available. The demand could be supplied from development of an on-site groundwater well. Projects located in industrial areas or the urban fringe may be able to connect to a municipal system.

New private water and wastewater treatment facilities (such as an on-site groundwater well or septic system) would be part of the project plan submitted for local site plan review and would be constructed to the standards of the applicable local jurisdiction; as this condition must be met, impacts from private water and wastewater treatment facilities would be less than significant. For service from an irrigation district or municipal system, the developer would need to ensure that service is available with adequate treatment capacity and thus this impact is potentially significant.

Mitigation Measures

> **Measure 15.3a:** If the project proposes to obtain water from a water supplier (irrigation district, municipal system or other public water entity), the developer would enter into an agreement for service with the supplier.

> **Measure 15.3b**: If the project proposes to obtain wastewater service from a wastewater treatment provider (municipal or other public entity), the developer would enter into an agreement for service with the provider.
>
> **Impact Significance After Mitigation:** Less than Significant

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Impact 15.4: The project would not result in significant environmental effects from the construction of new stormwater treatment facilities or expansion of existing facilities. (Less than Significant)

Dairies have ponds which also receive stormwater runoff. The addition of digester facilities, co-digester facilities, or centralized facilities at dairies would create additional impermeable surfaces; however, these surfaces would be small in comparison to the overall dairy operation and would not be enough to significantly affect the flow (rate or location) of stormwater. This impact is less than significant for facilities located on dairies.

The development of off-site centralized facilities could require new stormwater treatment facilities or connection to a municipal stormwater system. Stormwater facilities would likely be created on site, though there would be some potential for access to connected stormwater systems if the project is located in industrial areas or the urban fringe. Stormwater facilities would be part of the project plans submitted for local site plan review and would be constructed to the standards of the applicable jurisdiction and Central Valley Water Board. As this condition must be met, the impact would be less than significant.

Mitigation: None required.

Impact 15.5: The project would not require significant levels of new or expanded water supply resources or entitlements. (Less than Significant)

As discussed in Impact 15.3, there would be little to no increase in water demands for digester facilities, co-digester facilities, or centralized facilities located at dairies. Thus, facilities located at dairies would have a less-than-significant effect on expanded water supplies or entitlements.

As discussed in Impact 15.3, development of off-site centralized facilities could create water demands for dilution of feedstock/digestate, domestic water uses and fire suppression. Impact 5.5 (in Chapter 5, Hydrology) discusses that California Senate Bill (SB) 610 requires a water supply assessment to demonstrate adequate water supplies for large projects. The requirement applies to processing plants that occupy over 40 acres or projects that require more water than would be typically required for 500 dwelling units, and other projects defined by California Water Code §10912(a). Some centralized digestion and co-digestion facilities may not be large enough to meet the minimum requirements of this bill and therefore do not represent a significant source of water supply demands. Those facilities that must adhere to the requirements of SB 610 would be required to demonstrate adequate water supplies are available and therefore would have a less-than-significant impact on expanded water supplies or entitlements.

Mitigation: None required.

Impact 15.6: The project could result in exceeding the capacity of a wastewater treatment provider. (Significant)

As discussed in Impact 15.3, use of a wastewater treatment provider is considered only for development of centralized facilities (off-site from dairies) located in industrial areas or the urban fringe where municipal wastewater treatment is available. It should be noted that industrial wastewater discharge to a wastewater treatment provider is not covered under this waste discharge regulatory program. Wastewater treatment demands would include domestic uses. As the developer would need to ensure that adequate wastewater conveyance and treatment capacity is available, this impact is potentially significant.

Mitigation Measure

> **Measure 15.6:** If the project proposes to obtain wastewater service from a wastewater treatment provider (municipal or other public entity), implement Mitigation Measure 15.3b.
>
> **Impact Significance After Mitigation:** Less than Significant

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Impact 15.7: The project could result in the construction new energy supplies and could require additional energy infrastructure. (Significant)

The project could facilitate the construction of new energy supplies within the project area through the production of biogas as part of the dairy digestion and co-digestion process. The energy created from biogas at dairy digester and co-digester facilities is considered renewable. As there is currently a demand for renewable energy in California, there is a beneficial effect to providing energy from renewable resources. Dairy digester and co-digestion facilities are designed to have minimal electrical loads, however accessing additional power on-site or generating electricity to export from the dairy could require additional energy infrastructure, with potential significant impacts from construction.

The amount of energy infrastructure needed would be dependent on how the biogas is used. As an energy source, biogas may be used in internal combustion engines to produce electricity, conditioned to biomethane for use in fuel cells or in natural gas vehicles, or conditioned to biomethane for injection into natural gas pipelines. The need for additional infrastructure for each of these uses is described in greater detail below.

Biogas uses that would not require substantial off-site infrastructure improvements include the production of electricity through the combustion of biogas in internal combustion engines and the upgrading of biogas to biomethane for use in fuel cells or in natural gas vehicles. The construction of the facilities for each of these options could have less-than-significant environmental effects.

As described previously, biogas may also be conditioned to biomethane and then injected into existing and future natural gas pipelines. The conditioning of biogas could occur at dairies with digester and co-digester facilities, or it may be collected as raw biogas and conditioned a centralized facility. After processing, the biomethane would then likely need to be piped (at least short distances) from the facility to natural gas pipelines. Each of these production scenarios would require the construction of new energy infrastructure, such as pipelines, to connect to the existing gas utility network. Likewise, if biogas is converted into electricity on site and sold to a utility provider, then off-site infrastructure, or upgrades to existing off-site electrical distribution infrastructure, may be needed.

The development of new energy infrastructure or expansion of existing energy infrastructure on-site or off-site has the potential to cause significant impacts to biological, cultural, and/or other environmental resources. Typically, energy infrastructure can be located within existing easements or rights-of-way (i.e., public roads or utility easements). Specific impacts associated with off-site energy improvements would be evaluated at the project level during the local project review process. Mitigation Measure 15.7 would reduce impacts associated with the construction of off-site energy infrastructure improvements to less than significant.

Mitigation Measure

> **Measure 15.7:** Implement Mitigation Measures for construction of energy infrastructure including Mitigation Measures 6.1b, 9.1a, 9.1b, 9.2a, 9.2b, 9.3b, 12.1b, 12.2, 12.3, and 14.1a-c.
>
> **Impact Significance After Mitigation:** Less than Significant
>
> Implementation of the above resource-specific measures will ensure that the construction of off-site energy infrastructure would result in less-than-significant impacts.

Impact 15.8: The project would not conflict with existing energy policies or standards. (No Impact)

The project may indirectly facilitate the production of biogas and biomethane within the project area. This would be beneficial in helping to meet the California's Renewable Portfolio Standard. If a facility proposes to inject conditioned biogas into a natural gas pipeline, the developer is required to provide evidence to the purchasing utility that the biogas meets the utilities quality standards. No conflicts with existing energy polity or standards would occur and thus there would be no impact.

Mitigation: None required.

Impact 15.9: Development of dairy digester and co-digester facilities would not contribute to cumulative impacts to public services and utilities. (Less than Significant)

Water, Wastewater and Stormwater

Projects located at dairies would not create substantial increased demands on water, wastewater, or stormwater and thus would not contribute to cumulatively considerable impacts (see Impacts 15.3 to 15.6).

The water, wastewater, and stormwater facilities that may be required for centralized locations off-site of dairies would be distributed throughout the Central Valley. As noted in the discussion of Impacts 15.3 and 15.4, new water, wastewater or stormwater facilities are project components, subject to review and regulation by local jurisdictions and agencies. Because centralized facilities are unlikely to be built within close proximity to one another, where demand may be concentrated and magnified, cumulative impacts to local water, wastewater, and drainage facilities are less than significant for those facilities.

Natural Gas

In cases where biogas is not utilized in natural gas injection into pipelines, impacts would be less than significant as off-site infrastructure would be minimal. No cumulatively considerable impact is expected in these cases.

In cases where energy infrastructure, such as pipelines, must be constructed to collect biogas or biomethane, new natural gas infrastructure would be built. As discussed in Impact 15.7, the specific impacts associated with off-site energy improvements would be evaluated at the project level during the local project review process. Mitigation Measure 15.7 would also reduce cumulative impacts associated with the construction of off-site energy infrastructure improvements to less than significant.

Electricity

The projects would provide additional renewable energy supplies throughout the Central Valley which has beneficial cumulative effects due to existing demand for renewable energy sources.

Fire protection

The project would contribute to a minor increase in fire protection services from fire districts/departments throughout the Central Valley. Impacts would be spread throughout the region and service demands specific to dairy digester and co-digester facilities are expected to be infrequent. Due to the infrequent and limited nature of increased fire protection demands, this impact is considered less than significant.

Mitigation: None required.

15.3 References

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CHAPTER 16

Other CEQA Considerations - Impact Overview

16.1 Effects Found Not To Be Significant

As required by CEQA, this Draft Program EIR focuses on expected significant or potentially significant environmental effects (CEQA Guidelines §15143). An Initial Study Checklist was prepared for the project to identify issues to be evaluated in this Draft Program EIR (**Appendix** NOP).

Direct and indirect impacts found to be less than significant during the scoping process include mineral resources and population and housing. Direct and indirect impacts found to be no impact during the scoping process include recreation. The Initial Study dismissed potential impacts in these resource areas as clearly insignificant and unlikely to occur as a result of the project. No subsequent scoping comments have been received inconsistent with the findings in the Initial Study related to these three resource areas.

Mineral Resources

Dairy digester facilities would not be of significant size to prohibit recovery of known mineral resources of value to the region or state. While there are several known sand and gravel mines, among other commodities, located within the Central Valley, due to the availability of agricultural land and extent of dairy operations which avoid designated mineral resource areas, the project would not be expected to result in the loss of specific recovery sites (Department of Conservation, 1999). Less than significant impacts are anticipated in this regard. The program will not result in foreseeable loss in mineral resources.

Population and Housing

Dairy digester operation would create a small number of jobs throughout the Central Valley region; however, this increase would not be considered substantial. The project does not involve the construction of features (i.e., roads, residences) that would induce population growth. Biogas generated by the dairy digester facilities would provide for an existing need for renewable energy and is not proposed to be used for new off-site developments. In addition, dairy digester facilities would not displace residences, as they would be located on, or in the vicinity of dairies. Less than significant impact to existing housing would occur. Finally, dairy digester facilities would be located on dairies, or in the immediate vicinity of dairies, and would not displace people. Less than significant impact to population growth would occur. The program will not result in foreseeable displacement of populations or housing.

Recreation

Dairy digester facilities would not induce population growth, restrict recreational opportunities, or thus would not increase use or demand for recreational facilities. The project description does not include recreational facilities. Considering these factors the project would not result in foreseeably significant impacts on recreation.

16.2 Cumulative Impacts

CEQA Guidelines §15130(a) requires that an EIR discuss the cumulative impacts of a project when the project's incremental effect is "cumulatively considerable," meaning that the project's incremental effects are considerable (as defined in §15065(c)). Cumulative impacts refer to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts (CEQA Guidelines §15355). Further, such impacts can result from individual effects which may be minor, but collectively significant over time. The discussion on cumulative impacts shall reflect the severity of the impacts and their likelihood of occurrence (CEQA Guidelines §15130(b)). CEQA Guidelines note that the cumulative impacts discussion does not need to provide as much detail as is provided in the analysis of project-only impacts and should be guided by the standards of practicality and reasonableness. Considering this, CEQA Guidelines §15130(b)(1) recommends the use of a "list" or "projection" approach in the discussion of significant cumulative impacts to adequately address cumulative impacts.

The cumulative impact analysis considered the combined effect of the proposed project and other closely related, past, present and reasonably foreseeable future projects that may be constructed or commence operation during the time of activity associated with the proposed project. . The cumulative impacts of the project are analyzed in detail in the final impact(s) discussion located in each of the environmental resource chapters (Chapters 5 – 15). Please refer to those impacts for a detailed discussion.

16.3 Growth-Inducing Impacts

The CEQA Guidelines §15126.2(d) require that an EIR evaluate the growth-inducing impacts of a proposed action (Section). A growth-inducing impact is defined by the CEQA Guidelines as:

> *[T]he ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth.... It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment.*

A project can have direct and/or indirect growth-inducement potential. Direct growth inducement would result if a project involved construction of new housing. A project can have indirect growth-inducement potential if it would establish substantial new permanent employment opportunities (e.g., commercial, industrial or governmental enterprises) or if it would involve a substantial construction effort with substantial short-term employment opportunities and indirectly stimulate the need for additional housing and services to support the new employment demand. Similarly, under CEQA, a project would indirectly induce growth if it would remove an obstacle to additional growth and development, such as removing a constraint on a required public service. An example of this indirect effect would be the expansion of a wastewater treatment plant, which might allow for more development in service areas.

The proposed project would not result in a substantial increase in employment, and correspondingly, would not result in a substantial increase in population and associated demand for housing in the area. Mitigation of impacts resulting from the Draft Program EIR will not require the construction of any additional roadways or public services or utilities. For these reasons, the project is not anticipated to result in substantial growth inducement.

16.4 Significant and Unavoidable Environmental Impacts

CEQA §21100(b)(2) requires that any significant effect on the environment that cannot be avoided or irreversible if the project be implemented must be identified in a detailed statement of the environmental impact report. CEQA Guidelines §15126.2(b) provides that an environmental impact report must discuss, preferably separately, the significant environmental effects which cannot be avoided if the proposed project is implemented. In addition, CEQA Guidelines §15093(a) requires the decision making agency to balance, as applicable, the economic, legal, social, technological, or other benefits of a proposed project against its unavoidable environmental risks when determining whether to approved a project. Benefits may include, but not be limited to, those that are region-wide or statewide. If the benefits of a proposed project outweigh the unavoidable adverse environmental effects, the adverse environmental effects may be considered : “acceptable.” If the Central Valley Water Board approves a project which will result in the occurrence of significant effects which are identified in the final environmental impact report but are not avoided or substantially lessened, the agency shall state in writing the specific reasons to support this action based on the final environmental impact report (EIR) and/or other information in the record (CEQA Guidelines §15093(b)). In this, the Statement of Overriding Considerations shall be supported by substantial evidence in the record. CEQA Guidelines §15093 provides that if an agency makes a Statement of Overriding Consideration the statement should be included in the record of the project approval and should be mentioned in the notice of determination. This statement does not substitute for and shall be addition to findings the Central Valley Water Board must make before approving a project for which the EIR was prepared (CEQA Guidelines §15091). The potentially significant and unavoidable adverse impact identified in this EIR is listed below. For this potentially significant and unavoidable adverse impact, the Central Valley Water Board must prepare and adopt a Statement of Overriding Considerations if the Central Valley Water Board approves the project.

Significant and Unavoidable Adverse Impact

Significant and unavoidable cumulative impact identified in this Draft Program EIR include:

- Impact 5.6 – Development of dairy digester and co-digester facilities, together with anticipated cumulative development in the area, could contribute to cumulative water quality impacts.
- Impact 6.6 – The criteria air pollutant emissions from the cumulative development of dairy manure digester and co-digester facilities in Region 5 (200 total digesters at a rate of 20 digesters or co-digesters per year for 10 years) were compared to and exceeded the significance thresholds of the San Joaquin Valley Air Pollution Control District (SJVAPCD) for both annual construction emissions and operational emissions.

Implementation of the program has been determined to result in a significant impacts for air quality and water quality. These significant cumulative impact is identified and discussed in greater detail in Chapter 5, Hydrology and Water Quality, and Chapter 6, Air Quality (see Impacts 5.6 and 6.6 respectively).

16.5 Significant Irreversible Environmental Changes

Section 15126.2(c) of the CEQA Guidelines requires an EIR to describe significant irreversible environmental changes that would occur if a proposed project is implemented. The guidelines further state that:

> *Uses of nonrenewable resources during the initial and continued phases of the project may be irreversible since a large commitment of such resources makes removal or nonuse thereafter unlikely. Primary impacts and, particularly, secondary impacts [such as highway improvement which provides access to a previously inaccessible area] generally commit future generations to similar uses. Also irreversible damage can result from environmental accidents associated with the project. Irretrievable commitments of resources should be evaluated to assure that such current consumption is justified.*

The proposed project would use non–renewable fuel resources during construction and such resources would also be used to some degree for the duration of the project (i.e., some petroleum for deliveries of co-digestion substrates and electricity generated off-site that is used for the digester facilities). However development of dairy digester and co-digester facilities would provide the ability to process the manure and co-digestion substrates to generate and capture biogas, which is a flexible renewable energy source. The overall energy would be net positive, the current energy potential of cow manure is not being captured, resulting in a net benefit in energy. In essence the development of the manure digesters and co-digesters would provide future generations access to the equipment that can generate renewable energy.

16.6 References

California Department of Conservation, Division of Mines and Geology. 1999. Mines and Mineral Producers Active in California (1997--1998). Special Publication 103. Sacramento, CA.

CHAPTER 17

Alternatives

17.1 Introduction

CEQA Guidelines §15126(a) requires an Environmental Impact Report (EIR) to describe a range of reasonable alternatives to the project which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate comparative merits of the alternatives. A range of reasonable alternatives to project must be addressed because the EIR will identify ways to mitigate or avoid the significant effects that a project may have on the environment (CEQA Guidelines §15126.6(b). Consideration of a range of potentially feasible alternatives promotes informed decision making and public participation. An EIR is not required to consider infeasible alternatives, but the alternatives discussion should present alternatives to the project which are capable of avoiding or substantially lessening any significant effects of the project, even if these alternatives would impede to some degree the attainment of the project objectives, or would be more costly (CEQA Guidelines §15126.6(b).

CEQA Guidelines §15126.2(f) provides that the range of alternatives is governed by the “rule of reason”, requiring the EIR to set forth only those alternatives necessary to permit a reasoned choice. In the evaluation of alternatives, the EIR shall contain sufficient detail to allow meaningful evaluation, analysis and comparison with the project. If an alternative would cause one or more significant effects in addition to those that would be caused by the project as proposed, the significant effects of the alternative shall be discussed, but in less detail than the significant effects of the project as proposed (CEQA Guidelines §15126.6(d)).

The EIR must evaluate a “No Project” alternative in order to provide a comparison between the impacts of approving the project with the impacts of not approving the project (CEQA Guidelines §15126.6(e)). CEQA Guidelines §15126(e) requires that the alternatives analysis must identify the “environmentally superior” alternative among those considered. If the “No Project” alternative is identified as the environmentally superior alternative, then the EIR must also identify an environmentally superior alternative among the other alternatives.

This chapter discusses the following alternatives to the project:

1. No Project Alternative
2. Additional Co-digester Substrate Restrictions Alternative
3. Thermal Conversion Alternative
4. Reduced NOx Emissions Alternative

The components of these four alternatives are described below, including a discussion of their impacts and how they would differ from the significant impacts of the project as proposed. A discussion of the environmentally superior alternative is included in this chapter.

Factors in the Selection of Alternatives

CEQA Guidelines §15126.6(c) recommends that an EIR briefly describe the rationale for selecting the alternatives to be discussed. A reasonable range of alternatives is considered for this analysis. The following factors were considered in identifying a reasonable range of alternatives to the project:

- Does the alternative accomplish all or most of the primary project objectives?
- Is the alternative feasible, from an economic, environmental, legal, social and technological standpoint?
- Does the alternative avoid or lessen any significant environmental effects of the project?

Program Objectives

As also stated in Chapter 3, Program Description, the objectives for the project covered by this draft Program EIR are:

1. Protect the beneficial uses of surface and groundwater[1] within the Central Valley Region from discharges to land associated with dairy manure digesters and co-digesters on or off-site of dairies.
2. Provide a regulatory framework for the water quality aspects of anaerobic biological digestion facilities using dairy manure and dairy manure with other organic substrates (co-digestion) to produce biogas (a flexible renewable fuel source).
3. Assist the State in meeting greenhouse gases (GHG) reduction measures in support of the California Global Warming Solutions Act of 2006 (Assembly Bill [AB] 32) through the production of biogas from dairy manure.
4. Provide a renewable green energy source to allow energy companies to help achieve the 2010 and 2020 California Renewables Portfolio Standard (RPS) through the production of biogas from dairy manure.
5. Reduce the time required to develop and issue water quality permits for dairy manure digester and co-digester projects by more than 75 percent primarily through the issuance of one or more Waste Discharge Requirements (WDRs) General Orders (GOs) and secondarily through the issuance of Individual WDRs or Conditional Waivers of WDRs (CWs).
6. Reduce the permitting time for other State and local agencies[2] with discretionary permit responsibilities by providing a Program EIR that can be relied upon or tiered from for regionwide environmental and regulatory settings, project alternatives analyses and cumulative impacts analyses.

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[1] Beneficial uses are described in *Water Quality Control Plan for the Tulare Lake Basin*, Second Edition, revised January 2004 (Tulare Lake Basin Plan) and *Water Quality Control Plan for the Sacramento River Basin and the San Joaquin River Basins*, Fourth Edition, revised September 2009 (Sacramento and San Joaquin Basin Plan).

[2] San Joaquin Valley Air Pollution Control District staff have estimated that the certification of the Program EIR will reduce air quality permitting time 50 percent or more for certain digester projects.

The project objectives were considered in the evaluation of the four alternatives, which included a No Project Alternative, in the alternative analysis contained in the draft Program EIR.

17.2 Alternatives that Were Considered but Not Further Analyzed

The CEQA Guidelines §15126.6(a) require that an EIR briefly describe the rationale for selecting the alternatives to be discussed, and suggest that an EIR also identify any alternatives that were considered by the lead agency but were rejected as infeasible (CEQA Guidelines §15126.6(c)). The following alternatives were considered, but were eliminated from further consideration and analysis for the reasons expressed below.

No Co-Digestion Alternative

An alternative that excluded use of co-digestion was considered in order to determine if such an alternative could minimize environmental impacts associated with co-digestion while meeting most of the project objectives. Under this alternative, only manure digester facilities would be included while co-digester facilities would be excluded from the project. Co-digestion has been included in the project because it can substantially increase biogas production and material diversion options for the co-digestion substrates. The increased potential revenue from the increased biogas (and potentially tipping fees for the co-digestion feedstocks) makes the dairy digester facilities more economically feasible. While this alternative could reduce potential impacts to water quality it was rejected for further analysis because, by limiting feedstock materials, it would limit the biogas potential of the dairy digesters and thus limit the potential for this alternative to increase renewable energy sources in California (a key goal of the project).

No Lagoon Digester Alternative

Dairy lagoons are large holding or detention ponds, usually with earthen dikes, used to contain, treat, and/or digest dairy process water and manure. The Central Valley Water Board has specifications regarding the construction of dairy lagoons. The option of modifying existing lagoons for digestion can potentially provide a less expensive method for digesting dairy manure process water than construction of new concrete or steel tanks.

Lagoons have a greater potential than tanks to adversely affect groundwater. By limiting dairy digesters and co-digesters to concrete or steel tanks, significant water quality impacts could potentially be avoided. However, the project is a regulatory program that seeks to promote the increase of renewable energy sources in California. Eliminating the option of lagoon digesters could unnecessarily eliminate a huge potential source of digesters that are essentially in place now, missing only the lagoon covers, potentially additional groundwater protections, and gas collection systems. For this reason, the potential alternative was rejected for any further analysis.

No Centralized Facilities Alternative

There are two categories of centralized location facilities for dairies that are analyzed in this EIR: (1) Central AD Facility, whereby individual dairies would collect manure and transport the manure by pipeline or truck to a central facility; and (2) Central Biogas Clean-Up Facility, whereby raw biogas from individual dairies (including dairies linked via underground gas pipelines) is piped to a central facility. These types of centralized facilities can be on dairies or located off-site. For both location options, the central facility would have the potential to receive manure, manure plus co-digestion substrate, and/or raw biogas.

Under this alternative, the development of centralized AD facilities would not be included in the project. This alternative would result in centralized facilities requiring individual permits and CEQA compliance for the development of dairy manure digester and co-digester facilities within the Central Valley Region.

By excluding centralized facilities from the project, potential site-specific environmental impacts to off-dairy locations would be avoided. However, the project is a regulatory program that seeks to promote the increase of renewable energy sources in California. Various business models have been tested and others are being considered that include a central facility: such facilities would add biogas utilization options that could encourage the development dairy biogas production. The biogas producers would be relieved of the significant expense of biogas treatment. Limiting the project to non-centralized facilities undermines the purpose of the project and therefore is not considered to be within a reasonable range of alternatives. For this reason, the potential alternative was rejected for any further analysis.

17.3 Alternatives Selected for Further Consideration

No Project Alternative

CEQA Guidelines §15126.6(e) provides that a No Project Alternative shall also be evaluated along with its impact. According to the CEQA Guidelines, the No Project Alternative shall discuss the existing conditions at the time the Notice of Preparation was published, as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services.

The No Project Alternative would maintain the status quo for dairy digester and co-digester facilities with respect to CEQA and permitting. The waste discharge regulatory program for dairy manure digesters under consideration by the Central Valley Water Board would not be implemented under this alternative. Dairy digester and co-digester facilities would be required to comply with current CEQA and Central Valley Water Board regulatory requirements without the benefit of the Program EIR or regulatory program. Development of dairy digesters and co-digester facilities would continue in its current form and would be regulated by the Central Valley Water Board through individual WDRs and exemptions, by other permits from responsible agencies (i.e., County Use Permits, air quality permits, etc.) and by county governments through local ordinances and regulations.

The No Project Alternative would not change the time that is currently needed for permitting dairy manure digester and co-digester facilities, or reduce the time or expense required to develop and issue permits associated with digesters by federal, State and local permitting agencies. This alternative would also be expected to be result in the development of fewer facilities and therefore less renewable energy. The No Project Alternative fails to meet the objectives of the Program EIR. The No Project Alternative would not provide a regulatory framework for dairy manure digesters, it would not assist in reducing GHG emissions, it would not help energy companies achieve RPS targets and it would not help to reduce the time required for permitting dairy manure digesters.

Impacts

Under the No Project Alternative, the proposed waste discharge regulatory program would not be implemented, so development and permitting of dairy digesters and co-digester facilities would continue in its current form. Future development of dairy digester and co-digester facilities would be analyzed on an individual basis, and would be subject to individual federal, State, and local laws, regulations, ordinances and guidance. With this alternative, development of individual dairy manure digester or co-digester projects would result in similar impacts as the project to land use and agricultural resources, transportation and traffic, biological resources, hazards and hazardous materials, aesthetic resources, cultural resources, geological resources, noise, and public services and utilities. However, without the Program EIR or the project, permitting of dairy digesters would slow somewhat or considerably in California, therefore resulting in the development of fewer facilities, thus, any impacts (adverse or beneficial) would likely be seen in fewer locations and be smaller in overall scale. For projects constructed and operated under the No Project Alternative, the impacts resulting from the construction of individual facilities would be similar to those described in the project. Impact 6.6 (significant cumulative impact from criteria air pollutants) would probably be less significant under this alternative as the alternative would be expected to reduce the future development of dairy manure digester and co-digester facilities.

In the event of adoption of the No Project Alternative, the waste discharge regulatory program associated with the Program EIR would not be implemented, which would result in status quo for the development of dairy digesters with respect to hydrology and water quality.

The adoption of the No Project Alternative would result in greater impacts from GHG emissions, as an overall beneficial impact of the dairy digester and co-digestion facilities estimated to be built in the next 10 years would be a net decrease in GHG emissions. The majority of the reduction is due to methane capture through a closed system inherent in the dairy digester process, whereas conventional manure storage structures result in large quantities of fugitive methane emissions released into the atmosphere from the natural anaerobic digestion of animal waste. In the event of the adoption of the No Project Alternative, development and construction of dairy digester facilities remain at the same (slower) rate, resulting in an expectation of continued release of more methane into the environment, as compared to the project. By slowing the potential rate of development of dairy digester facilities (that capture and use methane), this alternative would have a negative effect on California’s efforts to reduce GHG emissions (AB 32).

Additional Co-digestion Substrate Restrictions Alternative

The restrictions in the Additional Co-digestion Substrate Restrictions Alternative are proposed to facilitate the management of nutrients and salts in the project area without unnecessarily restricting the potential for increase biogas production and tipping fee revenue. This alterative would apply three additional restrictions to the use of co-digestion substrates in dairy manure digesters. First, it would prohibit the use of co-digestion substrates that originate from outside the regional aquifer. Second, it would prohibit the use of co-digestion substrates until dairies have identified and secured an appropriate destination or market for the additional digestate that would be generated by the additional co-digestion substrates. Finally, the alternative would restrict the percentage of non-manure co-substrates that would be processed by dairy manure digester facilities.

Dairies currently under the General Order for existing Milk Cow Dairies must develop and implement management practices that control nutrient losses and describe these in a Nutrient Management Plan (NMP) (Central Valley Water Board, 2007). The existing General Order also requires preparation of a Salinity Report. As part of the dairy digester waste discharge regulatory program the operation of dairy manure digesters will require a site-specific NMP and a site-specific Salt Minimization Plan (SMP) for the on-site use of liquid and solid digestate.

There are existing restrictions in place regarding the importation of materials onto a dairy for use in digester facilities. The Waste Discharge Requirements General Order for existing Milk Cow Dairies restricts the following materials for importation onto a dairy, for the purpose of nutrient recycling or disposal: whey, cannery wastes, septage, municipal or industrial sludge, municipal or industrial biosolids, ash, or similar types of wastes (Central Valley Water Board, 2007). This draft Program EIR also prohibits hazardous wastes, mammalian tissue, dead animals, or human wastes.

The Additional Co-digestion Substrate Restrictions Alternative would add to the existing restrictions and prohibit the importation of any co-substrates originating from outside the regional aquifer. Despite existing Central Valley Water Board regulations, salt accumulation has been identified as an ongoing and increasingly difficult problem to manage in the jurisdictional boundaries of the Central Valley Region (Region 5). This alterative would address that issue by ensuring that there is no net increase in salts discharged to the regional aquifer due to importation of co-digestion substrates allowed by the project.

This alternative would also require dairy operators to have identified and secured a proper end use for their digestate before any co-substrates could be imported to the dairy. In cases where the digestate would be applied on-site, the operator would need to establish that the application would be consistent with their NMPs or SMPs. In cases where the intended use of solid digestate is land application off-site, or an alternate off-site market, the operator must have an agreement with the third party receiver before importation of the co-substrate.

Finally, this alternative would restrict the volume of materials being processed in the digester to not more than 30 percent non-manure co-substrates, with the remainder being dairy manure. Similar restrictions on the level of co-digestion substrates have been legislatively introduced in the State of Washington in 2009, as have environmental permitting procedures in the State of New York. Regulations of co-digestion substrates by volume of materials are also enforced in Ohio, Michigan, and Iowa (Greer, 2009).

These additional co-substrate restrictions would limit in several ways the generation and fate of liquid and solid wastes that could result from the development of dairy co-digester facilities. The limitations would, however, still allow for the co-digestion of organic substrates to increase the yield of biogas from the dairy digester and collection of revenue for tipping fees from processing the co-digestion substrates.

The project is a regulatory program that seeks to reduce permitting time and promote the increase of renewable energy sources in California. Limiting the use of co-substrates could work against the project objective of reduced permitting time by adding additional regulations and restrictions. The alternative could also reduce the overall generation of biogas by reducing the income available from co-substrate tipping fees, and thus reducing some of the overall incentives of the project. Strict limitations on co-substrates would also impact the project goal of increasing renewable energy sources because co-substrates can significantly increase biogas generation.

Impacts

The following impact analysis is provided in order to compare the impacts of the Additional Co-digestion Substrate Restrictions Alternative to the impacts of the project. See also Table 17-1, the matrix of effects of the alternatives.

The area physically affected under the Additional Co-digestion Substrate Restrictions Alternative (Region 5) would be the same as that affected under the project. Therefore, most impacts related to land use and agricultural resources, geological resources, cultural resources, aesthetic resources, hydrology, hazards and hazardous materials, and public services and utilities would be similar to those identified with implementation of the project. These impacts would potentially be slightly less overall, however, as the introduction of additional restrictions would make the construction and operation of dairy digester and co-digester facilities less economically viable, therefore probably resulting in the development of fewer facilities. In the event of facility construction and operation with equal levels of development as those detailed in the project, however, many impacts resulting from the construction of individual facilities would be equal to or similar in magnitude to those described in the project.

The Additional Co-digestion Substrate Restrictions Alternative would result in fewer impacts to biological resources relating to waters of the State and/or the United States, including wetlands. Controlling the materials used in anaerobic digestion would result in improving the quality of the digestate that is distributed into agricultural fields. This would result in potentially reduced impacts to the surrounding surface water and groundwater, and subsequently riparian habitats and wetlands.

The Additional Co-digestion Substrate Restrictions Alternative would result in fewer impacts to the degradation of groundwater quality, specifically those relating to the increased rate of nitrogen and salt loading and the release of other contaminants in the basin resulting from the land application of wastewater from digester and co-digester facilities. By limiting the potential introduction of additional salt and nitrogen, the proposed alternative would reduce potential water quality impacts.

By limiting the distance that trucks transporting materials would be required to travel due to restrictions related to the origin of materials, the impacts of this alternative on air quality and GHG, as well as traffic, would be slightly less than those described by the project. By slowing the potential rate of development of dairy digester facilities (that capture and use methane), this alternative (in comparison to the project) would have a negative effect on California’s efforts to reduce greenhouse gas emissions (AB 32).

Thermal Conversion Alternative

The Thermal Conversion Alternative would replace anaerobic digesters with thermal conversion technologies. Under the Thermal Conversion Alternative the regulatory program would apply to the construction and operation of thermal conversion facilities for the production of biogas from dairy manure.

Thermal conversion refers to a range of technologies that use a combination of high heat, steam, high pressure, and oxygen reduced environments to convert organic matter into various products including combustible gases, oils, and charcoals, as well as noncombustible, ashes and molten slags (CIWMB, 2007). Thermal conversion technologies are different from direct incineration of organic matter in that they utilize environments with a range of sub-stoichiometric concentrations of oxygen and thus interrupt the combustion process before complete oxidation can occur. Much like anaerobic digestion, the resultant products can be used for a variety of products including combustion for energy, transportation fuels, industrial chemicals, and soil amendments. Unlike anaerobic digestion, however, thermal conversion involves temperatures sufficiently high to guarantee pathogen reduction.

Possible thermal conversion technologies could include, but not be limited to, the following processes:

- **Heat drying**

  Heat Drying is a generic term for any of several methods for heating manure to kill viable pathogens and to reduce their moisture content to 10 percent or lower. This requirement is reached by agitating manure while exposing it to heat using hot gases such as hot air or steam

- **Pyrolysis and gasification**

  Pyrolysis and gasification are two closely related thermal conversion processes that have many commercial uses including generating gas from coal, oil refining, conversion of municipal solid waste (MSW) and other organic feedstocks, and charcoal production. Both of these processes have the potential to create combustible gasses and other products from the conversion of dairy manure, and both would likely require pre-processing to remove excess moisture from the manure (Los Angeles County, 2007) . In some cases compression/pelletization may be required before the manure could be thermally converted.

  Pyrolysis generally operates in the near absence of oxygen and is unique in that it produces “biochar” and a pyrolitic oil in addition to a combustible gas. Biochar is known to have nutrient and water retention characteristics that can make it a valuable soil amendment.

> Gasification differs from pyrolysis in that it often involves heating biomass with restricted amounts of oxygen and injected steam, and generally creates ash or molten slag as opposed to carbon rich biochar (CIWMB, 2007).

Like digesters, thermal conversion facilities are capable of processing more than just dairy manure. Potential feedstocks include, among others, energy crops, tires, biomass, or residual MSW (Los Angeles County, 2007). Many of these feedstocks have the potential to increase biogas yield.

Impacts

The following impact analysis is provided in order to compare the impacts of the Thermal Conversion Alternative to the impacts of the project. See also Table 17-1, the matrix of effects of the alternatives.

The area physically affected under the Thermal Conversion Alternative is assumed to be the same as that affected under the project. Due to similarities in construction and processing, most impacts related to land use and agricultural resources, biological resources, geological resources, cultural resources, aesthetic resources, hydrology, air quality and GHG, transportation and traffic, and public services and utilities would be similar to those identified with implementation of the project. These impacts would potentially be slightly less overall, however, as the introduction of new technology would make the construction and operation of dairy facilities less economically viable, therefore resulting in the development of fewer facilities. In the event of facility construction and operation and equal levels of development as those detailed in the project, however, many impacts resulting from the construction of individual facilities would be equal to those described in the project.

The Thermal Conversion Alternative would have similar noise impacts as those described in the project. The additional equipment needed for thermal conversion would not result in significant increase to noise impacts compared to those detailed in the project.

Impacts relating to hazards in the Thermal Conversion Alternative would potentially be greater than the project. . Thermal technologies have the potential to create hazardous ash and/or air emissions[3], depending on the technology and feedstock used. This would result in the introduction of additional impacts relating to hazardous materials. Additionally, any release of hazardous materials could potentially have a negative effect on water quality, resulting in additional impacts to water quality in addition to those identified in the project.

The project is a regulatory program that seeks to promote availability of biofuels and renewable energy. Limiting the project to thermal conversion processes, which are not as commercially developed for use on dairy manure could undermine opportunities for energy companies to achieve 2010 and 2020 California Renewable Portfolio Standards by converting dairy manure, green waste, and other waste steams to a valuable, renewable green energy resource.

Thermal conversion technologies only treat the screened/dried, solid portion of manure. This alternative would limit opportunities for on-site treatment of dairy manure process water. This

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[3] Hazardous emissions are an issue with thermal technologies more than anaerobic digesters because anaerobic digesters only process organics. Thermal conversion has the potential, depending on feestocks, to process plastics and other feedstocks that could leave to eventual emission of toxic constituent.

could undermine the objective to create alternate waste treatment methods for dairy manure and other organic waste streams to the extent it would exclude the liquid component of the dairy manure. While the Thermal Conversion Alternative still meets the alternate waste treatment method objective, it does not meet it as efficiently as the project.

Reduced NOx Emissions Alternative

The Reduced NOx Emissions Alternative would limit the use of combustion engines in the generation of electricity by requiring, or developing incentives, for biogas uses from dairy digester facilities that minimize NOx emissions in the Central Valley (i.e., fuel cells, transportation fuels and injection into utility gas pipelines). The Central Valley Water Board would issue discharge permits only to facilities demonstrating use of technologies supporting low-NOx emissions.

Nitrogen Oxides (NOx) are air quality pollutants generated by internal combustion engines and microturbines that are precursors to the formation of ozone. Combustion of biogas generates electricity but it also generates NOx emissions. This alternative involves the use of technologies that generate reduced NOx emissions. By limiting energy production to the use of fuel cells or for utility pipeline injection or for development of transportation fuel, significant unavoidable cumulative air quality impacts from the emission of NOx could be reduced.

The SJVAPCD, which overlaps geographically with the Central Valley Region, is designated by the US EPA as “extreme nonattainment” for both the 1-hour and 8-hour federal ozone standards.[4] Due to this designation the district has been required to implement a state implantation plan (SIP) which contains aggressive measure to reduce NOx emissions[5]. Despite SIP NOx requirements, the draft Program EIR analysis indicates that individual dairy digester projects generating on-site electricity would probably not generate NOx emissions that would exceed the SJVAPCD significance threshold for NOx emissions (10 tons per year). However, the cumulative development of dairy digesters over 10 years in Region 5 may culminate in as many as 200 on-site generating facilities which would result in aggregate NOx emissions that would exceed the significance threshold. As mentioned above, there are three options (fuel cells, utility pipeline injection, and transportation fuels) for using the biogas in a manner that would reduce NOx air emissions in the air basin, compared to the project.

Fuel Cells

Fuel cells remain a promising technology for converting biogas to heat and electricity with minimal NOx emissions. There is a 900 kW system fuel cell currently operating at the City of Tulare wastewater treatment plant, but no fuel cells know to be operating at dairy digesters. The high costs of fuel cells are a major impediment, even with numerous State incentives.

The usage of fuel cells significantly elevates the net electrical efficiency and maximizes the potential electrical energy available from small sources of biogas. Moreover, the fuel cell achieves the

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[4] http://www.epa.gov/region9/air/sjvalley/index.html#0410

[5] See section X “Air Quality” for details.

higher conversion efficiency while producing negligible emissions that are well below the most stringent limits established by the presiding air districts.

Fuel cell technology is currently at an early stage of development and consequently the costs for fuel cells are many times greater than for comparably sized micro-turbine, turbine or IC engines. Even though the efficiency of fuel cells are considerably better than the other technologies, given this very large production cost differential, until major technological improvements and/or large scale commercialization is achieved, fuel cells will remain dramatically less cost-effective for implementation.

Transportation Fuel

Raw dairy digester biogas can be converted into biomethane, which, when compressed, can be used as transportation fuel for natural gas-fueled vehicles. Biomethane is created by removing the impurities such as CO_2, water and hydrogen sulfide, from raw biogas, which can then be pressurized and used as fuel (Western United Dairymen, 2005).

Currently, compressed natural gas (CNG) is used as a petroleum alternative for cars and other light use vehicles. In addition, liquefied natural gas (LNG) is also being developed as a diesel alternative suitable for heavier industrial vehicles. Compressed biomethane (CBM) and liquefied biomethane (LBM), which have nearly equivalent heating values to their petroleum based counterparts[6], are both potential substitute fuels for CNG and LNG vehicles.

One of the primary barriers to upgrading raw biogas to transportation fuel quality is the cost associated with the additional processing. There are incentive and grant programs available to offset these costs at the federal and State levels. Recently California has prioritized alternative fuel production. The California Energy Commission allocated 176 million dollars for fiscal years 2008-09 and 2009-10 as part of its “Investment Plan for the Alternative and Renewable Fuel and Vehicle Technology Program[7]” Another $100 million is expected to be allocated for the subsequent fiscal year.

In 2009, Hilarides Dairy in Lindsay, California became the first dairy in the U.S. to produce pressurized, either compressed or liquefied, biomethane for use as vehicle fuel, powering two semi trucks, three pickup trucks, and four boilers (Richardson, 2009). As is typical of most industrial and agricultural operations in the Central Valley Region, Hilarides utilized diesel fueled heavy duty vehicles. Converting heavy duty diesel vehicles significantly reduces NOx emissions. On site use of biomethane as transportation fuel by dairies eliminates the transportation costs and air emissions associated with both the distribution and use of diesel fuel (Richardson, 2009).

Utility Pipeline Injection

Biomethane can be distributed by dedicated biomethane pipelines to the natural gas pipeline utility grid. Injecting biomethane into the grid directly offsets natural gas use which will result in NOx emissions by directing the gas to larger, more efficient consumers.

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[6] Gas Technology Institute- Guidance Document for Introduction of Dairy Waste Biomethane Reporting Period: October 2007 through June 2008 Report Issued: September 30, 2009. Page 8.

[7] April 2009 CEC-600-2009-008-CMF

The necessary infrastructure and biogas conditioning required for injection into the utility grid typically would be more onerous than for generating transportation fuels. In order to be used within the natural gas pipeline grid, biogas and biomethane must meet standards of quality and interconnection requirements, including system capacity constraints, which would not be necessary for on-site use for energy or fuels. Facilities for the collection and cleaning of biogas would be required to be constructed, as well as the necessary dedicated pipelines to connect the facility to the natural gas grid.

Currently, although California utilities are willing and able to purchase biomethane produced by manure digesters, the supplying dairy must provide all the facilities necessary to deliver pipeline quality biomethane to the utility's natural gas transmission system. Furthermore, the dairy must also perform the scrubbing and compression of the biomethane as well as install and operate the metering equipment and pipeline tap. Interconnection costs are often prohibitively high for dairy operators. Utility operators assert that interconnection fees are based on standard industry practice and existing regulations prohibit them from effectively passing these costs on to ratepayers, thus creating a barrier to implementing to injection projects. In addition, proximity to the natural gas transmission line will also be a major limiting factor.

Vintage Dairy in Riverside, California has been selling its biogas, about 200,000 cubic feet per day, to PG&E since 2008 (Walden University, 2009). If an existing network is relatively close to the dairy digester facility, the biomethane can be distributed via dedicated pipelines that are either buried or aboveground. The natural gas pipeline network offers a storage and distribution infrastructure for biomethane. Once the biomethane is injected into the natural gas pipeline network, it becomes a direct substitute for natural gas (Western United Dairymen, 2005).

Impacts

The following impact analysis is provided in order to compare the impacts of the Reduced NOx Emissions Alternative to the impacts of the project. See also Table 17-1, the matrix of effects of the alternatives.

The area physically affected under the Reduced NOx Emissions Alternative is assumed to be the same as that affected under the project. Due to similarities in construction and processing, most impacts related to land use and agricultural resources, biological resources, geological resources, cultural resources, aesthetic resources, hydrology and water resources, transportation and traffic, and public services and utilities would be similar to those identified with implementation of the project. These impacts would potentially be slightly less overall, however, as the requirements for the use of specific technologies would make the construction and operation of dairy facilities less economically viable, therefore resulting in the development of fewer facilities. In the event of facility construction and operation and equal levels of development as those detailed in the project, however, many impacts resulting from the construction of individual facilities would be equal to those described in the project.

The Reduced NOx Emissions Alternative would have similar or lower noise impacts as those described in the project. The additional equipment needed for the conversion of raw dairy digester biogas into biomethane would not result in significant increase to noise impacts compared to those detailed in the project. The noise from the IC engines would be reduced by this alternative.

The Reduced NOx Emissions Alternative would result in fewer impacts to air quality by reducing NOx emissions (an ozone precursor) in the Central Valley. Reducing NOx emissions is a major goals of the San Joaquin Valley Air Pollution Control District San Joaquin Valley Air Pollution Control District.

However, the project is a regulatory program that seeks to promote the increase of renewable energy sources in California. The majority of existing dairy manure digesters in California and in the United States generate electricity from the combustion of biogas. This alternative would reduce the options for producing renewable energy (including the most common current option for dairy digesters).

17.4 Comparison of Alternatives

The relative impacts of the various project alternatives identified for consideration is this document, including the project and No Project Alternative, are shown in **Table 17-1**. Only those effects identified as significant before mitigation for the project are listed in **Table 17-1**. In addition, the significance of each impact is described prior to implementation of feasible mitigation measures. This is done in order to identify which alternatives would avoid or substantially lessen one or more potentially significant impacts, as required by CEQA Guidelines §15126.6(a). For the level of significance of the proposed project after mitigation, refer to Table 1-1 and the impact analysis in Chapters 5-15. Many mitigation measures identified for the project would also be feasible under the No Project Alternative, the Additional Co-digestion Substrate Restrictions Alternative, the Thermal Conversion Alternative, and the Reduced NOx Emissions Alternative.

Ability to achieve project objectives

Table 17-2 shows the ability of each alternative to achieve the project objectives that are listed above. As shown by the table, the No Project Alternative fails to meet the majority of the project objectives and the Thermal Conversion Alternative fails to meet half of the objectives. The proposed project, the Additional Co-digestion Substrate Restrictions Alternative, the Reduced NOx Emissions Alternative each meet all of the project objectives.

Environmentally Superior Alternative

CEQA Guidelines §15126.6(d) requires that an EIR include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed project. CEQA Guidelines §15126(e) requires that the alternatives analysis must identify the "environmentally superior" alternative among those considered. If the "No Project" alternative is identified as the environmentally superior alternative, then the EIR must also identify an environmentally superior alternative among the other alternatives. The analysis in this chapter clearly shows that the No Project Alternative is not the environmentally superior alternative. The analysis also indicates that the Thermal Conversion Alternatives is not the environmentally superior alternative because if fails to meet several project objectives and could have adverse effects on water quality.

Table 17-1 indicates that the Additional Co-digestion Substrate Restrictions Alternative, and the Reduced NOx Emissions Alternative each would have reduced impacts in some environmental resource areas when compared to the project and none of the potential impacts for these two alternatives are greater than impacts of the proposed project. The Additional Co-digestion Substrate Restrictions Alternative has restrictions on co-digestion substrates that could potentially provide additional protection for the water resources in Region 5. By reducing NOx emissions that would have an incremental beneficial effect to all Region 5 residents, the Reduced NOx Emissions Alternative provides the most potential benefit to the greatest number of residents of the Central Valley. To the extent that the technology required for the Reduced NOx Emissions Alternative becomes feasible and cost effective, this Alternative would constitute the environmentally superior alternative.

Regardless of their potential benefits, both the Additional Co-digestion Substrate Restrictions Alternative, and the Reduced NOx Emissions Alternative place restrictions on the development of dairy manure digester and co-digester projects that could further restrict future growth of digesters in Region 5. Dairy digester development would be restricted by the high costs and/or additional regulatory hurdles of the technologies associated with the Reduced NOx Emissions Alternative (i.e., fuel cells, transportation fuel, and utility pipeline injection). Dairy digester development would also be restricted by additional limitations contained in the Additional Co-digestion Substrate Restrictions Alternative. By likely restricting the development of dairy digesters in Region 5, both the Additional Co-digestion Substrate Restrictions Alternative, and the Reduced NOx Emissions Alternative would have a negative influence on two of the primary objectives of the project, which are the development of a renewable energy resource (biogas) and the reduction of greenhouse gas emissions from dairy operations. Accordingly, some environmental benefits would as a practical matter be lost under these alternatives. Given the existing technological and economic constraints, therefore, these alternatives cannot be said to be clearly environmentally superior to the proposed project.

TABLE 17-1
PROJECT ALTERNATIVES: COMPARISON OF SIGNIFICANT EFFECTS[1]

	No Project Alternative	Additional Co-digestion Substrate Restrictions Alternative	Thermal Conversion Alternative	Reduced NOx Emissions Alternative
5. Hydrology and Water Quality				
Impact 5.2: Digester and co-digester development could adversely affect surface waters.	LS	LS	PG	E
Impact 5.3: Digester and co-digester development could adversely affect groundwater quality.	E	LS	PG	E
Impact 5.4: Development of dairy digester and co-digester facilities could be exposed to flooding hazards.	E	LS	PG	E
Impact 5.6: Development of dairy digester and co-digester facilities could contribute to cumulative impacts to water quality.	LS	LS	PG	E
6.Air Quality and GHGs				
Impact 6.1: Construction of dairy digester and co-digester facilities within Region 5 would generate short-term emissions of criteria air pollutants: ROG, NOx, CO, SO_2, PM10, and PM2.5 that could contribute to existing nonattainment conditions and further degrade air quality.	E	E	E	E

TABLE 17-1
PROJECT ALTERNATIVES: COMPARISON OF SIGNIFICANT EFFECTS[1]

	No Project Alternative	Additional Co-digestion Substrate Restrictions Alternative	Thermal Conversion Alternative	Reduced NOx Emissions Alternative
Impact 6.2: Pre-processing, digestion, and post-processing operational activities of dairy digester and co-digester facilities in Region 5 would result in emissions of criteria air pollutants at levels that could substantially contribute to a potential violation of applicable air quality standards or to nonattainment conditions.	E	E	E	LS
Impact 6.3: Operation of dairy digester and co-digester facilities in Region 5 could create objectionable odors affecting a substantial number of people.	E	E	E	E
Impact 6.4: Construction and operation of dairy digester and co-digester facilities in Region 5 could lead to increases in chronic exposure of sensitive receptors in the vicinity to certain toxic air contaminants from stationary and mobile sources.	E	LS	E	LS
Impact 6.6: Development of dairy digester and co-digester facilities in Region 5, together with anticipated cumulative development in the area, would contribute to regional criteria pollutants.	LS	E	E	LS
8. Transportation and Traffic				
Impact 8.1: Construction of dairy digester and co-digester facilities would intermittently and temporarily increase traffic levels and traffic delays due to vehicle trips generated by construction workers and construction vehicles on area roadways.	E	LS	E	E
Impact 8.3: Construction and operation of dairy digester and co-digester facilities could potentially cause traffic safety hazards for vehicles, bicyclists, and pedestrians on public roadways, and could increase traffic hazards due to possible road wear or to accident spills of manure, or co-digestion feedstocks or digestate.	E	E	E	E
Impact 8.4: Construction of dairy digester and co-digester facilities could intermittently and temporarily impede access to local streets or adjacent uses (including access for emergency vehicles), as well as disruption to bicycle/pedestrian access and circulation.	E	LS	E	E
Impact 8.5: Construction and operation of dairy digester and co-digester facilities could contribute to cumulative impacts to traffic and transportation (traffic congestion, traffic safety, and emergency vehicle access).	E	E	E	E
9. Biological Resources				
Impact 9.1: The project could impact special-status plant or wildlife species or their habitats.	E	E	E	E
Impact 9.2: The project could result in impacts on biologically unique or sensitive natural communities.	E	E	E	E
Impact 9.3: The project could result in impacts on waters of the State and/or the U.S., including wetlands.	E	LS	E	E

TABLE 17-1
PROJECT ALTERNATIVES: COMPARISON OF SIGNIFICANT EFFECTS[1]

	No Project Alternative	Additional Co-digestion Substrate Restrictions Alternative	Thermal Conversion Alternative	Reduced NOx Emissions Alternative
Impact 9.6: Development of dairy digester and co-digester facilities could contribute to cumulative impacts to biological resources.	E	E	E	E
10. Hazards and Hazardous Wastes				
Impact 10.1: Construction of dairy digester and co-digester facilities could result in the potential exposure of construction workers, the public and the environment to preexisting soil and/or groundwater contamination.	E	E	PG	E
Impact 10.6: Installation of biogas pipelines in public rights-of-way could impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.	E	E	E	E
11. Aesthetic Resources				
Impact 11.1: Implementation of the project, including operation of dairy digester and co-digester facilities, could result in impacts to scenic highways and/or scenic vistas.	E	E	E	E
Impact 11.2: Construction of the project could result in impacts to scenic highways and/or scenic vistas.	E	E	E	E
Impact 11.3: Implementation of the project could result in substantial creation of or change in light or glare.	E	E	E	E
Impact 11.4: Development of dairy digester and co-digester facilities could contribute to cumulative impacts to aesthetics.	E	E	E	E
12. Cultural Resources				
Impact 12.1: Construction of dairy digester and co-digester facilities could result in the adverse change in the significance of a historical or archaeological resource, pursuant to §15064.5.	E	E	E	E
Impact 12.2: Construction of dairy digester and co-digester facilities could result in the disruption of human remains, including those interred outside formal cemeteries.	E	E	E	E
Impact 12.3: Construction of dairy digester and co-digester facilities could result in direct or indirect disturbance or destruction of a unique paleontological resource or site or unique geologic feature.	E	E	E	E
Impact 12.4: Development of dairy digester and co-digester facilities could contribute to cumulative impacts related to archaeological, historical, and/or paleontological resources.	E	E	E	E
13. Geology				
Impact 13.1: The project could expose people to injury and structures to damage resulting from seismic activity.	E	E	E	E
Impact 13.2: The project could expose people to injury and structures to damage resulting from unstable soil conditions.	E	E	E	E

TABLE 17-1
PROJECT ALTERNATIVES: COMPARISON OF SIGNIFICANT EFFECTS[1]

	No Project Alternative	Additional Co-digestion Substrate Restrictions Alternative	Thermal Conversion Alternative	Reduced NOx Emissions Alternative
14. Noise				
Impact 14.1: Construction of dairy digester and co-digester facilities could temporarily increase noise levels at nearby sensitive receptor locations or result in noise levels in excess of standards in local general plans, noise ordinance, or other applicable standards.	E	E	E	E
Impact 14.2: Noise from operation of dairy digester and co-digester facilities or centralized facilities could substantially increase ambient noise levels at nearby land uses or result in noise levels in excess of standards in local general plans, local noise ordinances, or other applicable standards.	E	E	E	E
Impact 14.4: Development of dairy digester and co-digester facilities could result in a cumulative increase in noise levels.	E	E	E	E
15. Public Services				
Impact 15.3: The project could result in significant environmental effects from the construction and operation of new water and wastewater treatment facilities or expansion of existing facilities.	LS	LS	E	E
Impact 15.6: The project could result in exceeding the capacity of a wastewater treatment provider.	LS	LS	E	E
Impact 15.7: The project could result in the construction new energy supplies and could require additional energy infrastructure.	E	E	E	E

PG Potentially Greater Impact than project
LS Less Significant Impact than project
E Equal Impact to the project

1. The significance of each impact is described prior to implementation of feasible mitigation measures.

SOURCE: Environmental Science Associates, 2010

TABLE 17-2
PROJECT ALTERNATIVES: COMPARISON OF ABILITY TO ACHIEVE PROJECT OBJECTIVES

	Project	No Project Alternative	Additional Co-digestion Substrate Restrictions Alternative	Thermal Conversion Alternative	Reduced NOx Emissions Alternative
Objective 1 – Protect the beneficial uses of surface and groundwater within the Central Valley Region from discharges to land associated with dairy manure digesters and co-digesters on or off-site of dairies	✓	✓	✓	✓	✓
Objective 2 – Provide a regulatory framework for the water quality aspects of anaerobic biological digestion facilities using dairy manure and dairy manure with other organic substrates (co-digestion) to produce biogas (a flexible renewable fuel source).	✓	**0**	✓	**0**	✓
Objective 3 – Assist the State in meeting greenhouse gases (GHG) reduction measures in support of the California Global Warming Solutions Act of 2006 (Assembly Bill [AB] 32) through the production of biogas from dairy manure.	✓	**0**	✓	✓	✓
Objective 4 – Provide a renewable green energy source to allow energy companies to help achieve the 2010 and 2020 California Renewables Portfolio Standard (RPS) through the production of biogas from dairy manure.	✓	**0**	✓	✓	✓
Objective 5 – Reduce the time required to develop and issue water quality permits for dairy manure digester and co-digester projects by more than 75 percent primarily through the issuance of one or more GOs and secondarily through the issuance of Individual WDRs or CWs.	✓	**0**	✓	**0**	✓
Objective 6 – Reduce the permitting time for other state and local agencies[8] with discretionary permit responsibilities by providing a Program EIR that can be relied upon or tiered from for regionwide environmental and regulatory settings, project alternatives analyses and cumulative impacts analyses.	✓	**0**	✓	**0**	✓

✓ Alternative substantially achieves objective
0 Alternative does not achieve objective

SOURCE: Environmental Science Associates, 2010

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[8] San Joaquin Valley Air Pollution Control District staff have estimated that the certification of the Program EIR will reduce air quality permitting time 50 percent or more for certain digester projects.

17.5 References

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Western United Dairymen, 2005. Biomethane from Dairy Waste: A Sourcebook for the Production and Use of Renewable Natural Gas in California. July 2005.

CHAPTER 18
EIR Authors and Organizations/Persons Consulted

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The following members are recognized and appreciated for their contribution to Technical Advisory Committee.

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18.3 Organizations/Persons Consulted

The organizations and persons consulted, and other referenced reports and materials can be found in the reference sections at the end of each chapter of this Draft Program EIR

18.4 List of NOP Comment Letters and Scoping Meeting Comments

Comments received in response to the NOP were considered during preparation of the Draft EIR. Listed below are the agencies and persons that responded in writing or at public scoping meetings to the NOP for the preparation of the Dairy Digester and Co-Digester Facilities Draft EIR: Three Scoping Meeting were conducted during the circulation period for the NOP; two meetings in Sacramento and one meeting in Fresno.

Comment Letters:

- Caltrans District 10
- CalRecycle – Department of Resources Recycling and Recovery
- Native American Heritage Commission
- Fresno County Environmental Health Division
- Madera County Resource Management Agency: Planning Department
- Monterey Bay Unified Air Pollution Control District
- San Joaquin Valley Air Pollution Control District
- Stanislaus County Environmental Review Committee
- Yuba County Community Development and Services Agency
- Hanafi R Fraval, Innate Energy California LLC and Biogas Energy Inc.
- Jo Anne Kipps
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- Paul Martin, Western United Dairymen
- Herman P. Miller III, PE, Environmental Developers Inc.

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- Lee Smith,
- Joann Kipps
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CHAPTER 19

Acronyms and Glossary

19.1 Acronyms

AB	Assembly Bill
ACEEE	American Council for an Energy Efficient Economy
ACHP	Advisory Council on Historic Preservation
AD	Anaerobic Digestion
AIRFA	American Indian Religious Freedom Act
APCDs	Air Pollution Control Districts
AQMDs	Air Quality Management Districts
ARB	Air Resources Board
ARPA	Archeological Resources Protection Act
ASCE	American Society of Civil Engineers
BACT	Best Available Control Technology
BMPs	best management practices
BPTC	Best Practical Treatment or Control
CAA	Clean Air Act
CAFO	Confined Animal Feeding Operations
Cal-EPA	California Environmental Protection Agency
CAL FIRE	California Department of Forestry and Fire Protection
Caltrans	California Department of Transportation
CAPCOA	California Air Pollution Control Officers Association
CAR	Coordination Act Report
CARB	California Air Resources Board
CAT	Climate Action Team
CBG	Compressed Biomethane

CBC	California Building Code
CCAA	California Clear Air Act
CCAR	California Climate Action Registry
CCR	California Code of Regulations
CDFA	California Department of Food and Agriculture
CDFG	California Department of Fish and Game
CDHS	California Department of Health Services
CEC	California Energy Commission
CEN	Compression Biomethane
CESA	California Endangered Species Act
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CHP	California Highway Patrol
CHP	Combined Heat and Power
CNDDB	California Natural Diversity Database
CNEL	Community Noise Equivalent Level
CNG	Compressed Natural Gas
CNPS	California Native Plant Society
CO	Carbon monoxide
CO_2	carbon dioxide
COHP	California Office of Historic Preservation
CPUC	California Public Utilities Commission
CRHR	California Register of Historical Resources
CTR	California Toxics Rule
CUPA	Certified Unified Program Agency
CVRWQCB	Central Valley Regional Water Quality Control Board
CV-SALTS	Central Valley Salinity Alternatives for Long-Term Sustainability
CVSC	Central Valley Salinity Coalition
CVWB	Central Valley Water Board

CW	Conditional Waiver
CWA	Clean Water Act
dB	decibels
dBA	A-weighted decibels
DG	Distributed Generation
DOT	U.S. Department of Transportation
DPM	diesel particulate matter
DTSC	Department of Toxic Substances Control
EC	Electrical Conductivity
EDC	Endocrine disrupting-chemicals
EFZs	earthquake fault zones
EIR	Environmental Impact Report (California)
EIS	Environmental Impact Statement (federal)
EPA	U.S. Environmental Protection Agency
ERB	Emerging Renewables Program
ERT	Emergency Response Team
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FICON	Federal Interagency Committee on Noise
FIP	Federal Implementation Plan
FIRM	Flood Insurance Rate Maps
FMMP	Farmland Mapping and Monitoring Program
GAMA	Groundwater Ambient Monitoring and Assessment
GHG	Greenhouse Gas
GO	General order
HABS/HAER	Historic American Buildings Survey/Historic American Engineering Report
HAPs	Hazardous Air Pollutants
HCP	Habitat Conservation Plan
HSC	California Health and Safety Code

HR	Hydrologic Region
Hz	hertz
IBC	International Building Code
IC	Internal Combustion
IEUA	Inland Empire Utilities Agency
IPCC	International Panel on Climate Change
IPM	integrated pest management
LCFS	California Low Carbon Fuel Standard
LBM	Liquefied Biomethane
LNG	Liquefied Natural Gas
LRA	Local Responsibility Areas
LUST	Leaking Underground Storage Tanks
MAF	million acre-feet
MBTA	Migratory Bird Treaty Act
MCL	Maximum Contaminant Level
mg/L	milligrams per liter
MHB	Methemoglobinemia
MMRP	Mitigation Monitoring and Reporting Program
MPR	Market Price Referent
MSW	Municipal Solid Waste
NAGPRA	Native American Graves Protection and Repatriation Act
NAHC	Native American Heritage Commission
NAS	National Academy of Sciences
NAAQS	National Ambient Air Quality Standards
NCRS	Natural Resource Conservation Service
NEHRP	National Earthquake Hazards Reduction Program
NEHRPA	National Earthquake Hazards Reduction Program Act
NEPA	National Environmental Policy Act
NESHAPs	National Emission Standards for Hazardous Air Pollutants
NFPA	National Fire Protection Association

NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NMP	Nutrient Management Plan
NOI	Notice of Intent
NOx	Nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRCS	National Resources Conservation Service
NRHP	National Register of Historic Places
NWPs	Nationwide permits
OES	California State Office of Emergency Services
OHP	California Office of Historic Preservation
ONRWs	Outstanding National Resource Waters
OPR	Governor’s Office of Planning and Research
OPS	Office of Pipeline Safety
OSHA	Occupational Safety and Health Administration
PHMSA	Pipeline and Hazardous Materials Safety Administration
PG&E	Pacific Gas and Electric Company
PIER	Public Interest Energy Research Program
PM10	particulate matter of less than 10 microns in size
PM2.5	particulate matter of less than 2.5 microns
PPA	Power Purchase Agreement
PPD	Pounds Per day
PRC	California Public Resources Code
PSA	Pressure Swing Absorption
REA	Registered Environmental Assessor
REC	Renewable Energy Credits
Region5	Jurisdictional area of the Central Valley Water Board
RELs	Reference Exposure Levels
RWQCB	Regional Water Quality Control Board
ROG	Reactive organic gases

RPS	Renewable Portfolio Standards
SCAQMD	South Coast Air Quality Management District
SDC	Seismic Design Category
SEMP	Salinity Evaluation and Minimization Plan
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SJVAPCD	San Joaquin Valley Air Pollution Control District
SMP	Salt Minimization Plan
SMUD	Sacramento Metropolitan Utilities District
SVP	Society of Vertebrate Paleontology
SWRCB	State Water Resources Control Board
SWPPP	Stormwater pollution prevention plan
TAC	Toxic Air contaminant
TAG	Technical Advisory Group
TCPs	Traffic Control Plans
TCP	traditional cultural property
TDS	total dissolved solids
TKN	Total Kjeldahl Nitrogen
TMDL	Total Maximum Daily Loads
USC	United States Code
UST	Underground storage tanks
USDA	U.S. Department of Agriculture
US EPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
VERA	Voluntary Emission Reduction Agreement
WDRs	Waste Discharge Requirements
Working Group	Bioenergy Interagency Working Group
WQCP	water quality control plans

19.2 Glossary

25 Year, 24 Hour Storm Event	The rainfall event with a probable recurrence interval of once in 25 years with a duration of 24 hours, as defined by the National Weather Service in technical Paper Number 40, “Rainfall Frequency Atlas of the United States:, May1961, and subsequent amendments.
Aerobic Bacteria	Bacteria that require free elemental oxygen to sustain life.
Aerobic	Requiring, or not destroyed by, the presence of free elemental oxygen.
AgSTAR	A voluntary federal program that encourages the use of effective technologies to capture methane gas, generated from the decomposition of animal manure, for use as an energy resource.
Anaerobic	Requiring, or not destroyed by, the absence of air or free oxygen.
Anaerobic Bacteria	Bacteria that only grow in the absence of free elemental oxygen.
Anaerobic Lagoon	A treatment or stabilization process that involves retention under anaerobic conditions.
Anaerobic Digestion	The degradation of organic matter including manure brought about through the action of microorganisms in the absence of elemental oxygen.
Bacteria	A group of universally distributed and essentially unicellular microscopic organisms lacking chlorophyll.
Best Management Practice (BMP)	A practice or combination of practices found to be the most effective, practicable (including economic and institutional considerations) means of preventing or reducing the amount of pollution generated by nonpoint sources to a level compatible with water quality goals.
Biogas	Gas resulting from the decomposition of organic matter under anaerobic conditions. The principal constituents are methane and carbon dioxide.
Biomass	Plant materials and animal wastes used especially as a source of fuel.
Bull	A mature (approximately 24 months of age or older) uncastrated male dairy or beef animal.
Calf	An immature dairy or beef animal up to approximately six months of age.
Carbohydrates	Any of various compounds of carbons, hydrogen, and oxygen (e.g., sugars, starches, and celluloses), which are generally formed by green plants. Carbohydrates are a principal source of energy in animal feeds and are excreted if not utilized.

Co-Digester Facility	See Dairy Digester and Co-Digester Facilities
Co-substrate	For the purposes of this Program EIR, this refers to the additional materials combined with manure during dairy co-digestion, typically food and/or vegetative waste. Also referred to as “substrate” in this Program EIR.
Complete Mix Digester	A controlled temperature, constant volume, mechanically mixed vessel designed to maximize biological treatment, methane production, and odor control as part of a manure management facility with methane recovery.
Composting	The biological decomposition and stabilization of organic matter under conditions which allow the development of elevated temperatures as the result of biologically produced heat. When complete, the final product is sufficiently stable for storage and application to land without adverse environmental effects.
Conditional Waiver (CW)	An exemption given by the State in the event that regulating standards cannot be met; given that certain conditions are met by the applicant.
Covered Lagoon Digester	An anaerobic lagoon fitted with an impermeable, gas- and air-tight cover designed to capture biogas resulting from the decomposition of manure.
Cow	A mature female dairy or beef animal that has produced at least one calf.
CV-SALTS	Central Valley Salinity Alternatives for Long-Term Sustainability: a new Central Valley Water Board regulatory program that will develop a comprehensive region-wide Salt and Nitrate Management Plan (Plan) describing a water quality protection strategy that will be implemented through a mix of voluntary and regulatory efforts throughout the entire Central Valley.
Dairy digester facilities	Shortened version but the same as dairy digester and co-digester facilities.
Dairy digester and co-digester facilities	For the convenience of this Program EIR, this definition includes a facility that processes dairy manure for use in anaerobic digestion to create biogas. This refers also to centralized facilities located on or offsite of dairies. Co-digester facilities refer to facilities with process dairy manure along with other organic substrates (or feedstocks) in order to produce biogas.
Dairy Digester General Order	A General Order under the Central Valley Water Board’s waste discharge regulatory program to permit the waste discharge to land from dairy manure and co-digester projects located on or off-site dairies within Region 5.

Dairy-Free Stall	A dairy farm where cows are confined in a totally or partially enclosed structure but are not confined in individual stalls.
Dairy General Order	Order No. R5-2007-0035, Waste Discharge Requirements General Order for Existing Milk Dairies.
Delta	The Sacramento-San Joaquin Delta
Digestate	Digestate is the liquid and solids slurry residual of the dairy digesters. A common first process after the digester is to separate the solids from the slurry, resulting in liquid digestate and solid digestate. .
Digester facility	Shorthand referring to dairy digester and dairy co-digester facilities (see definition above)
Effluent	The discharge from an anaerobic digester or other manure stabilization process.
Facultative	Living, active, or occurring in the presence or absence of free oxygen.
Facultative Bacteria	Bacteria living in the presence or absence of free oxygen. Facultative bacteria are important in the decomposition of manure.
Farmland of Local Importance	Land of importance to the local agricultural economy as determined by each county’s board of supervisors and a local advisory committee
Farmland of Statewide Importance	Farmland similar to Prime Farmland but with minor shortcomings, such as greater slopes or less ability to store soil moisture.
Fats	Any of numerous compounds of carbon, hydrogen, and oxygen that are glycerides of fatty acids, the chief constituents of plant and animal fat, and a major class of energy-rich food. “Fats are a principal source of energy in animal feeds and are excreted if not utilized.”
Flushing System	A manure collection system that collects and transports manure using water.
Freeboard	The distance between the highest possible wastewater level in a manure storage/treatment structure and the top of the structure. Freeboard is an important design parameter in designing lagoons, ponds, storage basins, digesters, and other manure storage and treatment structures.
General Order	A regulatory document which controls discharge requirements for similar types of activities, as long as the facility complies with the terms of the General Order.

General Order Dairy	Dairies that are currently regulated under Order No. R5-2007-0035, Waste Discharge Requirements General Order for Existing Milk Cow Dairies.
Greenhouse Gas	An atmospheric gas, which is transparent to incoming solar radiation but absorbs the infrared radiation emitted by the Earth's surface. The principal greenhouse gases are carbon dioxide, methane, and CFCs.
Heifer	A female dairy or beef animal that has not produced a calf.
Hydraulic Retention Time (HRT)	The average length of time any particle of manure remains in a manure treatment or storage structure. The HRT is an important design parameter for treatment lagoons, covered lagoon digesters, complete mix digesters, and plug flow digesters.
Individual WDR	(Individual Waste Discharge Requirements) A regulatory permit prescribed by the state board or a regional board which controls the discharge of pollutants to state waters.
Influent	The flow into an anaerobic digester or other manure stabilization process.
Kilowatt	One thousand watts (1.341 horsepower).
Kilowatt Hour	A unit of work or energy equal to that expended by one kilowatt in one hour or to 3.6 million joules. A unit of work or energy equal to that expended by one kilowatt in one hour (1.341 horsepower-hours).
Lagoon	Any large holding or detention pond, usually with earthen dikes, used to contain wastewater while sedimentation and biological treatment or stabilization occur.
Land Application	Application of manure to land for reuse of the nutrients and organic matter for their fertilizer value.
Liquid Manure	Manure having a total solids content of no more than five percent.
Loading Rate	A measure of the rate of volatile solids (VS) entry into a manure management facility with methane recovery. Loading rate is often expressed as pounds of VS/1000 cubic feet.
Manure	The fecal and urinary excretions of livestock and poultry.
Mesophilic	Operationally between 80°F and 100°F (27°C and 38°C).
Methane	A colorless, odorless, flammable gaseous hydrocarbon that is a product of the decomposition of organic matter. Methane is a major greenhouse gas. Methane is also the principal component of natural gas.

Mix Tank	A control point where manure is collected and added to water or dry manure to achieve the required solids content for a complete mix or plug flow digester.
Natural Gas	A combustible mixture of methane and other hydrocarbons used chiefly as a fuel.
Nonpoint Source Pollution	Pollution resulting from intermittent discharges of pollutants from diffuse sources and is in transit over land before entering a water body.
Nitrogen oxides (NOx)	A main ozone precursor that reacts in the presence of sunlight. Major sources include on-road motor vehicles, solvent evaporation, and commercial / industrial mobile equipment.
Nitrogen Dioxide	A respiratory irritant and a precursor of ozone created by combustion processes.
Nutrients	A substance required for plant or animal growth. The primary nutrients required by plants are nitrogen, phosphorus, and potassium. The primary nutrients required by animals are carbohydrates, fats, and proteins.
Ozone	A secondary air pollutant produced in the atmosphere from reactions of reactive organic gases and nitrogen oxides.
Parlor	Facility where lactating cows are managed before, during, and after milking.
Pasture	An open area where the animals may roam freely.
pH	A measure of acidity or alkalinity. The pH scale ranges from zero to 14, with a value of 7 considered neutral. The lower a value, the higher the acidity, and the higher the value, the higher the alkalinity.
Plug Flow Digester	A constant volume, flow-through, controlled temperature biological treatment unit designed to maximize biological treatment, methane production, and odor control as part of a manure management facility with methane recovery.
Point Source Pollution	Pollution entering a water body from a discrete conveyance such as a pipe or ditch.
Prime Farmland	Farmland with the best combination of physical and chemical features able to sustain long term agricultural production.
Process Water	Water used in the normal operation of a livestock farm. Process water includes all sources of water that may need to be managed in the farm’s manure management system.

Proteins	Any of numerous naturally occurring extremely complex combinations of amino acids containing the elements carbon, hydrogen, nitrogen, and oxygen. Proteins are in animal feeds are utilized for growth, reproduction, and lactation and are excreted if not utilized.
Region5	Jurisdictional area of the Central Valley Water Board
Respirable Particulate Matter	PM10 and PM2.5 represent fractions of particulate matter that can be inhaled into the air passages and the lungs and can cause adverse health effects.
Scrape System	Collection method that uses a mechanical or other device to regularly remove manure from barns, confine buildings, drylots, or other similar areas where manure is deposited.
Separator	A mechanical device or gravity settling basin that separates manure into solid and liquid fractions.
Settling Basin	A basin designed to separate solid and fibrous material in the manure from the liquid portion.
Storage Pond	An earthen basin designed to store manure and wastewater until it can be utilized. Storage ponds are not designed to treat manure.
Storage Tank:	A concrete or metal tank designed to store manure and wastewater until it can be utilized. Storage tanks are not designed to treat manure.
Storm Runoff	Manure contaminated rainfall which must be stored and utilized on the farm and may not be discharged into rivers, streams, lakes, or other bodies of water.
Substrate	For the purposes of this Program EIR, this refers to the additional materials combined with manure during dairy co-digestion, typically food and/or vegetative waste. Also referred to as “co-substrate” in this Program EIR.
Supplemental Heat	Heat added to complete mix and plug-flow digesters to maintain a constant operating temperature to increase rates of waste stabilization and biogas production.
Supplemental Heat	Additional heat added to complete mix and plug flow digester to maintain a constant operating temperature at which maximum biological treatment may occur.
Thermophilic	Operationally between 110°F and 140°F (43°C and 60°C).
Total Solids	The sum of dissolved and suspended solids usually expressed as a concentration or percentage on a wet basis.

Toxic Air Contaminants	Airborne substances that are capable of causing short-term and/or long-term adverse human health effects.
Unique Farmland	Farmland of lesser quality soils used for the production of the state's leading agricultural crops.
Volatile Solids	The fraction of total solids that is comprised primarily of organic matter.
Volatilization	The loss of a dissolved gas, such as ammonia, from solution.
Waste Discharge Requirements (WDRs)	Porter-Cologne requires all who discharge contaminants into state waters (including groundwater) to: (a) file a report of the discharge and, as needed, (b) implement waste discharge requirements that ensure that those discharges do not impact use of the state's waters. The local regional water board then determines whether the discharge should be regulated through waste discharge requirements, or through a waiver of waste discharge requirements accompanied by conditions.
Withdrawal Schedule	The fraction of the treated manure and water effluent that is withdrawn from the effluent storage facility each month.

Appendix AQ
Criteria Pollutant and GHG Emissions

APPENDIX AQ

Criteria Pollutant and GHG Emissions

Introduction to the Air Quality Models and Results

The Urban Emissions model (URBEMIS 2007), version 9.2.4, was used to quantify direct emissions of criteria pollutants from digester construction and operations, including off-road equipment and fugitive dust emissions during construction activities and on-road vehicle pollutant emissions during operations.

GHG emissions associated with the dairy digesters were calculated using the URBEMIS 2007 model based on the projected equipment and traffic. In addition, methane capture and electricity generation information provided by the USEPA AgSTAR program (USEPA, 2010) was averaged for all California dairy digesters and applied to the Program EIR based on the projected number of digesters that could be developed by the year 2020 in Region 5. This data was used to determine the annual metric tons of CO_2e that would be displaced through dairy digester operations.

Results of the URBEMIS2007 modeling and GHG analysis are presented below. This Appendix is separated into the following sub-sections:

- URBEMIS2007 MODEL RESULTS FOR SINGLE DIGESTER CONSTRUCTION
- URBEMIS2007 MODEL RESULTS FOR SINGLE DIGESTER OPERATIONS
- URBEMIS2007 MODEL RESULTS FOR CUMULATIVE OPERATIONS
- AGSTAR CALIFORNIA DAIRY DIGESTER SUMMARY INFORMATION
- GREENHOUSE GAS EMISSION REDUCTIONS
- CRITERIA POLLUTANT EMISSIONS FROM BIOGAS COMBUSTION AND VOCS REDUCED THROUGH DIGESTER OPERATIONS

URBEMIS2007 MODEL RESULTS FOR SINGLE DIGESTER CONSTRUCTION

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Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: E:\209481 - Dairy Digestion PEIR\Task 19\AQ Modeling\Dairy Digester Proj Construction.urb924

Project Name: Dairy Digester Construction - Single Digester

Project Location: San Joaquin Valley APCD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2011 TOTALS (tons/year unmitigated)	1.27	2.81	2.14	0.00	1.08	0.14	1.22	0.23	0.13	0.36	393.86

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

2011	1.27	2.81	2.14	0.00	1.08	0.14	1.22	0.23	0.13	0.36	393.86
Fine Grading 01/01/2011-05/31/2011	0.16	1.29	0.74	0.00	1.07	0.06	1.13	0.22	0.06	0.28	135.16
Fine Grading Dust	0.00	0.00	0.00	0.00	1.07	0.00	1.07	0.22	0.00	0.22	0.00
Fine Grading Off Road Diesel	0.15	1.25	0.64	0.00	0.00	0.06	0.06	0.00	0.06	0.06	120.23
Fine Grading On Road Diesel	0.00	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.99
Fine Grading Worker Trips	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.94
Trenching 05/01/2011-07/31/2011	0.06	0.54	0.32	0.00	0.00	0.03	0.03	0.00	0.02	0.02	61.76
Trenching Off Road Diesel	0.06	0.53	0.26	0.00	0.00	0.03	0.03	0.00	0.02	0.02	55.73
Trenching Worker Trips	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.04
Asphalt 08/01/2011-08/31/2011	0.02	0.14	0.12	0.00	0.00	0.01	0.01	0.00	0.01	0.01	16.62
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.02	0.13	0.08	0.00	0.00	0.01	0.01	0.00	0.01	0.01	11.26
Paving On Road Diesel	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.62
Paving Worker Trips	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.74
Building 09/01/2011-11/30/2011	0.09	0.84	0.95	0.00	0.01	0.04	0.05	0.00	0.04	0.04	178.29
Building Off Road Diesel	0.04	0.28	0.15	0.00	0.00	0.02	0.02	0.00	0.02	0.02	29.04
Building Vendor Trips	0.04	0.54	0.39	0.00	0.00	0.02	0.02	0.00	0.02	0.02	105.07
Building Worker Trips	0.01	0.02	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	44.18
Coating 12/01/2011-12/31/2011	0.93	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.02
Architectural Coating	0.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.02

Phase Assumptions

Phase: Fine Grading 1/1/2011 - 5/31/2011 - Default Fine Site Grading Description

Total Acres Disturbed: 4

Maximum Daily Acreage Disturbed: 1

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 23.15

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Trenching 5/1/2011 - 7/31/2011 - Type Your Description Here

Off-Road Equipment:

2 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

1 Other General Industrial Equipment (238 hp) operating at a 0.51 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 0 hours per day

Phase: Paving 8/1/2011 - 8/31/2011 - Default Paving Description

Acres to be Paved: 1

Off-Road Equipment:

4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day

1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

Phase: Building Construction 9/1/2011 - 11/30/2011 - Default Building Construction Description

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 4 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

Phase: Architectural Coating 12/1/2011 - 12/31/2011 - Default Architectural Coating Description

Rule: Residential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 130

Rule: Residential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 130

Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

URBEMIS2007 MODEL RESULTS FOR SINGLE DIGESTER OPERATIONS

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Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: E:\209481 - Dairy Digestion PEIR\Task 19\AQ Modeling\Dairy Digester Proj Ops.urb924

Project Name: Dairy Digester Operations - Single Digester

Project Location: San Joaquin Valley APCD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2012 TOTALS (tons/year unmitigated)	0.02	0.15	0.23	0.00	3.66	0.01	3.67	0.76	0.01	0.78	31.79

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	0.04	0.39	0.25	0.00	0.04	0.02	71.80

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	0.04	0.39	0.25	0.00	0.04	0.02	71.80

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Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2012	0.02	0.15	0.23	0.00	3.66	0.01	3.67	0.76	0.01	0.78	31.79
Fine Grading 01/01/2012-12/31/2012	0.02	0.15	0.23	0.00	3.66	0.01	3.67	0.76	0.01	0.78	31.79
Fine Grading Dust	0.00	0.00	0.00	0.00	3.66	0.00	3.66	0.76	0.00	0.76	0.00
Fine Grading Off Road Diesel	0.02	0.14	0.10	0.00	0.00	0.01	0.01	0.00	0.01	0.01	14.98
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.01	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.81

Phase Assumptions

Phase: Fine Grading 1/1/2012 - 12/31/2012 - Loader for digester

Total Acres Disturbed: 4

Maximum Daily Acreage Disturbed: 1

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 2 hours per day

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Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

Source	ROG	NOX	CO	SO2	PM10	PM25	CO2
Dairy Digesters	0.04	0.39	0.25	0.00	0.04	0.02	71.80
TOTALS (tons/year, unmitigated)	0.04	0.39	0.25	0.00	0.04	0.02	71.80

Operational Settings:

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2012 Season: Annual

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Dairy Digesters		1.00	acres	4.00	4.00	160.00
					4.00	160.00

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	16.6	1.2	98.6	0.2
Light Truck < 3750 lbs	16.7	2.5	90.9	6.6
Light Truck 3751-5750 lbs	16.7	0.9	98.6	0.5
Med Truck 5751-8500 lbs	0.0	0.8	99.2	0.0
Lite-Heavy Truck 8501-10,000 lbs	0.0	0.0	75.0	25.0
Lite-Heavy Truck 10,001-14,000 lbs	0.0	0.0	44.4	55.6

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Med-Heavy Truck 14,001-33,000 lbs	0.0	7.7	15.4	76.9
Heavy-Heavy Truck 33,001-60,000 lbs	50.0	0.0	0.0	100.0
Other Bus	0.0	0.0	0.0	100.0
Urban Bus	0.0	0.0	0.0	0.0
Motorcycle	0.0	64.1	35.9	0.0
School Bus	0.0	0.0	0.0	100.0
Motor Home	0.0	0.0	90.0	10.0

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	10.8	7.3	7.5	9.5	7.4	7.4
Rural Trip Length (miles)	40.0	40.0	40.0	40.0	40.0	40.0
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
Dairy Digesters				0.0	0.0	100.0

URBEMIS2007 MODEL RESULTS FOR CUMULATIVE OPERATIONS

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Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: C:\Documents and Settings\mxm\Desktop\Backup of USB\209481 - Dairy Digestion PEIR\Task 19\AQ Modeling\Dairy Digester Cumulative Ops.urb924

Project Name: Dairy Digester Operations - Cumulative

Project Location: San Joaquin Valley APCD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2020 TOTALS (tons/year unmitigated)	2.35	14.92	32.69	0.03	174.02	0.85	174.87	36.37	0.78	37.15	6,364.85

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	2.45	27.49	11.38	0.11	3.68	1.39	11,810.78

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	2.45	27.49	11.38	0.11	3.68	1.39	11,810.78

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Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2020	2.35	14.92	32.69	0.03	174.02	0.85	174.87	36.37	0.78	37.15	6,364.85
Fine Grading 01/01/2020-12/31/2020	2.35	14.92	32.69	0.03	174.02	0.85	174.87	36.37	0.78	37.15	6,364.85
Fine Grading Dust	0.00	0.00	0.00	0.00	173.85	0.00	173.85	36.31	0.00	36.31	0.00
Fine Grading Off Road Diesel	2.11	14.27	19.73	0.00	0.00	0.77	0.77	0.00	0.70	0.70	2,996.25
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.25	0.65	12.96	0.03	0.17	0.08	0.25	0.06	0.07	0.14	3,368.60

Phase Assumptions

Phase: Fine Grading 1/1/2020 - 12/31/2020 - Loader for digester

Total Acres Disturbed: 475

Maximum Daily Acreage Disturbed: 47.5

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

200 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 2 hours per day

Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

Source	ROG	NOX	CO	SO2	PM10	PM25	CO2
Dairy Digesters	2.45	27.49	11.38	0.11	3.68	1.39	11,810.78
TOTALS (tons/year, unmitigated)	2.45	27.49	11.38	0.11	3.68	1.39	11,810.78

Operational Settings:

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2020 Season: Annual

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Dairy Digesters		0.88	acres	475.00	418.00	16,720.00
					418.00	16,720.00

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	1.0	1.2	98.6	0.2
Light Truck < 3750 lbs	2.0	2.5	90.9	6.6
Light Truck 3751-5750 lbs	2.0	0.9	98.6	0.5
Med Truck 5751-8500 lbs	0.0	0.8	99.2	0.0
Lite-Heavy Truck 8501-10,000 lbs	0.0	0.0	75.0	25.0
Lite-Heavy Truck 10,001-14,000 lbs	0.0	0.0	44.4	55.6

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Med-Heavy Truck 14,001-33,000 lbs	0.0	7.7	15.4	76.9
Heavy-Heavy Truck 33,001-60,000 lbs	95.0	0.0	0.0	100.0
Other Bus	0.0	0.0	0.0	100.0
Urban Bus	0.0	0.0	0.0	0.0
Motorcycle	0.0	64.1	35.9	0.0
School Bus	0.0	0.0	0.0	100.0
Motor Home	0.0	0.0	90.0	10.0

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	10.8	7.3	7.5	9.5	7.4	7.4
Rural Trip Length (miles)	40.0	40.0	40.0	40.0	40.0	40.0
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
Dairy Digesters				0.0	0.0	100.0

AGSTAR CALIFORNIA DAIRY DIGESTER SUMMARY INFORMATION

Farm/Project Name	Project Type	County	State	Digester Type	Status	Year Operational	Farm Type	Population Feeding Digester	Biogas End Use(s)	Installed Capacity (kW)	Baseline System	Methane Emission Reductions (metric tons CH4/yr)	Methane Emission Reductions (metric tons CO2E/yr)
Blakes Landing Dairy	Farm Scale	Marin	CA	Covered Lagoon	Operational	2004	Dairy	362	Electricity	75	Storage Lagoon	78	1,639
Bob Giacomini Dairy	Farm Scale	Marin	CA	Covered Lagoon	Operational	2009	Dairy	300	Cogeneration	80	Storage Lagoon	76	1,593
Bullfrog Dairy	Farm Scale	Imperial	CA	Covered Lagoon	Operational	2008	Dairy	3,300	Electricity	300	Storage Lagoon	834	17,519
Cal Poly Dairy	Farm Scale	San Luis Obispo	CA	Covered Lagoon	Operational	1998	Dairy	175	Electricity	30	Storage Lagoon	44	929
CAL-Denier Dairy	Farm Scale	Sacramento	CA	Covered Lagoon	Operational	2008	Dairy	900	Electricity	65	Storage Lagoon	190	3,983
Castelanelli Bros. Dairy	Farm Scale	San Joaquin	CA	Covered Lagoon	Operational	2004	Dairy	3,214	Electricity	180	Storage Lagoon	599	12,588
CottonWood Dairy	Farm Scale	Merced	CA	Covered Lagoon	Operational	2004	Dairy	5,000	Cogeneration; Boiler/Furnace Fuel	700	Storage Lagoon	1,264	26,544
Fiscalini Farms	Farm Scale	Stanislaus	CA	Complete Mix	Operational	2008	Dairy	2,513	Cogeneration	720	Storage Tank or Pond or Pit	254	5,343
Hilarides Dairy	Farm Scale	Tulare	CA	Covered Lagoon	Operational	2004	Dairy	1,500	Electricity; Vehicle Fuel	750	Storage Lagoon	91	1,918
Langerwerf Dairy	Farm Scale	Butte	CA	Horizontal Plug Flow	Operational	1982	Heifer raising facility	750	Cogeneration	60	Storage Tank or Pond or Pit	38	791
Lourenco Dairy	Farm Scale	Tulare	CA	Covered Lagoon	Operational	2006	Dairy	2,640	Flared Full Time		Storage Lagoon	351	7,364
Meadowbrook Dairy	Farm Scale	San Bernardino	CA	Horizontal Plug Flow	Operational	2004	Dairy	2,000	Electricity	160	Storage Stack	13	279
Strauss Family Dairy	Farm Scale	Marin	CA	Covered Lagoon	Operational	2004	Dairy	200	Cogeneration	25	Storage Tank or Pond or Pit; Storage Lagoon	25	525
Tollenaar Holsteins Dairy	Farm Scale	Sacramento	CA	Complete Mix	Operational	2008	Dairy	1,895	Cogeneration; Boiler/Furnace Fuel	250	Storage Lagoon	345	7,248
Vintage Dairy	Farm Scale	Fresno	CA	Covered Lagoon	Operational	2008	Dairy	5,000	Pipeline Gas		Storage Lagoon	1,264	26,544
							Averages	1,983		261		364	7,654
								head per facility		kW (~350 hp)		metric tons CH4/yr	metric tons CO2e/yr

GREENHOUSE GAS EMISSION REDUCTIONS

Direct (Methane Capture) and Indirect GHG Emissions Reduction from Biogas Combustion for Electricity Generation

Direct Emissions Reductions from AgSTAR:	7,654	metric tons CO2e/yr per facility	
All 200 Digesters:	1,530,752	metric tons CO2e/yr from methane reduction	
Average Electrical Capacity from AgSTAR:	261	kWh/day	per facility that combusts biogas
All 180 Digesters assumed to combust biogas:	411,544,800	kWh/yr	total electricity displaced
	411,545	mWh (megawatt hours)/yr	

		Annual		CO2	Annual
Indirect GHG gases	Emission Factor lb/mWh	Project Electricity mWh	GHGs metric tons	Equivalent Factor	CO2 Equivalent Emissions (metric tons)
Carbon Dioxide (CO2)	724.12	411,545	135,174	1	135174.2
Nitrous Oxide (N2O)	0.0081	411,545	1.5	296	447.6
Methane (CH4)	0.0302	411,545	5.6	23	129.7

Total Indirect GHG Emissions from Project Electricity Use= 135751 annual average

Total Direct and Indirect GHG Emissions Reduced: **1,666,503**

Notes and References:

CO2, CH4, and N2O Emission Factor Source: CCAR, 2009

lbs/metric ton = 2204.62

CRITERIA POLLUTANT EMISSIONS FROM BIOGAS COMBUSTION AND VOCS REDUCED THROUGH DIGESTER OPERATIONS

Criteria Pollutant Emissions from Biogas Combustion and VOCs Reduced through Digester Operations

Average Electrical Capacity from AgSTAR: 261 kWh/day per facility that combusts biogas
~350 hp average engine

	BACT Standard (g/bhp-hr)	Tons Per Year	(assumes 180 digesters combusting biogas)
NOx	0.15	91	
VOC	0.2	122	
SOx	0.06	37	
PM10	0.1	61	
CO	2.5	1,521	
PM2.5	NA	60	(assumes 99% of exhaust PM10 is PM2.5)

VOC Reduction Estimate

Average Pop. Feeding Digester from AgSTAR: 1,983 head per facility

Individual Dairy VOC		1.29	tpy
	60% reduction by AD	0.773474	tpy reduced
Total Dairy VOC		257.82	tpy
	60% reduction by AD	154.6948	tpy reduced

Appendix BIO

Potentially Affected Special-Status Species

TABLE BIO-1
POTENTIALLY AFFECTED SPECIAL-STATUS PLANT SPECIES[a]

Common and Scientific Name	Legal Status	Geographic Distribution	Habitat Requirements	Identification Period
Ferris' milk-vetch *Astragalus tener var. ferrisiae*	--/--/1B.1	Butte, Colusa, Glenn, Solano, Sutter, and Yolo Counties.	Vernally mesic meadow and seeps, and sub alkaline flats in valley and foothill grasslands.	April-May
alkali milk-vetch *Astragalus tener var. tener*	--/--/1B.1	Bay Area Region along with San Joaquin, Stanislaus and Merced Counties	Playas; valley and foothill grasslands with adobe clay soils; and vernal pools with alkaline soils.	March-June
heartscale *Atriplex cordulata*	--/--/1B.2	Various counties throughout the Sacramento and San Joaquin Valleys	Chenopod scrub, meadows and seeps, and valley and foothill grasslands with saline or alkaline soils.	April-October
brittlescale *Atriplex depressa*	--/--/1B.2	Various counties throughout the Sacramento and San Joaquin Valleys	Chenopod scrub; meadows and seeps; playas; alkali vernal pools with clay soil; and valley and foothill grassland.	April-October
Earlimart orache *Atriplex erecticaulis*	--/--/1B.2	Kings, Tulare, and Kern Counties	Valley and foothill grasslands	August-September
San Joaquin spearscale *Atriplex joaquiniana*	--/--/1B.2	Central California; found mostly in Solano, Contra Costa and Colusa Counties	Chenopod scrub; meadows and seeps; playas; and alkali valley and foothill grassland.	April-October
lesser saltscale *Atriplex minuscula*	--/--/1B.1	Butte, Fresno, Kern, Madera, Merced, Stanislaus and Tulare Counties	Chenopod scrub; playas; and valley and foothill grasslands with sandy, alkali soil..	May-October
vernal pool smallscale *Atriplex persistens*	--/--/1B.2	Glenn, Madera, Merced, Solano, Stanislaus, and Tulare Counties	Alkali vernal pools.	June-October
subtle orache *Atriplex subtilis*	--/--/1B.2	Butte, Fresno, Kings, Kern, Madera, Merced and Tulare Counties	Valley and foothill grasslands	June-August
Lost Hills crownscale *Atriplex vallicola*	--/--/1B.2	Fresno, Kings, Kern, and Merced Counties	Chenopod scrub, valley and foothill grasslands, vernal pools (alkaline)	April-August
big tarplant *Blepharizonia plumosa*	--/--/1B.2	Alameda, Contra Costa, San Joaquin, San Luis Obispo, Solano, and Stanislaus Counties	Valley and foothill grasslands.	July-October
Hoover's calycadenia *Calycadenia hooveri*	--/--/1B.3	Madera, Merced, Mariposa and Stanislaus Counties	Annual herb found in chenopod scrub, playas, and valley and foothill grassland with alkaline, sandy soil.	July-September
Bristly sedge *Carex comosa*	--/--/2.1	Sonoma, Contra Costa, Lake, Mendocino, Shasta Sacramento, San Joaquin and San Bernardino Counties	Found on lake margins and wet places.	May-September
Brown fox sedge *Carex vulpinoidea*	--/--/2.2	Butte, Kern, Los Angeles, Shasta, Siskiyou, San Joaquin and Tehama Counties	Freshwater marshes and swamps and riparian woodlands.	May-June
succulent owl's-clover *Castilleja campestris* ssp. *succulenta*	FT/SE/1B.2	Southern Sierra Nevada foothills: eastern San Joaquin Valley: Fresno, Madera, Merced, Mariposa, San Joaquin, and Stanislaus Counties	Vernal pools (often acidic)	April-May
pink creamsacs *Castilleja rubicundula ssp. rubicundula*	--/--/1B.2	Butte, Colusa, Glenn, Lake, Shasta, Napa, and Santa Clara Counties	Chaparral, cismontane woodland, meadows and seeps, Valley Foothill Grassland, on serpentinite soils	April-June
Pappose tarplant *Centromadia parryi ssp. parryi*	--/--/1B.2	Butte, Colusa, Glenn, Lake, Napa, San Mateo, Solano, and Sonoma Counties	Chaparral, marshes, swamps, meadows and seeps, Valley Foothill Grassland (vernally mesic), on alkaline soils	May-November

TABLE BIO-1
POTENTIALLY AFFECTED SPECIAL-STATUS PLANT SPECIES[a]

Common and Scientific Name	Legal Status	Geographic Distribution	Habitat Requirements	Identification Period
Hoover’s spurge *Chamaesyce hooveri*	FT/--/1B.2	Central Valley, including Butte, Glenn, Merced, Stanislaus, Tehama, and Tulare Counties	Vernal pools.	July-September
slough thistle *Cirsium crassicaule*	--/--/1B.1	Kings, Kern, and San Joaquin Counties	Chenopod scrub, marshes and swamps, and riparian scrub.	May-August
palmate-bracted bird's-beak *Cordylanthus palmatus*	FE/SE/1B.1	Livermore Valley, Central Valley, including portions of Alameda, Colusa, Fresno, Madera, San Joaquin, and Yolo Counties	Chenopod scrub and alkali valley and foothill grasslands.	May-October
recurved larkspur *Delphinium recurvatum*	--/--/1B.1	Various locations throughout central California; primarily in San Joaquin Valley	Chenopod scrub; cismontane woodland; and in alkali valley and foothill grassland.	March-June
dwarf downingia *Downingia pusilla*	--/--/2.2	Fresno, Merced, Stanislaus, San Joaquin, Napa, Sonoma, Sacramento, Placer, Solano, Yuba, and Tehama Counties	Vernal pools, mesic valley and foothill grassland.	March-May
Delta button-celery *Eryngium racemosum*	--/SE/1B.1	San Joaquin River Delta and floodplains; Calaveras, Merced, San Joaquin, and Stanislaus Counties	Vernally mesic clay depressions in riparian scrub habitat.	June-October
Diamond-petaled California poppy *Eschscholzia rhombipetala*	--/--/1B.1	Alameda, Contra Costa, Colusa, San Joaquin, San Luis Obispo, and Stanislaus Counties	Valley and foothill grassland with alkaline clay soil.	March-April
stinkbells *Fritillaria agrestis*	--/--/4.2	Various counties throughout the Central Valley and foothills	Chaparral; cismontane woodland; pinyon and juniper woodland; and valley and foothill grasslands (clay and sometimes serpentine soils.)	March-June
Boggs Lake hedge-hyssop *Gratiola heterosepala*	--/SE/1B.2	Fresno, Lake, Lassen, Madera, Modoc, Placer, Sacramento, Shasta, San Joaquin, Solano, and Tehama Counties	Margins of marshes and swamps and in vernal pools with clay soil.	April-August
Woolly rose-mallow *Hibiscus lasiocarpus var. occidentalis*	--/--/2.2	Butte, Solano, Sutter, Yolo, Sacramento, San Joaquin, Colusa, and Glenn Counties	Freshwater marshes and swamps	June-September
Carquinez goldenbush *Isocoma arguta*	--/--/1B.1	Only occurs in Solano County	Alkali valley and foothill grassland	August-December
Ahart's dwarf rush *Juncus leiospermus var. ahartii*	--/--1B.2	Butte, Placer, Sacramento, Tehama, and Yuba Counties	Wet areas of valley and foothill grasslands	March-May
Coulter's goldfields *Lasthenia glabrata ssp. coulteri*	--/--/1B.1	Colusa, Merced, and various counties throughout southern California	Coastal salt marshes and swamps, playas, and vernal pools.	February-June
Delta tule pea *Lathyrus jepsonii var. jepsonii*	--/--/1B.2	Contra Costa, Napa, Sonoma, Sacramento, and San Joaquin Counties	Freshwater and brackish marshes and swamps.	May-July
Munz's tidy-tips *Layia munzii*	--/--/1B.2	Fresno, Kern, and San Luis Obispo Counties	Chenopod scrub, valley and foothill grasslands (alkaline clay)	March-April
Legenere *Legenere limosa*	--/--/1B.1	Shasta, Tehama, Yuba, Placer, Sacramento, San Joaquin Counties; including San Francisco Bay Area region	Vernal pools	April-June

TABLE BIO-1
POTENTIALLY AFFECTED SPECIAL-STATUS PLANT SPECIES[a]

Common and Scientific Name	Legal Status	Geographic Distribution	Habitat Requirements	Identification Period
Heckard's pepper-grass *Lepidium latipes var. heckardii*	--/--/1B.2	Glenn, Solano, and Yolo Counties	Valley and foothill grasslands (alkaline flats)	March-May
Mason's lilaeopsis *Lilaeopsis masonii*	--/SR/1B.1	Various counties in the Sacramento Valley and San Francisco Bay area	marshes and swamps, riparian scrub	April-November
San Joaquin woollythreads *Monolopia congdonii*	FE/--/1B.2	Fresno, Kings, Kern, Santa Barbara, San Benito, San Luis Obispo, and Tulare Counties	Chenopod scrub, Valley and foothill grassland; sandy soils	February-May
Baker's navarretia *Navarretia leucocephala ssp.bakeri*		Sutter, Tehama, and Yolo Counties; North Bay Region	Cismontane woodland; lower montane coniferous forest; meadows and seeps Valley and foothill grassland; and mesic vernal pools	April-July
Pincushion navarretia *Navarretia myersii ssp. myersii*	--/--/1B.1	Amador, Calaveras, Placer, Merced, and Sacramento Counties	vernal pools (often acidic)	May
Colusa grass *Neostapfia colusana*	FT/SE/1B.1	Colusa*, Merced, Solano, Stanislaus, and Yolo Counties	Vernal pools (large, adobe)	May-August
San Joaquin Valley Orcutt grass *Orcuttia inaequalis*	FT/SE/1B.1	Scattered occurrences in southwest California: Los Angeles, Riverside, San Diego, and Ventura Counties; Baja California	Vernal pools	April-August
hairy Orcutt grass *Orcuttia pilosa*	FE/SE/1B.1	Scattered locations along east edge of the Central Valley and adjacent foothills: Butte, Glenn, Madera, Merced, Stanislaus, and Tehama Counties	Vernal pools	May-September
slender Orcutt grass *Orcuttia tenuis*	FT/SE/1B.1	Sierra Nevada and Cascade Range foothills: Lake, Lassen, Plumas, Sacramento, Shasta, Siskiyou, and Tehama Counties	Vernal pools	May-October
Sacramento Orcutt grass *Orcuttia viscida*	FE/SE/1B.1	Sacramento County	Vernal pools	May-June
Ahart's paronychia *Paronychia ahartii*	--/--/1B.1	Butte, Shasta and Tehama Counties	Cismontane woodland, valley and foothill grassland, and vernal pools	March-June
Hartweg's golden sunburst *Pseudobahia bahiifolia*	FE/SE/1B.1	Eastern side of Sacramento-San Joaquin Valleys, formerly as far north as Yuba County	Rocky, bare areas along rolling hills, adjavent to vernal pools, usually with heavy clay soils	March-April
San Joaquin adobe sunburst *Pseudobahia peirsonii*	FT/SE/1B.1	Fresno, Kern, and Tulare Counties	Cismontane woodland, valley and foothill grassland, adobe clay	March-April
Sanford's arrowhead *Sagittaria sanfordii*	--/--/1B.2	Various Counties throughout the Central Valley region	Shallow freshwater marshes and swamps	May-October
Wright's trichocoronis *Trichocoronis wrightii var. wrightii*	--/--/2.1	Sutter, San Joaquin, Colusa, Merced, and Riverside Counties	Meadows and seeps, marshes and swamps, riparian forest, and vernal pools (alkaline)	May-September
Caper-fruited tropidocarpum *Tropidocarpum capparideum*	--/--/1B.1	Fresno, Glenn, San Luis Obispo, Monterey, San Joaquin, and Santa Clara Counties	Valley and foothill grassland (alkaline hills)	March-April

TABLE BIO-1
POTENTIALLY AFFECTED SPECIAL-STATUS PLANT SPECIES[a]

Common and Scientific Name	Legal Status	Geographic Distribution	Habitat Requirements	Identification Period
Greene's tuctoria *Tuctoria greenei*	FE/SR/1B.1	Scattered distribution along east edge of the Central Valley from Tehama to Merced County; Fresno, Madera, San Joaquin, Stanislaus, and Tulare Counties	Vernal pools	May-July
Crampton's tuctoria *Tuctoria mucronata*	FE/SE/1B.1	Solano and Yolo Counties	Valley and foothill grassland (mesic), vernal pools	April-July

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a. The list of potentially affected special-status plant species was compiled based off of a review of the CNDDB query conducted for the project area. Those species with the potential to occur in habitats likely to be impacted by the project were included in this list.

Status Key
Federal
E listed as endangered under the federal Endangered Species Act
T listed as threatened under the federal Endangered Species Act
State
E listed as endangered under the California Endangered Species Act
R listed as rare under the California Native Plant Protection Act. This category is no longer used for newly listed plants, but some plants previously listed as rare retain this designation
-- no listing

TABLE BIO-2
POTENTIALLY AFFECTED SPECIAL-STATUS ANIMAL SPECIES[a]

Common and Scientific Name	Status	California Distribution	Habitats
Invertebrates			
Conservancy fairy shrimp *Branchinecta conservatio*	FE/--	Disjunct occurrences in Solano, Merced, Tehama, Butte, and Glenn Counties	Large, deep vernal pools in annual grasslands
longhorn fairy shrimp *Branchinecta longiantenna*	FE/--	Eastern margin of central Coast Ranges from Contra Costa County to San Luis Obispo County	Small, clear pools in sandstone rock outcrops of clear to moderately turbid clay- or grass-bottomed pools
vernal pool fairy shrimp *Branchinecta lynchi*	FT/--	Central Valley, central and south Coast Ranges from Tehama County to Santa Barbara County; isolated populations also in Riverside County	Common in vernal pools; also found in sandstone rock outcrop pools
valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	FT/--	Streamside habitats below 3,000 feet through the Central Valley of California	Riparian and oak savanna habitats with elderberry shrubs; elderberries are host plant
vernal pool tadpole shrimp *Lepidurus packardi*	FE/--	Shasta County south to Merced County	Vernal pools and ephemeral stock ponds
Fish			
Sacramento perch *Archoplites interruptus*	--/SSC	Historically found in the sloughs, slow-moving rivers, and lakes of the Central Valley.	Prefers warm water, as well as aquatic vegetation for young. Tolerates wide range of physio-chemical water conditions.
Delta smelt *Hypomesus transpacificus*	FT/ST	Found in Sacramento-San Joaquin Delta; seasonally in Suisun Bay, Carquinez Strait and San Pablo Bay	Young delta smelt feed and grow in the mixing zone (Suisun Bay); then spawn upstream in spring in river channels and tidally influenced backwater sloughs
Hardhead *Mylopharodon conocephalus*	--/SSC	Low to mid-elevation streams in the Sacramento-San Joaquin River Drainage. Also present in the Russian River.	Found in clear, deep pools with sand-gravel-boulder bottoms and slow water velocity. Not found where exotic centrarchids predominate.
chinook salmon - Central Valley spring-run ESU *Oncorhynchus tshawytscha*	FT/ST	Found in the Sacramento River and its tributaries	Requires cool, well-oxygenated waters, adult numbers depend on pool depth and volume, amount of cover and proximity to gravel
chinook salmon - Sacramento River winter-run ESU *Oncorhynchus tshawytscha*	FE/SE	Found in the Sacramento River below Keswick Dam; spawns in the Sacramento River but not in tributary streams	This ESU enters the Sacramento and San Joaquin Rivers and tributaries March to July, spawning from late August to early October. Young move to rearing areas in and through the Sacramento and San Joaquin Rivers, Delta, and San Pablo and San Francisco Bays
Sacramento splittail *Pogonichthys macrolepidotus*	--/SSC	Current spawning distribution includes the Sacramento River up to the Red Bluff Diversion Dam and the San Joaquin River up to Salt Slough in wet years as well as into the lower reaches of the Feather River and American River.	Found mostly in slow-moving marshy sections of rivers, sloughs, backwaters, lakes and rivers in the northern San Francisco Estuary and Central Valley of California. Require floodplains that stay flooded for several weeks for spawning. With the exception of spawning, largely confined to Delta, Suisun Bay, Suisun Marsh, and lower Napa River, lower Petaluma River and parts of the San Francisco Estuary.

TABLE BIO-2
POTENTIALLY AFFECTED SPECIAL-STATUS ANIMAL SPECIES[a]

Common and Scientific Name	Status	California Distribution	Habitats
Amphibians			
California tiger salamander *Ambystoma californiense*	FT/SC,SE	Most populations in the Central Valley have been eliminated from its historical range, and the remainder are found in the surrounding foothills. Two other populations have been isolated from the rest of the range long enough that they may constitute two unique species - one in Sonoma County near Santa Rosa, and another in Santa Barbara County.	Lifetime spent mostly underground in willow groves, coastal scrub, coast like oak, or riparian habitats; migrates to breeding ponds in early late winter, and juveniles disperse from the pond in September
California red-legged frog *Rana aurora draytonii*	FT/SSC	Found along the coastal mountain ranges of California from Humboldt County to San Diego County; Sierra Nevada from Butte County to Fresno County	Permanent and semipermanent aquatic habitats, such as creeks and coldwater ponds, with emergent and submergent vegetation and riparian species along the edges; may aestivate in rodent burrows or cracks during dry periods
Western spadefoot *Spea hammondii*	--/SSC	Ranges from near Redding south throughout the Great Valley and its associated foothills, through the South Coast Ranges into coastal southern California south of the Transverse mountains and west of the Peninsular mountains, into northwest Baja California.	Occurs seasonally in grasslands, prairies, chaparral, and woodlands, in and around wet sites. Breeds in shallow, temporary pools formed by winter rains. Takes refuge in burrows.
Reptiles			
Western pond turtle *Actinemys marmorata*	--/SSC	Found in several counties throughout central and coastal California.	Ponds, marshes, rivers, streams, and irrigation ditches with aquatic vegetation. Requires basking sites and suitable upland habitat for egg-laying. Nest sites most often characterized as having gentle slopes (<15%) with little vegetation or sandy banks.
Silvery legless lizard *Anniella pulchra pulchra*	--/SSC	Current range from northern Monterey County south to Baja California extending inland as far as California's central valley and Barstow.	Sandy or loose loamy soils under sparse vegetation. Soil moisture is essential so they prefer soils with a high moisture content.
blunt-nosed leopard lizard *Gambelia sila*	FE/SE	San Joaquin Valley from Stanislaus County through Kern County and along the eastern edges of San Luis Obispo and San Benito Counties	Open habitats with scattered low bushes on alkali flats, and low foothills, canyon floors, plains, washes, and arroyos; substrates may range from sandy or gravelly soils to hardpan
San Joaquin whipsnake *Masticophis flagellum ruddocki*	--/SSC	Ranges from Arbuckle in the Sacramento Valley in Colusa County southward to the Grapevine in the Kern County portion of the San Joaquin Valley and westward into the inner South Coast Ranges. An isolated population occurs in the Sutter Buttes.	Occurs in open, dry, treeless areas, including grassland and saltbush scrub. Takes refuge in rodent burrows, under shaded vegetation, and under surface objects.
Coast horned lizard *Phrynosoma blainvillii*	--/SSC	Historically, found along the Pacific coast from the Baja California border west of the deserts and the Sierra Nevada, north to the Bay Area, and inland as far north as Shasta Reservoir, and south into Baja California. Ranges up onto the Kern Plateau east of the crest of the Sierra Nevada. Current range is more fragmented.	Found in scrubland, grassland, coniferous forests, and broadleaved woodland, especially in lowland areas along sandy washes with scattered low shrubs. Also requires open areas for basking and patches of fine, loose soil for burying prey.
giant garter snake *Thamnophis gigas*	FT/ST	Central Valley from Fresno north to the Gridley/Sutter Butte area; has been extirpated from areas south of Fresno	Soughs, canals, and other small waterways where there is a prey base of small fish and amphibians; requires grassy banks and emergent vegetation for basking and areas of high ground protected from flooding during winter

TABLE BIO-2
POTENTIALLY AFFECTED SPECIAL-STATUS ANIMAL SPECIES[a]

Common and Scientific Name	Status	California Distribution	Habitats
Birds			
tricolored blackbird *Agelaius tricolor*	--/SSC	Largely endemic to California, most numerous in the Central Valley and nearby vicinity.	Typically requires open water, protected nesting substrate, and foraging grounds within vicinity of the nesting colony. Nests in dense thickets of cattails, tules, willow, blackberry, wild rose, and other tall herbs near fresh water. Also nests in agricultural crops (e.g. silage), where colonies are threatened during harvest.
Grasshopper sparrow *Ammodramus savannarum*	--/SSC	Wintering habitat in California is found from Mendocino, Trinity, Shasta, and Lassen Counties south to San Diego County and west of the Sierra Nevada and desert regions. They are now known from Del Norte and Siskiyou Counties as well.	Prefers open grasslands, fallow agricultural fields, and cultivated fields with patches of bare ground.
Burrowing owl *Athene cunicularia*	--/SSC	Breeding in Central California has been reduced to only three isolated populations: the Central Valley, southern San Francisco Bay between Alameda and Redwood City, and near the Livermore area	Found in open grasslands with low vegetation, golf courses, and disturbed/ruderal habitat in urban areas.
cackling (=Aleutian Canada) goose *Branta hutchinsii leucopareia*	FD/--	The entire population winters in Butte Sink, then moves to Los Banos, Modesto, the Delta, and East Bay reservoirs; stages near Crescent City during spring before migrating to breeding grounds	Roosts in large marshes, flooded fields, stock ponds, and reservoirs; forages in pastures, meadows, and harvested grain fields; corn is especially preferred
Swainson's hawk *Buteo swainsoni*	--/ST	Lower Sacramento and San Joaquin Valleys, the Klamath Basin, and Butte Valley; the state's highest nesting densities occur near Davis and Woodland, Yolo County	Nests in oaks or cottonwoods in or near riparian habitats; forages in grasslands, irrigated pastures, grain fields, and vegetable crops
mountain plover *Charadrius montanus femoralis*	--/SSC	Winter resident in the California Central Valley. Breeds in the Midwest.	Typically found on grassy or bare dirt fields.
Northern harrier *Circus cyaneus*	--/SSC	Nests throughout California including the interior from Siskiyou County south to western Riverside and San Bernardino Counties and coastal regions from Marin County to San Diego County.	Nests in wet meadows and tall grasslands, forages in grasslands and marshes.
yellow warbler *Dendroica petechia brewsteri*	--/SSC	Nests throughout California except Central Valley, Mojave Desert region, and high altitudes and eastern side of Sierra Nevada; winters along Colorado River and in parts of Imperial and Riverside Counties; two small permanent populations in San Diego and Santa Barbara Counties.	Typically breeds in lowland and foothill riparian woodlands dominated by cottonwoods, alders, or willows and other small trees and shrubs typical of low, open-canopy riparian woodland.
white-tailed kite *Elanus leucurus*	--/FP	Inhabits herbaceous and open stages of most habitats mostly in cismontane California. Has extended range and increased numbers in recent decades.	Forages in open grasslands and agricultural fields and marshes. Nests in scattered mature trees within foraging habitat.
greater sandhill crane *Grus canadensis tabida*	--/ST	Breeds on the plains east of the Cascade Range and south to Sierra County; winters in the Central Valley, southern Imperial County, Lake Havasu National Wildlife Refuge, and the Colorado River Indian Reserve	Summers in open terrain near shallow lakes or freshwater marshes; winters in plains and valleys near bodies of fresh water

TABLE BIO-2
POTENTIALLY AFFECTED SPECIAL-STATUS ANIMAL SPECIES[a]

Common and Scientific Name	Status	California Distribution	Habitats
Yellow breasted chat *Icteria virens*	--/SSC	Nests locally in coastal mountains and Sierra Nevada foothills, east of the Cascades in northern California, along the Colorado River, and very locally inland in southern California.	Typically breeds in dense thickets and brush, often with thorns, streamside tangles, and dry brushy hillsides.
bank swallow *Riparia riparia*	--/ST	The state's largest remaining breeding populations are along the Sacramento River from Tehama County to Sacramento County and along the Feather and lower American Rivers and Cache Creek, in the Owens Valley; nesting areas also include the plains east of the Cascade Range south through Lassen County, northern Siskiyou County, and small populations near the coast from San Francisco County to Monterey County	Nests in bluffs or banks (usually steep), adjacent to water, where the soil consists of sand or sandy loam to allow digging
yellow-headed blackbird *Xanthocephalus xanthocephalus*	--/SSC	They winter in isolated sites in the Central Valley and Delta region, as well as the Lower Colorado River Valley and the Imperial Valley. Nesting occurs throughout the Sacramento-San Joaquin basin and the eastern plateau region.	Nests in freshwater marshes or reedy lakes; during migration and winter prefers open cultivated lands, fields, and pastures.
Mammals			
pallid bat *Antrozous pallidus*	--/SSC	Throughout California except high Sierra from Shasta to Kern Counties and the northwest coast, primarily at lower and mid-elevations.	Favors rocky outcrops with desert scrub, but commonly ranges up to forested areas with oak and pine. Roosts in caves, rock crevices, mines, hollow trees, and buildings.
Nelson's antelope squirrel *Ammospermophilus nelsoni*	--/ST	Western side of the San Joaquin Valley from southern Merced County south to Kern and Tulare Counties; also found on the Carrizo Plain in San Luis Obispo County and the Cuyama Valley in San Luis Obispo and Santa Barbara Counties	Arid grasslands from 200 to 1,200 feet, with loamy soils and moderate shrub cover of atriplex and other shrub species
giant kangaroo rat *Dipodomys ingens*	FE/SE	Occurs at high densities in only 12 square miles of habitat along the western side of the San Joaquin Valley, in five separate localities on Elkhorn Plain, Carrizo Plain, McKittrick Valley, and Cuyama Valley in Kern and San Luis Obispo Counties	Restricted to flat, sparsely vegetated areas with native annual grassland and shrubland habitats; requires uncultivated soils consisting of dry, fine, sandy loams for burrowing
Short-nosed kangaroo rat *Dipodomys nitratoides brevinasus*	--/SSC	The extent of its current distribution is unknown. Populations are known from the Coalinga area, Fresno County, a few scattered locations in the Kettlemen and Lost Hills, Kings and Kern counties, the Lokern, Elk Hills, San Emigdio, and Wheeler Ridge regions of western Kern County, the Carrizo Plain Natural Area, and the Caliente Mountains at the edge of the Cuyama Valley.	Occurs on western side of the San Joaquin Valley in grassland and desert shrub associations, especially *Atriplex spp*.
Fresno kangaroo rat *Dipodomys nitratoides exilis*	FE/SE	Found only in Fresno County	Found at elevations from 200 to 300 feet in alkali sink habitats
Tipton kangaroo rat *Dipodomys nitratoides nitratoides*	FE/SE	Occurs in the Tulare Lake Basin in portions of Fresno, Tulare, and Kern Counties	Found at elevations from 200 to 300 feet in arid grassland and alkali desert scrub communities with sparsely scattered shrubs; soil is usually finely textured and alkaline; may use areas that flood in winter and spring
riparian (=San Joaquin Valley) woodrat *Neotoma fuscipes riparia*		Riparian areas along the San Joaquin, Stanislaus and Tuolumne Rivers	Need areas with mix of brush and trees; need suitable nesting sites in trees; need suitable nesting sites in trees, snags or logs

TABLE BIO-2
POTENTIALLY AFFECTED SPECIAL-STATUS ANIMAL SPECIES[a]

Common and Scientific Name	Status	California Distribution	Habitats
Riparian brush rabbit *(Sylvilagus bachmani riparius)*	FE/SE	The largest remaining fragment of habitat and only extant population are found along the Stanislaus River in Caswell Memorial State Park, San Joaquin County	Found in dense, brushy areas of Valley riparian forests, marked by extensive thickets of wild rose (*Rosa* spp.), blackberries (*Rubus* spp.), and willows (*Salix* spp.).
American badger *Taxidea taxus*	--/SSC	Uncommon, permanent resident throughout the state except for north coast	Found in drier open stages of most shrub, forest, and herbaceous habitats, with friable soils.
San Joaquin kit fox *Vulpes macrotis mutica*	FE/ST	Principally occurs in the San Joaquin Valley and adjacent open foothills to the west; recent records from 17 counties extending from Kern County north to Contra Costa County	Saltbush scrub, grassland, oak, savanna, and freshwater scrub

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[a] The list of potentially affected special-status animal species was compiled based off of a review of the CNDDB query conducted for the project area. Those species with the potential to occur in habitats likely to be impacted by the project were included in this list.

Status Key
Federal
FE listed as endangered under the federal Endangered Species Act
FC Candidate proposed for federal listing under the federal Endangered Species Act
PT proposed for federal listing as threatened under the federal Endangered Species Act
-- no listing
State
SE listed as endangered under the California Endangered Species Act
ST listed as threatened under the California Endangered Species Act
FP fully protected under the California Fish and Game Code
SSC species of special concern in California
-- no listing

Appendix NOP

Notice of Preparation/Initial Study

California Regional Water Quality Control Board
Central Valley Region
Katherine Hart, Chair

Linda S. Adams
Secretary for Environmental Protection

1685 E Street, Fresno, California 93706
(559) 445-5116 • Fax (559) 445-5910
http://www.waterboards.ca.gov/centralvalley

Arnold Schwarzenegger
Governor

NOTICE OF PREPARATION

Development of Draft Program Environmental Impact Report for a Waste Discharge Regulatory Program for Dairy Manure Digester and Dairy Manure Co-Digester Facilities within Central Valley Region (Region 5)

NOTICE IS HEREBY GIVEN that the California Regional Water Quality Control Board, Central Valley Region (Central Valley Water Board) will be the Lead Agency for preparation of a Program Environmental Impact Report (EIR) for a waste discharge regulatory program for dairy manure digester and dairy manure co-digester facilities (i.e., utilize both manure and other organic feedstocks) located on or offsite of dairy facilities within its jurisdictional boundaries (Central Valley, California). This Notice of Preparation (NOP) provides responsible and trustee agencies with information describing the project and the potential environmental effects.

Public agencies may use the Program EIR prepared by the Central Valley Water Board when considering approval of individual projects for dairy manure digester and dairy manure co-digester facilities. The Central Valley Water Board needs to know the views of these agencies as to the scope and content of the environmental information which is germane to the agency's statutory responsibilities in connection with the proposed project.

The program description, project location, and potential environmental effects are described in the attached Initial Study (IS), which can additionally be downloaded in PDF format from the Central Valley Water Board's website at http://www.waterboards.ca.gov/centralvalley/press_room/announcements/. Copies of this document can also be obtained by contacting or visiting the Central Valley Water Board's office at 1685 E Street, Fresno, CA 93706 weekdays between 8:00 a.m. and 5:00 p.m. (excluding the first three Fridays of each month due to furloughs).

Due to time limits mandated by State law, the response of responsible and trustee agencies must be sent at the earliest possible date **but not later than 30 days after receipt of this notice**. Responses should include a contact name at your agency and be sent to:

Central Valley Regional Water Quality Control Board
Attn: Stephen Klein, Dairy Digester Program Project Manager
1685 E Street
Fresno, California 93706

Additionally, the Central Valley Water Board has set up three scoping meetings to provide participants with an opportunity to comment on the appropriate scope and content of the proposed Program EIR. Please see the Notice of CEQA Scoping Meeting and Public Workshop attached.

If you have any questions regarding this matter, please contact Stephen Klein at (559) 445-5558.

Clay L. Rodgers

Clay Rodgers, Assistant Executive Officer
18 March 2010

California Regional Water Quality Control Board
Central Valley Region
Katherine Hart, Chair

Linda S. Adams
Secretary for Environmental Protection

1685 E Street, Fresno, California 93706
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Arnold Schwarzenegger
Governor

NOTICE OF CEQA SCOPING MEETING AND PUBLIC WORKSHOP

Development of Draft Program Environmental Impact Report for a Waste Discharge Regulatory Program for Dairy Manure Digester and Dairy Manure Co-Digester Facilities within Central Valley Region (Region 5)

NOTICE IS HEREBY GIVEN that the California Regional Water Quality Control Board, Central Valley Region (Central Valley Water Board) will hold a California Environmental Quality Act (CEQA) (Public Resources Code section 21000 et seq) scoping meeting and public workshop to seek input on the scope and content of the environmental information that should be considered in the preparation of a Program Environmental Impact Report (EIR) for a waste discharge regulatory program for dairy manure digester and dairy manure co-digester facilities within its jurisdictional boundaries (Central Valley, California).

The Central Valley Water Board is lead agency in preparing a Program Environmental Impact Report (EIR) to evaluate the environmental impacts that could result from the development of dairy manure digester and co-digestion facilities at dairies and centralized off-site locations within the Central Valley. Through the process of anaerobic digestion, digester facilities treat dairy wastes and other non-hazardous organic wastes to produce biogas, a renewable source of energy. Biogas generated at digester facilities can be used in internal combustion engines to produce electricity or refined to biomethane a product equivalent to natural gas.

The Central Valley Water Board will regulate the discharge of effluent and solid digestate generated from such facilities. Regulatory options under consideration for the program include Waste Discharge Requirements (WDRs) General Orders and/or Conditional Waivers of WDRs. The Program EIR will provide CEQA compliance for the water quality permitting by the Central Valley Water Board to the owners and operators of those facilities. These digester facilities will also require discretionary permits issued by other state, county and local agencies and special districts. Other permitting agencies and districts may rely on or tier off the Program EIR to satisfy CEQA requirements.

Supplemental information in the form of an Initial Study may be downloaded in PDF format from the Central Valley Water Board's website at: http://www.waterboards.ca.gov/centralvalley/press_room/announcements/.

CEQA SCOPING MEETING AND SCHEDULE

Three scoping meetings will be held to provide participants with an opportunity to comment on the appropriate scope and content of the draft Program EIR to be prepared pursuant to CEQA in support of development of General Order(s) and/or Conditional Waiver(s) to regulate the discharge of wastes generated by the operation of dairy manure digester and dairy manure co-digester facilities.

Date:	March 24, 2010	March 30, 2010	April 7, 2010
Time:	5:30 p.m. – 7:00 p.m.	5:30 p.m. – 7:00 p.m.	5:30 p.m. – 7:00 p.m.
Address:	Central Valley Water Board 11020 Sun Center Drive,#200 Rancho Cordova, CA 95670	Central Valley Water Board 1685 E Street Fresno, CA 93706	Central Valley Water Board 11020 Sun Center Drive,#200 Rancho Cordova, CA 95670

Directions and location information to the Rancho Cordova and Fresno offices can be found on the Central Valley Water Board's website:
http://www.waterboards.ca.gov/centralvalley/about_us/contact_us/

The facilities will be accessible to persons with disabilities. Individuals requiring special accommodations are requested to contact Stephen Klein at (559) 445-5558 at least five working days prior to the meeting. TTY users may contact the California Relay Service at 1-800-735-2929 or voice line at 1-800-735-2922.

Submission of CEQA Scoping Comments

The Central Valley Water Board will accept both written and oral suggestions on the scope and content of the information to be included in the CEQA documents. Comments should be limited to identifying the range of actions, alternatives, mitigation measures, reasonably foreseeable means of compliance and their impacts, and potential significant environmental effects to be analyzed in-depth in the draft EIR. Written comments should be submitted to Jennifer Tencati of CirclePoint no later than **12:00 noon on 23 April 2010** (contact information below). Please indicate the project you are commenting upon in the subject line, "**Scoping Comment Letter – Central Valley Water Board Dairy Digester Program EIR.**"

WHO SHOULD ATTEND

Groups and individuals interested in the environmental impacts of dairy manure digester and co-digester projects as well as the development of the Central Valley Water Board's waste discharge regulatory program for these facilities are encouraged to attend these meetings. This includes, but is not limited to, public and private land owners; representatives of tribal nations; agricultural producers; dairy owners and operators; digester developers; and other federal, state and local regulators including air and water management officials.

CONTACT INFORMATION

Questions regarding this scoping meeting can be directed Jennifer Tencati at (916) 658-0180 x131. Please submit comments by mail to Jennifer Tencati, CirclePoint, 455 Capitol Mall, Suite 802, Sacramento, CA 95814, by email to j.tencati@circlepoint.com or by fax to (916) 658-0189. Electronic submission via e-mail is preferred. If you wish to receive ongoing information regarding the development of a dairy manure digester and dairy manure co-digester regulatory program, you may subscribe to the "Dairy Program" mailing list through our website at :
http://www.waterboards.ca.gov/resources/email_subscriptions/reg5_subscribe.shtml
or call Jennifer Tencati and request to be added to the mailing list.

Please bring the above information to the attention of anyone you know who would be interested in this matter.

Clay L. Rodgers

Clay Rodgers, Assistant Executive Officer
18 March 2010

ENVIRONMENTAL CHECKLIST

Initial Study

1. Project Title:	Central Valley Dairy Digester and Co-digester Facilities Program EIR
2. Lead Agency Name and Address:	California Regional Water Quality Control Board, Central Valley Region, (Central Valley Water Board or CVWB)
3. Contact Person and Phone Number:	Stephen Klein (559) 445-5558 CVWB Project Manager
4. Project Location:	California Regional Water Quality Control Board, Central Valley Region (Region 5) jurisdictional boundaries (Central Valley, California)
5. Project Sponsor's Name and Address:	California Regional Water Quality Control Board, Central Valley Region 1685 E Street Fresno, California 93706
6. General Plan Designation(s):	NA
7. Zoning Designation(s):	NA

8. Description of Project.

The Central Valley Regional Water Quality Control Board (Central Valley Water Board or CVWB) is proposing to develop a waste discharge regulatory program for anaerobic digesters (digesters) using manure and manure plus other organic feedstocks (i.e., used in co-digestion) located on-site or off-site dairy facilities in the Central Valley Region (Region 5). Regulatory options under consideration for the program include Waste Discharge Requirements (WDRs) General Orders and/or Conditional Waiver of WDRs. These WDRs and/or conditional waivers will regulate the discharge of effluent and solid digestate generated from dairy manure digesters and dairy manure co-digester projects.

A Program Environmental Impact Report (EIR) will be prepared to evaluate the environmental effects that could result from the development of dairy manure digester and co-digestion facilities within the Central Valley Region, and is intended to provide California Environmental Quality Act compliance for the water quality WDRs and/or conditional waivers issued by the Central Valley Water Board to the owners and operators of those facilities. These digester facilities will also require discretionary permits issued by other state, county and local agencies and special districts. The Program EIR is being developed to allow the other permitting agencies and districts to rely on or tier off the Program EIR to satisfy California Environmental Quality Act (CEQA) requirements. The goal is to reduce the time required for environmental review and other discretionary permitting of digesters at dairies and central facilities throughout the Central Valley.

Any water quality WDRs and/or conditional waivers issued under this program will contain terms and conditions to implement applicable requirements of the Porter Cologne Water Quality Control Act (California Water Code §13000 et seq.), the California Code of Regulations; the Water Quality Control Plan for the Tulare Lake Basin, Second Edition (Tulare Lake Basin Plan); the Water Quality Control Plan for the Sacramento River Basin and the San Joaquin River Basin, Fourth Edition (Sacramento and San Joaquin Basin Plan); and the State Water Resource Control Board Resolution No. 68-16 (Antidegradation Policy); and all other applicable Central Valley Water Board or State Water Resources Control Board plans and policies.

General WDRs and/or conditional waivers under this program will be applicable to existing dairies with facility-produced manure-only digesters and new or expanded dairies with facility-produced manure-only digesters. The proposed permitting process will also be applicable to dairies that propose to co-digest facility-produced-manure with other organic feedstocks, as well as centralized digester and co-digester facilities on or off-site dairy facilities that receive manure from single or multiple dairies.

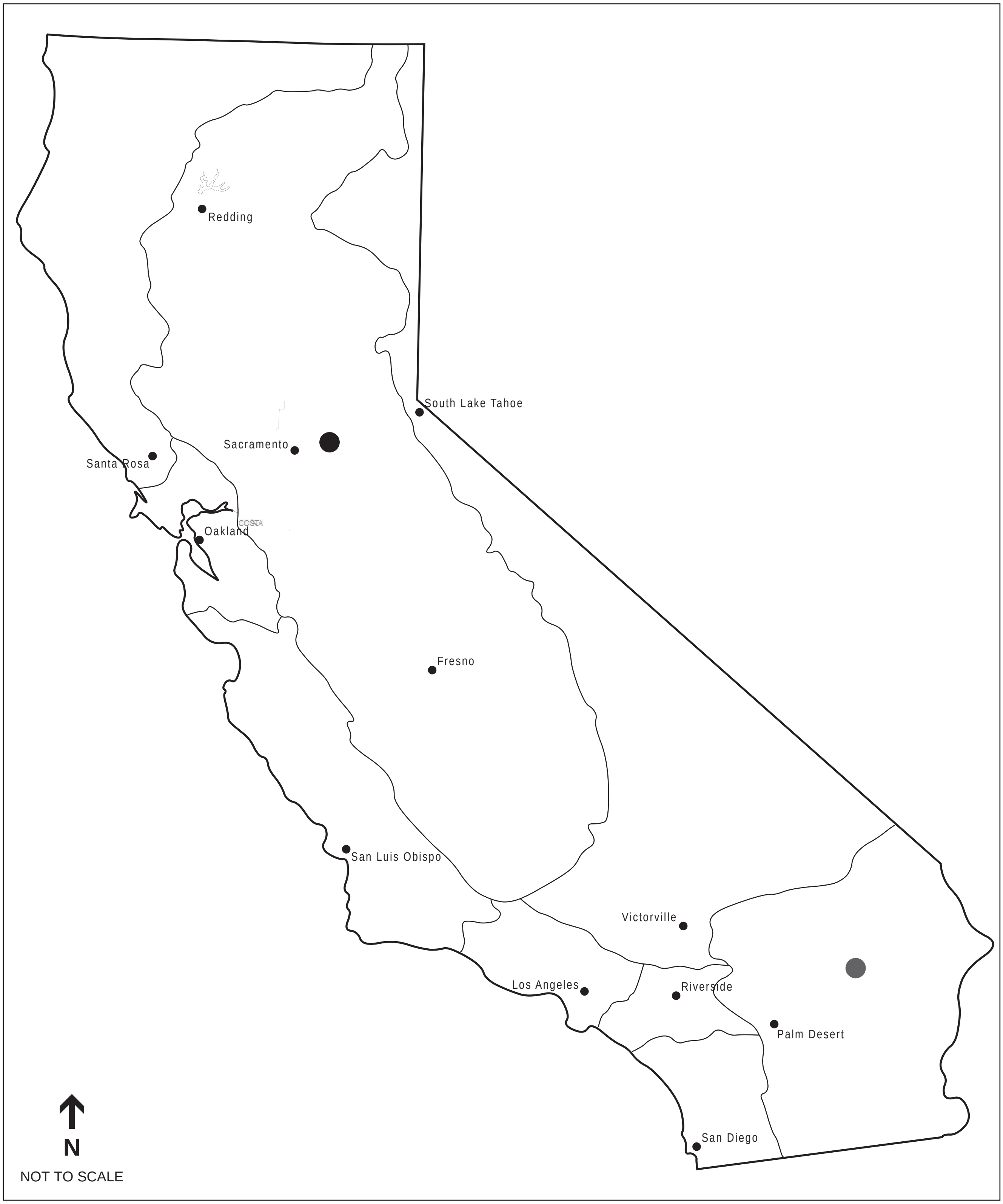
Background

California is split into nine water quality regions based on watershed boundaries, with each region under the jurisdiction of a semi-autonomous Regional Board. The project is under the authority of the California Regional Water Quality Control Board, Central Valley Region. (Central Valley Water Board or CVWB). The Central Valley Region is the State's largest region (as shown in **Figure 1**).

According to the 2007 *Census of Dairies and Dairy Cows* (California Agricultural Resource Directory, 2007), there are approximately 1.6 million cows at 1,578 dairies in the CVWB's jurisdiction. Dairy cows on average produce approximately 112 pounds of manure per day (Burke, 2001), which would equate to about 180 million pounds of manure generated per day within the Central Valley Region. This substantial quantity of manure has the potential to produce biogas, a renewable source of energy, if it is processed in a digester.

Broad objectives of the project are as follows:

- Support the Bioenergy Action Plan for California (July 2006)
- Support Executive Order S-06-06, which established targets for the use and production of biofuels and biopower and instructed state agencies to work together to advance biomass programs in California.
- Support a CVWB regulatory program to streamline the permitting of dairy manure digester facilities and dairy manure co-digester facilities. The CVWB estimates that this waste discharge regulatory program will reduce water quality permitting time by 75 percent or more through the use of general WDRs and/or conditional waivers.
- Reduce the time required to develop and issue permits associated with digesters by other state and local permitting agencies. For example, the Air Resources Board (ARB) and San Joaquin Valley Air Pollution Control District (SJVAPCD) have estimated that the certification of the Program EIR will reduce air quality permitting time by 50 percent or more for certain digester projects.



SOURCE: Central Valley RWQCB, 2009; and ESA, 2010

Central Valley Dairy Digester and Co-digester Program EIR . 209481

Figure 1
California Regional Water Quality Control Board – Central Valley Region
Region 5

- Enable State Agencies to achieve Executive Order S-14-08 to reduce permitting times by 50 percent or more for renewable energy projects.
- Reduce costs to comply with CEQA on the order of tens of thousands of dollars for smaller projects to hundreds of thousands of dollars for larger projects.
- Address the cross-media environmental requirements of multiple state and local agencies in one EIR.
- Increase opportunities for energy companies to achieve 2010 and 2020 California Renewable Portfolio Standards by converting dairy manure, green waste, and other waste streams to a valuable, renewable green energy resource.
- Provide an alternate waste treatment method for dairy manure and other organic waste streams and create a new revenue source for California dairies.
- Assist in meeting greenhouse gas (GHG) reduction measures in support of the California Global Warming Solutions Act of 2006 (Assembly Bill [AB] 32). The AB 32 Scoping Plan includes the following greenhouse gas reduction measures related to anaerobic digestion:
    - Measures E-3. Achieve a 33% renewables mix by 2020. (Anaerobic digestion produces biogas which is a renewable energy source.)
    - RW-3 High Recycling/Zero Waste. (Anaerobic digestion is one of five subcategories listed under this measure.)

Anaerobic digestion is the biological decomposition of organic matter in the absence of molecular oxygen. This project encompasses both manure digestion and co-digestion processes, which differ according to feedstock. The anaerobic digestion process results in the production of biogas and digestate. The biogas consists primarily of methane (CH_4), which can be used for energy, and carbon dioxide (CO_2), with small amounts of hydrogen sulfide (H_2S), and ammonia (NH_3). Typically biogas is saturated with water vapor and may have trace amounts of hydrogen (H_2), nitrogen (N_2), oxygen (O_2), dust and siloxane (Greer, 2010). The residual products from anaerobic digestion are wastewater and solid residuals (digestate). The anaerobic digestion process occurs naturally in marshes, wetlands and is the principal decomposition process in landfills.

Anaerobic digestion at dairies follows a general process as shown in **Figure 2**, although the actual facility and digester type can vary. As seen in Figure 2 there are several potential uses for the biogas produced by the anaerobic digester (AD) facilities.

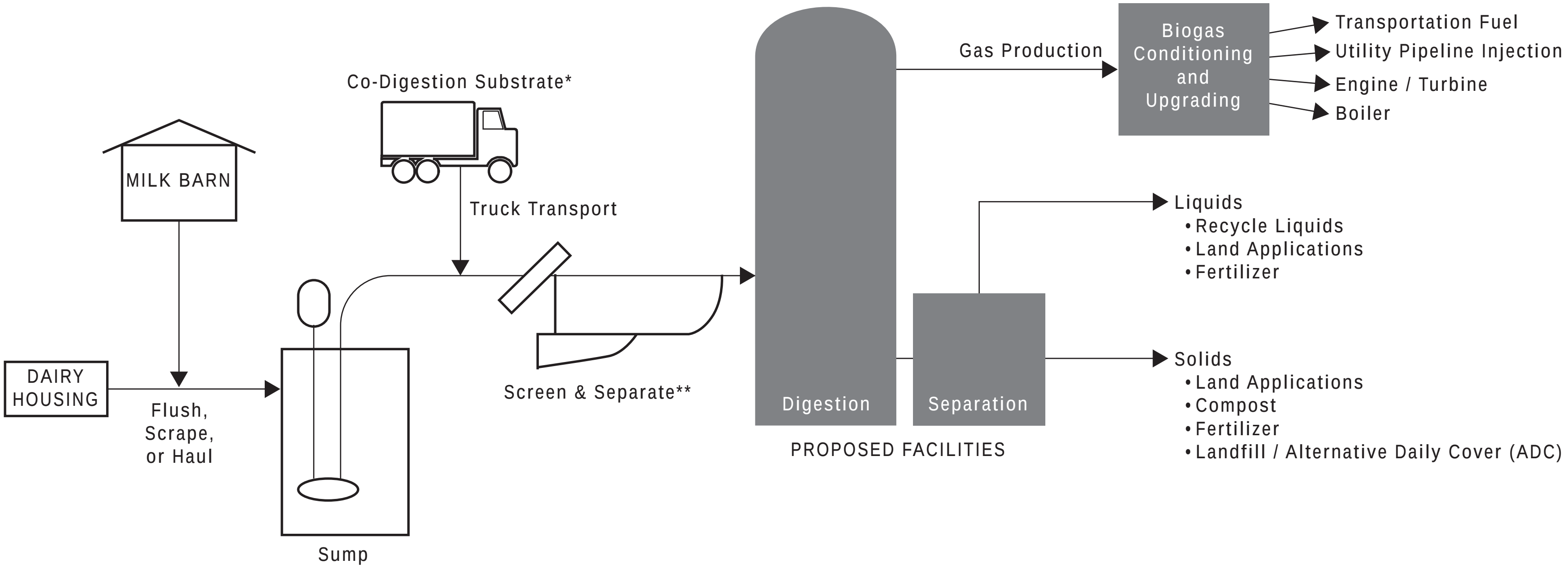
The following AD facility categories are addressed in this document:

- <u>Individual Dairies</u>

  This facility type includes the addition of AD facilities (i.e., dairy manure digester or co-digester facilities) onto an individual dairy (an operation that houses dairy cows and collects and processes manure). Facilities would be located within the current footprint of the dairy operations.

- <u>Centralized Locations</u>

  There are two categories of centralized location facilities for dairies that will be assessed in this EIR: (1) Central AD Facility, whereby individual dairies would collect manure and transport the manure by pipeline or truck to a central facility; and (2) Central Biogas Clean-Up Facility, whereby raw biogas from individual dairies (including dairies linked



* If co-digestion will be implemented at facility

** Screen & Separate – this step may be needed to remove straw, sand, and silt (Burke, 2001)

SOURCE: Burke, 2001; and ESA, 2010

Figure 2
Integration of Anaerobic Digestion in the Dairy Waste Stream

via underground gas pipelines) is piped to a central facility. These types of centralized facilities can be on dairies or located off-site. For both location options, the central facility would have the potential to receive manure, manure plus co-digestion substrate, and/or raw biogas.

The EIR will evaluate environmental impacts from the three basic types of systems including ambient-temperature anaerobic covered lagoons, plug-flow digesters, and complete mix systems. There are many variations and gradations between these basic types of AD systems. Each of the three basic digester types is described below.

The EIR will evaluate potential environmental impacts from a range of potential uses of the biogas including: on-site electrical production units (e.g., engines, turbines, and fuel cells), pipeline injection (i.e., into the utility natural gas pipelines), and transportation fuels (e.g., compressed biomethane and liquefied biomethane).

- Anaerobic Covered Lagoons

  Ambient-temperature covered lagoons are covered ponds, where the manure waste stream enters one end (influent) and the digested effluent is removed at the other end. The lagoons are covered by an impermeable cover that captures the biogas generated by AD. Covered lagoons are not typically heated and operate at ambient ground temperatures and therefore the AD reaction and biogas production rates are affected by seasonal temperature variations.

- Plug-Flow Digester

  Plug-flow digesters typically consist of unmixed, rectangular tanks that are normally heated by a hot water piping system to mesophilic temperatures (68º to 105º F) within the reactor. The rate of bacterial growth and AD is faster with higher temperatures than at ambient conditions. This AD system is typically used to digest thick waste with a relatively high solids concentration.

- Complete Mix Digester

  Complete mix anaerobic digesters consist of aboveground tanks whereby the organic waste stream is heated to mesophilic or thermophilic (110º to 160º F) temperatures and continuously or intermittently mixed by mechanical, gas, or liquid circulation mixers. Complete mix digester systems accommodate a wide-range of solids concentrations and can handle sand and silts in the waste stream since the mixing prevents stratification (Burke, 2001).

In summary, AD facilities are anticipated to provide the following benefits:

- reduce the odor associated with dairies,
- reduce GHG emissions,
- provide a renewable source of energy, and
- increase recycling and reduce waste.

Biogas generated through the AD process, which is the renewable source of energy listed above, is captured and can be used directly in internal combustion engines to produce electricity and heat, or the biogas can be upgraded to biomethane through the removal of hydrogen sulfide, carbon dioxide (CO_2), and moisture. Biomethane is a product equivalent to natural gas, which typically contains more than 95 percent methane. Biomethane can be used in place of natural gas for various processes, including use by utility companies if the biomethane is upgraded to utility standards and injected into a natural gas supply pipeline, as well as for electrical generation, heating, cooling, and for natural gas-fueled vehicles (Krich, et al., 2005).

The manure digestion process would occur 24 hours a day at AD facilities. The number of site visitors and employees at dairies is not anticipated to change substantially as a result of the addition of AD facilities. There may be increased truck trips associated with the delivery of agricultural products (in the case of co-digestion) or the transport of manure or biogas products (in the case of centralized facilities).

This Initial Study (IS) is being utilized as a tool to communicate the project concepts and likely key issues to interested members of the public, as well as trustee and responsible agencies, and to focus issue areas that could be potentially significant. The CVWB intends to prepare a Program EIR to discuss the project's potential effect on the environment and meet the project objectives described above. The Program EIR will identify and address potentially significant effects on the environment related to dairy digesters, and provide program-level measures to mitigate identified impacts.

9. Surrounding Land Uses and Setting.

The AD projects would be located in the Central Valley. The Central Valley is a large valley (approximately 42,000 square miles) that dominates the central portion of California. The population of the Central Valley is about 6.5 million persons. The Central Valley is one of the most productive agricultural regions in the United States, and the location for more than 1,500 dairies. Two major rivers in the Central Valley are the Sacramento River, that drains the northern third of the valley, and the San Joaquin River that drains the central third of the valley. The southern third of the Central Valley is the Tulare Lake Basin that is essentially a closed basin. During periods of exceptional precipitation, surface water can flow from the Tulare Lake Basin to the San Joaquin River. The Central Valley has periods of poor air quality because it is a valley surrounded by mountains that can trap air pollutants, and the air pollutant concentrations of ozone and particulate matter often exceed the state and federal standards. With respect to water quality, groundwater in parts of the Central Valley has been degraded, due in part to historical and current land uses and disposal practices. Generally, dairy digesters would be expected to be at dairies or near dairies and accordingly in areas of agricultural land use.

10. Other public agencies whose approval is required.

The CVWB would certify the EIR and the regulatory program for dairy digesters. Individual digester projects within the scope of this program could also potentially require approvals or permits from other jurisdictions or agencies; such as the County, the local air quality management district, California Department of Fish and Game, or the U.S. Army Corps of Engineers. These other entities responsible for issuing approvals could rely on or tier off this Program EIR.

Environmental Factors Potentially Affected

The proposed project could potentially affect the environmental factor(s) checked below. The following pages present a more detailed checklist and discussion of each environmental factor.

☒ Aesthetics
☒ Biological Resources
☒ Hazards and Hazardous Materials
☐ Mineral Resources
☒ Public Services
☒ Utilities and Service Systems
☒ Agriculture and Forest Resources
☒ Cultural Resources
☒ Hydrology and Water Quality
☒ Noise
☐ Recreation
☒ Mandatory Findings of Significance
☒ Air Quality & GHG Emissions
☒ Geology, Soils and Seismicity
☒ Land Use and Land Use Planning
☐ Population and Housing
☒ Transportation and Traffic

DETERMINATION: (To be completed by Lead Agency)

On the basis of this initial study:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☐ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☒ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, no further environmental documentation is required.

Clay L. Rodgers
Signature

March 18, 2010
Date

CLAY RODGERS, Assistant Executive Officer
Printed Name

Central Valley Water Board
For

Environmental Checklist

Aesthetics

Issues (and Supporting Information Sources):		*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
1.	**AESTHETICS—Would the project:**				
a)	Have a substantial adverse effect on a scenic vista?	☒	☐	☐	☐
b)	Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway corridor?	☒	☐	☐	☐
c)	Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☒	☐
d)	Create a new source of substantial light or glare which would adversely affect daytime or nighttime views in the area?	☒	☐	☐	☐

Discussion

a, b) Dairy digesters would be located on dairies, or central facilities that may not be dairies. These facilities are likely to be constructed in areas away from scenic vistas and scenic resources; however, because facility locations are unknown at this time, a determination cannot be made. Therefore, the project may have a potentially significant impact on scenic vistas and scenic resources, and these issues will be addressed in the Program EIR.

c) As described above, dairy digesters are likely to be constructed at dairies or at central facilities in agricultural areas and they would be consistent with other major structures that are part of the visual character of agricultural areas. Therefore the visual effect of the digesters developed for the project would not be likely to substantially degrade the visual character of the site and its surroundings. This issue will not be evaluated in the Program EIR.

d) Dairy digesters should have similar lighting requirements to other dairy operations. Outdoor nighttime lighting would primarily be limited to the minimal amount needed for security and safe operations. Dairy digesters may require a flare for combustion of surplus biogas or in the event of equipment failure of biogas conditioning facilities. Flares could be a potential new source of nighttime lighting and thus this issue will be evaluated in the Program EIR.

Agriculture and Forest Resources

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
2. AGRICULTURE and FOREST RESOURCES In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies my refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board.				
Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☒	☐	☐	☐
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☒	☐	☐	☐
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use?	☒	☐	☐	☐

Discussion

a) It is unknown how much of the land on which dairy digesters would be constructed has been designated as Farmland of Statewide Importance. Typically, dairy digester facilities would be considered an agricultural use; they support dairies by providing additional benefits from the dairy manure. However, there is the potential for some co-digester and central facilities development on Important Farmland; therefore this issue will be addressed in the Program EIR.

b) It is unknown how much of the land on which dairy digesters would be constructed has been zoned for agricultural use or is under a Williamson Act contract. Dairy digester facilities are generally considered to be a compatible use with dairies. However, there is the potential for some co-digester and the development of central facilities on land zoned for agricultural use or under a Williamson Act contract, therefore this issue will be addressed in the Program EIR.

c) Dairy digesters would not be located on forest land. The project would not conflict with existing zoning or cause rezoning of forest land. This issue will not be further evaluated in the Program EIR.

d) Dairy digesters would not be located on forest land. The project would not result in the loss of forest land or conversion of forest land to non-forest use. This issue will not be further evaluated in the Program EIR.

e) As discussed above, dairy digester facilities would be considered an agricultural use or use compatible with agriculture. Therefore, it is unlikely that development of digester facilities would result in the conversion of Farmland of Statewide Importance to non-agricultural uses. However, there is the potential for some co-digester and the development of central facilities on land used for agricultural, therefore this issue will be addressed in the Program EIR. Dairy digester facilities are not anticipated to result in the conversion of any forest land to non-forest use.

Air Quality and Greenhouse Gas Emissions

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
3. AIR QUALITY and Greenhouse Gas Emissions Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations.				
Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☒	☐	☐	☐
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☒	☐	☐	☐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☒	☐	☐	☐
d) Expose sensitive receptors to substantial pollutant concentrations?	☒	☐	☐	☐
e) Create objectionable odors affecting a substantial number of people?	☒	☐	☐	☐
f) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☒	☐	☐	☐
g) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☒	☐	☐	☐

Discussion

a) The project would assess potential construction and operation of AD facilities within the CVWB’s jurisdictional boundary. The construction and operation of any AD facilities will be subject to the rules and requirements, including permitting, of the applicable air quality district. The Program EIR will evaluate the potential for the project to conflict with or obstruct the implementation of any applicable air quality plans. Mitigation for potential air quality impacts would be established, as necessary.

b) Air pollutant emissions that would violate or substantially contribute to air quality standard violations may occur during construction and/or operation of AD facilities. Construction emission sources include exhaust generated from the use of heavy equipment and off-road vehicles and fugitive dust generated as a result of soil disturbance during excavation and grading activities. Implementation of standard best management practices would reduce the potential for air quality violations from construction of AD facilities. Appropriate best management practices will be identified and outlined in the Program EIR.

The project would result in the 24-hour per day operation of some AD facilities. Additional air pollutant sources and emissions would depend on several factors, such as the size and type of facility (i.e., AD facilities on individual dairies versus centralized locations), the increased truck traffic on the local roadway network (including haul trucks for co-digester facilities and for potential waste or biogas transport to centralized facilities), and the post processing of the biogas (i.e., combusted for electricity or cleaned up for use as a transportation fuel or injection to utility transmission lines). The potential nitrogen oxide (NOx) emissions that could result from the combustion of the biogas to produce electricity are an important issue for the project that will be analyzed in the Program EIR. Further discussion of potential air quality impacts and mitigation to reduce impacts will be evaluated in the Program EIR.

c) At the cumulative level, it is anticipated that the project would reduce the prevalence of fugitive methane from naturally occurring manure decomposition while producing a renewable source of energy (biogas). However, construction and operation of AD facilities under the project would result in additional sources and emissions of criteria pollutants (as described in issue “b” above). Consistency with applicable federal and state ambient air quality standards will be further discussed in the Program EIR.

d) Construction and operation of dairy digesters could expose sensitive receptors to substantial pollutant concentrations. During construction, sources of toxic substances would include emissions from off-road equipment (generally diesel fueled) for clearing and grading activities and diesel equipment used to build AD facilities. For operations, toxic emissions would be generated by trucks delivering waste to the AD facilities, as well as emissions from processing equipment operating on-site. In addition, the AD process could release emissions of toxic pollutants such as hydrogen sulfide and ammonia. Further discussion of potential air toxic impacts and mitigation to reduce impacts would be analyzed in the Program EIR.

e) Construction and operation of dairy digesters is anticipated to reduce odors currently associated with dairy waste products since AD occurs in a closed system. Volatile organic compounds are broken down through the anaerobic digestion process, and exhaust is generally processed in a more controlled environment. However, due to the transport, storage, and pre-processing activities of the odiferous cow manure and other organic substrates for potential co-digestion, the siting of these AD facilities, in particular centralized facilities not located on dairies, could lead to objectionable odors at off-site receptors in the vicinity. This issue will be discussed in the Program EIR.

f, g) An established goal of the project is the furthering of compliance with the greenhouse gas (GHG) reduction measures contained in the California Global Warming Solutions Act of 2006 (Assembly Bill [AB] 32), specifically Measures E-3 (achieve a 33% renewables mix by 2020 – AD produces biogas which is a renewable energy source) and RW-3 (high recycling/zero waste – AD is one of the categories listed under this measure). Furthermore, when biogas is combusted, the substantial methane portion is converted to carbon dioxide, which is much less damaging as a GHG than methane (methane has a global warming potential approximately 23 times greater than carbon dioxide). Finally, if the energy produced through AD operations displaces energy produced from oil, natural gas, or coal, the project could result in greenhouse gas benefits. These benefits, as well as additional potential sources of GHGs as part of the project, such as haul trucks, processing equipment, and increased electricity usage for AD facility operations, will be discussed in the Program EIR.

Biological Resources

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
4. BIOLOGICAL RESOURCES— Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☒	☐	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☒	☐	☐	☐
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☒	☐	☐	☐
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☒	☐	☐	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☒	☐	☐	☐
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☒	☐

Discussion

a) Project development has the potential to affect special-status species. Any direct and/or indirect impacts to special-status species would be dependant upon the specific location of the AD facilities. Impacts on special-status species would be low for those projects that construct facilities within dairy footprints, as dairies do not typically support habitat for special-status species. Central location facilities and pipelines have the potential to affect more habitat depending on their location.

The project would comply with the California Endangered Species Act, Federal Endangered Species Act, and Magnuson Stevens Fisheries Conservation Management Act, as appropriate. Further discussion of potential impacts on special-status species and mitigation to reduce impacts would be provided in the Program EIR and implemented at the project level.

b, c) While most dairy digesters are likely to be located on dairies or other areas subject to agricultural practices, AD facilities could adversely affect sensitive natural resources and federally protected wetlands, depending on their location. Generally these impacts can be avoided in the siting process.

During project-level facility siting, a habitat assessment shall be conducted, followed by a wetland delineation, if potential wetland habitat is present. As necessary, permits shall be obtained pursuant to Sections 401 and 404 of the Clean Water Act, Section 10 of the Rivers and Harbors Act and Sections 1600-1616 of the California Fish and Game Code. These issues will be addressed in the Program EIR.

d) Project components are unlikely to affect any established wildlife corridors as most digester facilities will be located at dairies. If required, pipelines will be underground and will not impair wildlife movement. The centralized facilities could be located on non-dairy properties and have the potential to affect established wildlife corridors, depending on their location.

The project has the potential to be located on wildlife nursery sites. Mitigation for this potential impact, such as requiring surveys at the project level to determine the potential for wildlife use of the site prior to approval, will be outlined in the Program EIR.

e) Dairy digesters may affect biological resources protected under local ordinance. Mitigation to reduce any potential impacts, including project-specific surveys, will be addressed in the Program EIR.

f) Major adopted plans in the CVWB’s jurisdiction include the San Joaquin Multi-species Habitat Conservation and Open Space Plan, Natomas Basin Habitat Conservation Plan (HCP), Kern Water Bank Authority HCP/Natural Community Conservation Planning (NCCP) and East Contra Costa County HCP. The continuation and expansion of agricultural facilities is provided for in most HCPs. Centralized facilities may trigger the need for compliance measures, including site-specific surveys and payment of fees under adopted plans but would not create any conflict. This impact will be less than significant and this issue will not be further evaluated in the Program EIR.

Cultural Resources

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
5. CULTURAL RESOURCES— Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	☒	☐	☐	☐
b) Cause a substantial adverse change in the significance of a unique archaeological resource pursuant to §15064.5?	☒	☐	☐	☐
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☒	☐	☐	☐
d) Disturb any human remains, including those interred outside of formal cemeteries?	☒	☐	☐	☐

Discussion

a) The preferred location for the AD facilities would likely be at dairies or centralized locations in the vicinity of dairies. In general, historic-era buildings in these areas are anticipated to be agricultural in nature. Therefore, project implementation in the vicinity of such historic structures would be consistent with the nature of the building. The potential remains, however, for an impact to the significance of a historical resource through site preparations such as demolition. The Program EIR will include a programmatic-level discussion of the historic resources present in the CVWB's jurisdictional boundary. Additional project-level cultural resources surveys may be necessary for projects located near historic structures or prehistoric sites and such surveys may be considered for inclusion in the provisions of the general WDRs and/or waiver. This issue will be addressed in the Program EIR.

b) At the program level of environmental review, it is not possible to determine if archaeological resources would be disturbed by the installation of AD facilities. Any site grading and excavation activities have the potential to disturb previously unknown archaeological resources. The EIR shall include a program level discussion of the archeological resources present in the CVWB's jurisdictional boundary.

Within this area, prehistoric and ethnohistoric materials might include flaked stone tools, tool-making debris, stone milling tools, fire-affected rock, basketry, culturally modified animal bone, fishing implements, or soil darkened by cultural activities (midden). Historic-era materials might include building remains, metal, glass, cans, or ceramic artifacts or debris.

Potential impacts from the project on archeological resources and measures to mitigate this impact will be addressed in the Program EIR.

c) There is potential for grading operations related to site preparations to result in an adverse impact on paleontological resources. This potential impact would be further discussed in the Program EIR, and measures will be incorporated to mitigate any potentially significant impacts.

d) There is potential for grading operations related to site preparations to result in an adverse impact on human remains. This potential impact would be further discussed in the Program EIR.

Geology, Soils, and Seismicity

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
6. GEOLOGY, SOILS, AND SEISMICITY— Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? (Refer to Division of Mines and Geology Special Publication 42.)	☐	☒	☐	☐
ii) Strong seismic ground shaking?	☐	☒	☐	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☒	☐	☐
iv) Landslides?	☐	☒	☐	☐
b) Result in substantial soil erosion or the loss of topsoil?	☐	☒	☐	☐
c) Be located on geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	☐	☒	☐	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☒	☐	☐
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☒	☐	☐

Discussion

a.i) Fault rupture can occur along fault systems during seismic events (earthquakes). If the rupture extends to the surface, movement on a fault is visible as a surface rupture. The occurrence of fault rupture depends on several factors, including location of the epicenter in relation to the project site, and the characteristics of the earthquake, such as intensity and duration. The hazards associated with fault rupture generally occur in the immediate vicinity of the fault system. Based on the available geologic and seismic data, there are few faults in the Central Valley and fault rupture is not considered likely. The Program EIR would further discuss the potential for fault rupture in the project area, as relevant.

a.ii) Strong earthquakes generated along a fault system generally create ground shaking, which attenuates (i.e., lessens) with distance from the epicenter. In general, the area affected by ground shaking will depend on the characteristics of the earthquake and location of the epicenter.

Much of the Central Valley is located outside of areas that are prone to strong seismic ground shaking. However, depending on the siting of individual AD facilities, some of those facilities may be located in areas that are prone to strong seismic shaking. The Program EIR would require facility construction to meet established local, state, and federal building codes, as relevant, to minimize damage in the event of and earthquake. Additional requirements and mitigation may also be required. For instance, the project applicants would be required to submit to the appropriate county engineering department for review and approval, a geotechnical engineering report produced by a California Registered Civil Engineer or Geotechnical Engineer addressing and making recommendations on the following:

- Road, pavement, and parking area design
- Structural foundations, including retaining wall design (if applicable)
- Design of tanks, pipelines, and other AD facilities
- Grading practices
- Erosion/winterization
- Special problems discovered on the site (e.g., groundwater, expansive/unstable soils, etc.)
- Slope stability

Compliance with California seismic design requirements would ensure that the project would not expose persons or property to hazardous conditions associated with strong seismic ground shaking events. The Program EIR would further discuss the potential for this issue in the project area, as relevant.

a.iii) Liquefaction and other seismically-induced forms of ground movement have historically occurred in California during major earthquake events. These phenomena generally consist of lateral movement, flow, or vertical settlement of saturated, unconsolidated soil in response to strong ground motion. Primary factors in determining liquefaction potential are soil type, the level and duration of seismic ground motions, and the depth to groundwater. Sandy, loose, or unconsolidated soils are most susceptible to liquefaction hazards. Geotechnical reporting would be incorporated into the project, as described above. Compliance with the California seismic design requirements, as noted above, would ensure that the project would not expose persons or property to hazardous conditions associated with seismic-related ground failure. The Program EIR would further discuss the potential for this issue in the project area, as relevant.

a.iv) Geographically, the Central Valley is generally flat, and potential for landslides in most areas is therefore low. However, topographic features located in some portions of the Central Valley, including the foothills along Central Valley margins, topographic features associated with rivers and other waterways, and manmade features including levees and other berms and fill areas, may be subject to mass movements including landslide. Program level measures, including compliance with requirements for geotechnical assessment and compliance with applicable building codes and local building permit requirements, will be applied. The Program EIR would further discuss the potential for this issue in the project area, as relevant.

b) Site preparation and earthwork would consist of stripping the area of vegetation, as well as site grading, as required. Grading and earthwork would be limited to facility footprint areas, including pipelines and other appurtenant facilities. In general, installation of AD facilities would not typically require excessive grading or earthwork.

Although large scale grading activities are not anticipated, stripping of vegetation and other grading could facilitate the entrainment of soils in water or wind, leading to the transport of surface soils and sediments off site. To minimize the loss of topsoils due to soil erosion and other factors, Best Management Practices (BMPs) would be required under CVWB permitting requirements. These BMPs would implement measures that would reduce or prevent the loss of topsoil from the AD facility site.

In addition, a drainage report would be prepared by a California Registered Civil Engineer, for each individual AD site. The report would identify measures to manage stormwater drainage flows and otherwise prevent topsoil from becoming entrained in stormwater or flood flows. These requirements and additional measures will be addressed in the Program EIR, as relevant. For additional discussion of water quality impacts associated with erosion, please see the Hydrology and Water Quality section of this initial study.

c-d) The project could result in the construction of AD facilities in locations where unstable geologic units or unstable soils may be present, including expansive soils. General measures may be applied in the Program EIR in order to underscore local, state, and federal requirements for the construction of facilities on potentially unstable geologic units or soils, or on expansive soils. These measures include, but are not limited to, compliance with relevant building codes and geologic investigations, as discussed previously.

e) The process wastewater produced by the AD facilities would not be discharged into a septic tank or sewer system. However, for larger/centralized AD facilities located in remote areas, as relevant, septic systems may be required for the treatment of sanitary wastewater flows generated by on-site employees. The ability of soils to support a septic system is highly variable, and requires assessment of conditions at specific installation sites. The Program EIR will implement measures to ensure compliance with relevant state and local codes regarding the engineering and installation of septic systems for sanitary wastewater treatment.

Hazards and Hazardous Materials

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
7. HAZARDS AND HAZARDOUS MATERIALS Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☒	☐	☐	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☒	☐	☐	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☒	☐	☐	☐
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☒	☐	☐	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☒	☐
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☒	☐
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☒	☐	☐	☐
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☒	☐	☐	☐

Discussion

a) During construction, hazardous materials may be transported, used, and disposed. All hazardous material transport and use should be performed consistent with standard best management practices that may be identified in the Program EIR and in accordance with state and Federal law.

Operation of dairy digester facilities would require the routine handling of gases that can be hazardous. Methane, in particular, can be hazardous due to its flammability and properties as an asphyxiate capable of reducing oxygen to dangerously low levels in the body. The United States Department of Transportation, Office of Pipeline Safety, regulates the safety of gas transmission pipelines. All gas pipeline projects delivering gas through a distribution system must be designed and constructed to meet or exceed the Federal safety standards established in 49 Code of Federal Regulations Part 192. These regulations include specific standards for material selections and qualification, protection from corrosion, and worker training, safety, and qualifications. Adhering to these guidelines and requirements will ensure that no significant hazards will be created to the public or the environment through the routine transport of compressed gas. This issue will be addressed in the Program EIR.

b) As indicated above, all material transport and use would be consistent with standard industry best management practices. Additional construction-related potential for upset of hazards includes the disturbance of a known or unknown contaminated site, contaminated agricultural soils, or underground storage tank. This issue will be addressed in the Program EIR. Mitigation to be incorporated into the project shall be further defined in the Program EIR, and will include preparation of a stormwater pollution prevention plan and hazardous material management and spill response plan.

c) The potential conflicts with locating a dairy digester facility within 1/4 –mile of an existing or proposed school will be addressed in the Program EIR and appropriate provisions to be incorporated into general WDRs and/or a waiver will be analyzed.

d) A search of readily available government databases shall be conducted at the project level to determine if proposed dairy digester facilities would be located on a hazardous materials site at the project level. This issue will be addressed in the Program EIR and appropriate provisions for submission of relevant information under general WDRs and/or waiver will be considered.

e, f) If a dairy digester were near an airport or private airstrip, airport or airstrip activity would be unlikely to pose an adverse safety hazard for workers at AD facilities. Any potential safety hazards from airport or airstrip operations would be easy to recognize and avoid during the facility siting process. This issue will not be further discussed in the Program EIR.

g) The potential of dairy digester facilities to interfere with emergency response plans would be discussed in the Program EIR. Concurrence with local emergency response plans should be reviewed prior to implementation of project construction. This issue will be addressed in the Program EIR.

h) The production and concentration of gases increases the risk of fire. This risk would be further evaluated in the Program EIR. Several factors, including the proximity of wildlands to the project site, would be analyzed to determine the significance of this impact at the project level. This issue will be addressed in the Program EIR.

Hydrology and Water Quality

Issues (and Supporting Information Sources):		*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
8.	**HYDROLOGY AND WATER QUALITY—Would the project:**				
a)	Violate any water quality standards or waste discharge requirements?	☒	☐	☐	☐
b)	Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☒	☐
c)	Substantially alter the existing drainage pattern of a site or area through the alteration of the course of a stream or river, or by other means, in a manner that would result in substantial erosion or siltation on- or off-site?	☐	☒	☐	☐
d)	Substantially alter the existing drainage pattern of a site or area through the alteration of the course of a stream or river or, by other means, substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site?	☐	☒	☐	☐
e)	Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☒	☐	☐	☐
f)	Otherwise substantially degrade water quality?	☒	☐	☐	☐
g)	Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other authoritative flood hazard delineation map?	☐	☐	☐	☒
h)	Place within a 100-year flood hazard area structures that would impede or redirect flood flows?	☒	☐	☐	☐
i)	Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☒	☐	☐	☐
j)	Expose people or structures to a significant risk of loss, injury or death involving inundation by seiche, tsunami, or mudflow?	☐	☐	☒	☐

Discussion

a) Specific water quality constituents can be reduced (but not eliminated) by the AD process including pathogens and constituents causing odor. Additionally, nutrient concentrations can be reduced via diversion to a solid product stream, for re-use, under some AD setups.

However, substantial potential water quality effects may still occur, especially from the addition of a variety of co-digestion substrates. Of significant concern is salt loading associated with the AD process. Salts that occur in the AD feedstock, including dairy wastes as well as other potential supplementary feedstocks, could be concentrated in the effluent water. These salts would be discharged to land and could result in degradation of groundwater quality. Salt is already a significant problem in much of the project area, including most Central Valley areas south of the Delta. Additional salt loading that may occur as a result of operation of the AD facilities could result in a potentially significant impact to water quality.

Water from the AD process would be land-applied in support of agriculture, and would in most cases contain high levels of nutrients. If improperly managed, the land application of process water could result in the discharge of water containing nutrients, salts, pathogens, and other water quality constituents to nearby waterways, or to groundwater. Downstream surface water quality, and groundwater quality, could thereby be adversely affected. Co-digestion of dairy wastes with other feedstocks may also introduce other water quality constituents of concern to the discharged wastewater, including increased salt loads, and pre-processing of wastes may require the use of hazardous chemicals, or other procedures that could result in the release of water pollutants to the environment. These issues may be significant, and will be explored in greater detail in the Program EIR.

Most AD facilities would produce solid waste streams, as well as the liquid waste discussed above. These solid waste streams would be composed of solid digestate leftover from the AD process. Solid digestate could in most cases be put to beneficial use, however, depending on that use and the composition of the solid digestate, water quality constituents could be leached from the digestate and become entrained in natural waters. This situation could potentially result in water quality degradation.

If improperly managed, feedstock handling procedures at the digester site could result in the release of untreated dairy wastes (including associated pathogens and other water quality constituents) to receiving waters during rain events. These potential releases would in general be considered mitigable, based on the application of specific measures including sealing of the AD process system, and drainage and seepage control measures.

Various other potential water quality issues could also arise as a result of implementing the project. These include: (1) construction-related release of fuels, sediments, grease, and other construction related water quality pollutants; (2) during operations, treatment chemicals or other hazardous materials may be spilled on site and could migrate into surface or groundwater if improperly managed; and (3) impervious surfaces that would be installed, especially for larger centralized plants, (parking lots, sidewalks, plant facilities, etc) could result in the collection of water quality pollutants (brake dust, oil and fuels from automobiles, dirt, trash) and subsequent discharge of those pollutants to surface waters during storm events. These potential water quality impacts are generally considered mitigable, but will require further analysis within the Program EIR.

b) Under specific circumstances, installation of dairy facilities may result in the withdrawal of groundwater, resulting in increased drawdown within the underlying aquifer. It is not expected that this would result in a significant net increase in groundwater depletion because any new water would offset groundwater that would otherwise be pumped for the crops.

Groundwater depletion can also occur as a result of construction of extensive impervious surfaces, which prevent the infiltration of groundwater to the underlying aquifer. The proposed AD facilities would include the construction of some impervious surfaces, associated with roads and other facilities. However, these impervious surfaces would not be extensive, and are not anticipated to substantially interfere with groundwater recharge. Groundwater supply will not be further evaluated in the Program EIR.

c,d) Earthwork would consist of cutting and/or filling to produce gradients specific to each individual AD project. If improperly managed, grading activities could result in the entrainment of sediment in stormwater flows, resulting in erosion or siltation on-site or off-site. Improperly managed grading could also result in changes in the amount of stormwater discharged from a facility area, resulting in flooding on-site or downstream. During operations, improperly designed or sized stormwater conveyance systems could result in further erosion, sedimentation, and flooding. These potential impacts are common among most construction projects where grading would occur, and would be generally considered mitigable based on the application of Best Management Practices (BMPs) to control erosion, sedimentation, and stormwater management, and in compliance with state and local permitting requirements for stormwater discharges.

In general, AD projects are anticipated to be sited to avoid interference with stream channels and other existing drainages. However, siting of specific facilities at the project level may result in interference with existing streams or drainages. The Program EIR will investigate measures that can be applied to reduce interference with existing streams and other drainages. These issues will be explored in greater detail in the Program EIR.

e) As discussed previously, installation of AD facilities may result in new impervious surfaces, which can cause increases in stormwater runoff. It is expected that stormwater runoff from individual AD facilities would be channeled into retention basins (lagoons) for flood mitigation, and/or for water quality treatment. The Program EIR will review these potential issues, as well as relevant and applicable mitigation to reduce the intensity of potential impacts related to stormwater flows.

f) Potential water quality issues are discussed under impact a), above. Note also that at the project level, completion or update of Nutrient Management Plans would be required prior to application of effluent waters to croplands. The discharger would have to comply with the Standard Provisions and Reporting Requirements for Waste Discharge Requirements General Order No. R5-2007-0035 for Existing Milk Cow Dairies dated May 3, 2007 or individual Waste Discharge Requirements. These requirements, and associated water quality, would be further discussed in the Program EIR.

g) The proposed project would not include any housing and therefore would not place any housing in a 100-year flood hazard area. This issue will not be further evaluated in the Program EIR.

h) Substantial portions of the project area are located in a 100-year floodplain hazard area. Installation of specific AD facilities may therefore occur within 100-year floodplain hazard areas. The installation of these facilities could, in the event of a flood event, result in the alteration or displacement of flood flows. Mitigation measures for facilities located within a 100-year floodplain hazard area will be further discussed in the Program EIR.

i) Levees and dams are relatively common in the project area, and it is likely that some individual AD facilities would be sited in areas where the collapse of a dam or levee would result in a flooding hazard. These issues will be further discussed in the Program EIR.

j) The potential for tsunami in the Central Valley is low. The potential for seiche and mudflow throughout most of the Central Valley is low. These issues will not be further discussed in the Program EIR.

Land Use and Land Use Planning

Issues (and Supporting Information Sources):		*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
9.	**LAND USE AND LAND USE PLANNING— Would the project:**				
a)	Physically divide an established community?	☐	☐	☒	☐
b)	Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☒	☐	☐	☐
c)	Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☒	☐

Discussion

a) Dairy digester facilities do not present a significant threat of physically dividing an established community. Sites for the facilities would be fully contained within dairies or on specified parcels of land. If required, pipelines would be underground and would not divide communities except temporarily during construction periods. This impact would be less than significant and this issue will not be further evaluated in the Program EIR.

b) At the project level, dairy digester facilities would be designed to be consistent with applicable land use plans, policies, and regulations. In general, the facilities would be located on sites zoned for agriculture. Under this scenario, dairy manure management is an integral part of the agricultural use of the land and would not result in a significant land use conflicts. Central facilities may be located on either agricultural or industrially zoned lands. At the program level, this impact is generally considered less than significant, however to comprehensively evaluate various land use and planning circumstances throughout the project area jurisdictions, this issue will be evaluated in the Program EIR.

c) Major adopted plans in the CVWB’s jurisdictional area include the San Joaquin Multi-species Habitat Conservation and Open Space Plan, Natomas Basin HCP, Kern Water Bank Authority HCP/NCCP and East Contra Costa County HCP. The continuation and expansion of agricultural facilities is provided for in most HCPs. Centralized facilities may trigger the need for compliance measures, including site-specific surveys and payment of fees under adopted plans but would not create any substantial conflict. This impact will be less than significant and this issue will not be further evaluated in the Program EIR.

Mineral Resources

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
10. MINERAL RESOURCES—Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☒	☐
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☒	☐

Discussion

a, b) Dairy digester facilities would not be of significant size to prohibit recovery of known mineral resources of value to the region or state. Due to the availability of agricultural land and extent of dairy operations which avoid designated mineral resource areas, the project would not be expected to result in the loss of specific recovery sites. Less than significant impacts are anticipated in this regard and this issue will not be discussed in the Program EIR.

Noise

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
11. NOISE—Would the project:				
a) Result in exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☒	☐	☐	☐
b) Result in exposure of persons to, or generation of, excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐
c) Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☒	☐	☐	☐
d) Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☒	☐	☐	☐
e) For a project located within an airport land use plan area, or, where such a plan has not been adopted, in an area within two miles of a public airport or public use airport, would the project expose people residing or working in the area to excessive noise levels?	☐	☐	☒	☐
f) For a project located in the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☒	☐

Discussion

a) Construction and operation of dairy digesters would have the potential to expose noise-sensitive receptors in the vicinity of these AD facilities to noise levels in excess of the applicable standards. Noise levels associated with construction activities would generally be higher than the ambient noise levels. Noise may be generated by the transport of materials and construction personnel to the facility sites and/or construction activities at the site. This impact is potentially significant. The Program EIR will set forth best management practices, including limits on the hours of construction operations that would reduce the potential significance of this impact.

The project would result in the 24 hour/day operation of AD facilities. Additional noise sources and levels would depend on several factors, such as proximity to noise-sensitive receptors, type of facility (i.e., AD facilities on individual dairies versus centralized locations), and the increased truck traffic on the local roadway network (including haul trucks for co-digester facilities and for potential manure, digestate or biogas transport to centralized facilities). Further discussion of potential impacts on noise-sensitive receptors and mitigations to reduce impacts will be analyzed in the Program EIR.

b) Site preparation and construction may result in ground borne vibration associated with earth movement and similar activities. Although these temporary activities may cause perceptible ground borne vibration, such impacts are anticipated to be minimal and limited to the project site. Operation of the project would not involve any activity that would produce any substantial groundborne noise or vibration. This issue will not be further evaluated in the Program EIR.

c) As discussed under issue “a” above, permanent increases in ambient noise levels from dairy digester operations will be analyzed in the Program EIR.

d) As discussed under issue “a” above, temporary increases in ambient noise levels from dairy digester construction will be analyzed in the Program EIR.

e, f) Even if a dairy digester were near an airport or private airstrip, the noise from the aircraft activities would be unlikely to expose people at the AD facility to excessive noise levels. Dairy digester facilities would not be considered sensitive receptors with regard to noise generated by off-site activities. Any potential impact from aircraft noise would be easy to recognize and avoid during the facility siting process. This issue will not be further discussed in the Program EIR.

Population and Housing

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
12. POPULATION AND HOUSING— Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☒	☐
b) Displace substantial numbers of existing housing units, necessitating the construction of replacement housing elsewhere?	☐	☐	☒	☐
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☒	☐

Discussion

a) Dairy digester operation would create a small number of jobs throughout the Central Valley region; however, this increase would not be considered substantial. The project does not involve the construction of features (i.e. roads, residences) that would induce population growth. Biogas generated by the AD facilities would provide for an existing need for renewable energy and is not proposed to be used for new off-site developments. Therefore, less than significant impacts would occur and this issue will not be further evaluated in the Program EIR.

b) Dairy digester facilities would not displace residences, as they would be located on, or in the vicinity of dairies. No significant impacts to existing housing would occur and this issue will not be further evaluated in the Program EIR.

c) Dairy digester facilities would be located on dairies, or in the immediate vicinity of dairies, and would not displace people. No significant impact would occur and this issue will not be further evaluated in the Program EIR.

Public Services

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
13. PUBLIC SERVICES— Would the project:				
a) Result in substantial adverse physical impacts associated with the provision of, or the need for, new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services:				
i) Fire protection?	☒	☐	☐	☐
ii) Police protection?	☐	☐	☐	☒
iii) Schools?	☐	☐	☐	☒
iv) Parks?	☐	☐	☐	☒
v) Other public facilities?	☒	☐	☐	☐

Discussion

a.i) The dairy digester and support facilities would be designed to meet the standards of the 2007 California Fire Code. All gas pipeline projects delivering gas through a distribution system must be designed and constructed to meet or exceed the Federal safety standards established in 49 Code of Federal Regulations Part 192. Installation of any pipelines in accordance with these standards would reduce the potential for fire. However, because the dairy digesters would result in the accumulation of methane and other gases that are flammable, this issue will be analyzed in the Program EIR.

a.ii) Installation of dairy digester facilities would not change the amount of police protection required at dairies. No impact would occur and this issue will not be further evaluated in the Program EIR.

a.iii) Dairy digester facilities would not include any new housing and would not generate any new students. Therefore, the proposed project would have no effect on schools and this issue will not be further evaluated in the Program EIR.

a.iv) Dairy digester facilities would not include any new housing and would not generate any new users of public parks. Therefore, the proposed project would have no effect on parks and this issue will not be further evaluated in the Program EIR.

a.v) The Program EIR will evaluate options for new dairy digester facilities to connect to or add to the existing natural gas infrastructure network.

Recreation

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
14. RECREATION— Would the project:				
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facilities would occur or be accelerated?	☐	☐	☐	☒
b) Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	☐	☐	☐	☒

Discussion

a, b) Dairy digester facilities would not induce population growth and thus would not increase use or demand for recreational facilities. The project description does not include recreational facilities. Considering these factors the project would have no impact on recreation. This issue will not be addressed in the Program EIR.

Transportation and Traffic

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
15. TRANSPORTATION AND TRAFFIC— Would the project:				
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☒	☐	☐	☐
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	☒	☐	☐	☐
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location, that results in substantial safety risks?	☐	☐	☐	☒
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒
e) Result in inadequate emergency access?	☐	☐	☒	☐
f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	☐	☐	☐	☒

Discussion

a, b) Dairy digester construction would generally result in the temporary addition of construction-related vehicle trips, including employee commuter trips and the delivery of construction materials and equipment. The existing circulation system in the Central Valley is generally not overburdened and capable of handling additional traffic volumes. As such, construction traffic generated by AD facilities would generally be considered negligible, and would not conflict with applicable plans, ordinances, policies, or programs.

AD facilities could add potential truck trips to haul organic materials to co-digester facilities and/or manure to dairies or central facility locations. In addition, AD facilities could result in increased employee traffic. The increase in traffic associated with AD facilities could conflict with applicable plans, ordinances, policies, or programs, and result in a potentially significant impact to existing roadways. Detail on the expected two-way vehicle trips generated for each of the proposed AD facility types will be analyzed in the Program EIR.

c) Air traffic patterns generally would not be affected by the installation of AD facilities. No impact would occur. This will not be further analyzed in the Program EIR.

d) Installation of AD facilities would not alter, or substantially change the type of equipment utilizing, existing roadways. Where employed pipelines would likely occur within road rights of way. Construction in the Caltrans right of way would require an encroachment permit. No increase in hazards due to a design feature or incompatible use would occur. This will not be further analyzed in the Program EIR.

e) Due to the relatively small footprint of AD facilities in comparison to the size of the dairies, it is not anticipated that development of AD facilities would affect emergency vehicle access. This issue will not be analyzed in the Program EIR.

f) AD facilities would not affect or alter existing alternative transportation facilities, nor interfere with the construction of any future alternative transportation facilities. This will not be further analyzed in the Program EIR.

Utilities and Service Systems

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
16. UTILITIES AND SERVICE SYSTEMS— Would the project:				
a) Conflict with wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☒	☐	☐	☐
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☒	☐	☐	☐
c) Require or result in the construction of new storm water drainage facilities, or expansion of existing facilities, the construction of which could cause significant environmental effects?	☒	☐	☐	☐
d) Require new or expanded water supply resources or entitlements?	☒	☐	☐	☐
e) Result in a determination by the wastewater treatment provider that would serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☒	☐	☐	☐
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☒	☐
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	☒

Discussion

a) The project would result in modification of the existing wastewater discharge systems at dairies or centralized facilities. Effluent from the digestion process would require storage and disposal through land application. As discussed above for Hydrology and Water Quality, this impact will be discussed in the Program EIR. The dairies would be required to control the amount of nutrients applied to land.

b, d) The construction of dairy digesters could create the need for new or expanded water and wastewater facilities at dairies and at centralized facilities. The majority of dairies utilize private water and wastewater systems which may need to be expanded. The Program EIR will address any additional water/wastewater demands created by the project.

c) Dairy digester facilities would create a demand for new or expanded stormwater drainage facilities. Runoff would be channeled to on-site ponds which may need to be resized to accommodate increased impervious surfaces from the project. The Program EIR will address the additional stormwater facilities created by the project and provide applicable best management practices.

e) The dairy digester facilities could create liquid waste streams which could require treatment by public wastewater treatment systems. The Program EIR will address whether public wastewater providers would be utilized and to what extent.

f) The dairy digesters and central facilities would not be expected to generate substantial amounts of solid waste that would be disposed of at landfills. This will not be further evaluated in the Program EIR.

g) The project would comply with federal, state, and local statutes and regulations related to solid waste. No impact would occur; this issue will not be discussed in the Program EIR.

Mandatory Findings of Significance

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
17. MANDATORY FINDINGS OF SIGNIFICANCE—Would the project:				
a) Have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?	☒	☐	☐	☐
b) Have impacts that would be individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)	☒	☐	☐	☐
c) Have environmental effects that would cause substantial adverse effects on human beings, either directly or indirectly?	☒	☐	☐	☐

Discussion

a) AD facilities would be constructed on dairies or on other centrally located parcels. There is a potential for the project, without mitigation, to adversely affect biological and cultural resources, including fish and wildlife species, natural habitat, and significant cultural resources. These issues will be addressed in the Program EIR.

b) There is a potential for the project to result in effects on the environment that would be cumulatively considerable, such as air quality impacts. Cumulative impacts will be addressed by issue area in the Program EIR.

c) As discussed above in the Hazards and Hazardous Materials section, there is a potential for hazardous impacts that could affect humans. Air pollutant emissions from AD facilities could also have a substantial adverse effect on humans. These issues will be addressed in the Program EIR.

References

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National Park Service. 1983. *Archaeology and Historic Preservation; Secretary of the Interior's Standards and Guidelines: Professional Qualifications Standards*. Electronic document, http://www.cr.nps.gov/local-law/arch_stnds_9.htm.

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JRMA
ARCHITECTS ENGINEERS

EDCO Recovery and Transfer
CAP Checklist Memo

May 01, 2018

The Owner proposes to improve and expand on their existing Transfer Station located at 3600 Dalbergia Street, San Diego California. The improvements will include a new Material Recovery Facility (MRF), new Anaerobic Digestion facility, new CNG facility new loadout area, new 2-story office and related site developments. The facility will be expanded to include the adjacent alley to the east and a parcel to the north. The total site area is 88,810 sf. The total proposed building area will be 60,680 sf.

This narrative establishes the framework for achieving the Owner's Sustain Design Goals and aligning these goals with the City of San Diego's Climate Action Plan(CAP). Additionally, the project will meet or exceed the mandatory requirements of CAL Green and work towards achieving a Silver certification under LEED version 4 (see exhibit attached).

The following measures will be implemented to satisfy the City of San Diego's Climate Action Plan strategies.

Step 2

1. All roofing material will have an initial SRI equal to or greater than 82 and be rated by the Cool Roof Rating Council.

2. Indoor Water Use Reduction:
   A. Plumbing fixtures and fittings will not exceed the maximum flow rates listed in Table A5.303.2.3.1 of the California Green Building Standards
   B. All appliances and fixtures will meet or exceed the provisions of Section A5.303.3 of the California Green Building Standards.

3. The project will reduce energy demands through the use of energy efficient lighting and mechanical systems. Photovoltaic panels will be installed over the office area.

4. Of the 3% of the total required parking spaces (3% of 29= .087 spaces, or 1 space) half will be "ready for use". As such, one electric vehicle parking space is being provided "ready for use"..

5. The facility includes changing rooms and both short term and long term bicycle parking spaces. Racks for 3 bicycles will be provided outside next to proposed main office entry, and 3 lockers are provided inside the building. The provided racks and lockers will exceed the Municipal Code requirements regarding short-and long-term bicycle parking spaces.

6. Changing Rooms have been included on the first floor of the Office Building. Lockers are included inside the Changing Rooms. The project will meet the requirements for the current CAL- Green Code. 1 shower per sex will be provided. More than 2 lockers for each sex will be provided.

7. The project will include a combination of these for a total of 4 parking spaces for low-emitting/fuel-efficient, and carpool/vanpool vehicles..

8. The expanded facility will receive material during 5:00am – 7:00pm Mon-Sat, with no restrictions on internal processing. There will be two shifts; each havning no more than 25-28 workers. On-site parking will be limited to visitors and operational personnel. To encourage the use of alternate forms of transportation, the Owner will install short term and long term bicycle parking options as mentioned above. In addition, within a ¼ mile of facility are two transit stops operated by the San Diego Metropolitan Transit System. The facility is also located near residential areas accessed by Vesta Street, and there are also several commercial entities located on nearby Main Street.

If questions arise based on these explanations, please contact our office.

Kyle A Rausch
Project Manager

Joanne Haye
Sustainable Lead Associate

End of Memo

CLIMATE ACTION PLAN
CONSISTENCY CHECKLIST INTRODUCTION

In December 2015, the City adopted a Climate Action Plan (CAP) that outlines the actions that City will undertake to achieve its proportional share of State greenhouse gas (GHG) emission reductions. The purpose of the Climate Action Plan Consistency Checklist (Checklist) is to, in conjunction with the CAP, provide a streamlined review process for proposed new development projects that are subject to discretionary review and trigger environmental review pursuant to the California Environmental Quality Act (CEQA).[1]

Analysis of GHG emissions and potential climate change impacts from new development is required under CEQA. The CAP is a plan for the reduction of GHG emissions in accordance with CEQA Guidelines Section 15183.5. Pursuant to CEQA Guidelines Sections 15064(h)(3), 15130(d), and 15183(b), a project's incremental contribution to a cumulative GHG emissions effect may be determined not to be cumulatively considerable if it complies with the requirements of the CAP.

This Checklist is part of the CAP and contains measures that are required to be implemented on a project-by-project basis to ensure that the specified emissions targets identified in the CAP are achieved. Implementation of these measures would ensure that new development is consistent with the CAP's assumptions for relevant CAP strategies toward achieving the identified GHG reduction targets. Projects that are consistent with the CAP as determined through the use of this Checklist may rely on the CAP for the cumulative impacts analysis of GHG emissions. Projects that are not consistent with the CAP must prepare a comprehensive project-specific analysis of GHG emissions, including quantification of existing and projected GHG emissions and incorporation of the measures in this Checklist to the extent feasible. Cumulative GHG impacts would be significant for any project that is not consistent with the CAP.

The Checklist may be updated to incorporate new GHG reduction techniques or to comply with later amendments to the CAP or local, State, or federal law.

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[1] Certain projects seeking ministerial approval may be required to complete the Checklist. For example, projects in a Community Plan Implementation Overlay Zone may be required to use the Checklist to qualify for ministerial level review. See Supplemental Development Regulations in the project's community plan to determine applicability.

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CAP CONSISTENCY CHECKLIST SUBMITTAL APPLICATION

- The Checklist is required only for projects subject to CEQA review.[2]
- If required, the Checklist must be included in the project submittal package. Application submittal procedures can be found in Chapter 11: Land Development Procedures of the City's Municipal Code.
- The requirements in the Checklist will be included in the project's conditions of approval.
- The applicant must provide an explanation of how the proposed project will implement the requirements described herein to the satisfaction of the Planning Department.

Application Information

Contact Information

Project No./Name: 515674 / EDCO Recovery & Transfer

Property Address: 3660 Dalbergia Street

Applicant Name/Co.: Steve South / EDCO

Contact Phone: 760-744-5615

Contact Email: ssouth@edcodisposal.com

Was a consultant retained to complete this checklist? ■ Yes ☐ No If Yes, complete the following

Consultant Name: Kyle Rausch

Contact Phone: 714-524-1870

Company Name: JR Miller & Associates

Contact Email: kyler@jrma.com

Project Information

1. What is the size of the project (acres)? 88,810 SF (2.04 acres)
2. Identify all applicable proposed land uses:
   - ☐ Residential (indicate # of single-family units):
   - ☐ Residential (indicate # of multi-family units):
   - ☐ Commercial (total square footage):
   - ■ Industrial (total square footage): 60,680
   - ☐ Other (describe):
3. Is the project or a portion of the project located in a Transit Priority Area? ☐ Yes ☐ No
4. Provide a brief description of the project proposed:

Improve and expand existing Transfer Station to include a new Material Recovery Facility, new loadout area, new office, new Anaerobic Digestion Facility, new CNG Facility, and related site improvements. Improvements and expansion will be master planned to accommodate phasing of the project. Site will be expanded to include the adjacent alley to the east and parcel to the north.

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[2] Certain projects seeking ministerial approval may be required to complete the Checklist. For example, projects in a Community Plan Implementation Overlay Zone may be required to use the Checklist to qualify for ministerial level review. See Supplemental Development Regulations in the project's community plan to determine applicability.

CAP CONSISTENCY CHECKLIST QUESTIONS

Step 1: Land Use Consistency

The first step in determining CAP consistency for discretionary development projects is to assess the project's consistency with the growth projections used in the development of the CAP. This section allows the City to determine a project's consistency with the land use assumptions used in the CAP.

Step 1: Land Use Consistency		
Checklist Item (Check the appropriate box and provide explanation and supporting documentation for your answer)	Yes	No
A. Is the proposed project consistent with the existing General Plan and Community Plan land use and zoning designations?;[3] OR, B. If the proposed project is not consistent with the existing land use plan and zoning designations, and includes a land use plan and/or zoning designation amendment, would the proposed amendment result in an increased density within a Transit Priority Area (TPA)[4] and implement CAP Strategy 3 actions, as determined in Step 3 to the satisfaction of the Development Services Department?; OR, C. If the proposed project is not consistent with the existing land use plan and zoning designations, does the project include a land use plan and/or zoning designation amendment that would result in an equivalent or less GHG-intensive project when compared to the existing designations?	☑	☐

If "***Yes***," proceed to Step 2 of the Checklist. For question B above, complete Step 3. For question C above, provide estimated project emissions under both existing and proposed designation(s) for comparison. Compare the maximum buildout of the existing designation and the maximum buildout of the proposed designation.

If "***No***," in accordance with the City's Significance Determination Thresholds, the project's GHG impact is significant. The project must nonetheless incorporate each of the measures identified in Step 2 to mitigate cumulative GHG emissions impacts unless the decision maker finds that a measure is infeasible in accordance with CEQA Guidelines Section 15091. Proceed and complete Step 2 of the Checklist.

The proposed project is consistent with the General Plan which identifies the site as Industrial; additionally, the project is consistent with the Barrio Logan Community Plan which designates the site as Residential/Commercial/Industrial. Lastly, the project is consistent with the requirements of Subdistrict B Zone of the Barrio Logan Planned District

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[3] This question may also be answered in the affirmative if the project is consistent with SANDAG Series 12 growth projections, which were used to determine the CAP projections, as determined by the Planning Department.

[4] This category applies to all projects that answered in the affirmative to question 3 on the previous page: Is the project or a portion of the project located in a transit priority area.

Step 2: CAP Strategies Consistency

The second step of the CAP consistency review is to review and evaluate a project's consistency with the applicable strategies and actions of the CAP.   Step 2 only applies to development projects that involve permits that would require a certificate of occupancy from the Building Official or projects comprised of one and two family dwellings or townhouses as defined in the California Residential Code and their accessory structures.[5] All other development projects that would not require a certificate of occupancy from the Building Official shall implement Best Management Practices for construction activities as set forth in the Greenbook (for public projects).

Step 2: CAP Strategies Consistency			
Checklist Item (Check the appropriate box and provide explanation for your answer)	Yes	No	N/A
Strategy 1: Energy & Water Efficient Buildings			
1. *Cool/Green Roofs*. • Would the project include roofing materials with a minimum 3-year aged solar reflection and thermal emittance or solar reflection index equal to or greater than the values specified in the voluntary measures under California Green Building Standards Code (Attachment A)?; <u>OR</u> • Would the project roof construction have a thermal mass over the roof membrane, including areas of vegetated (green) roofs, weighing at least 25 pounds per square foot as specified in the voluntary measures under California Green Building Standards Code?; <u>OR</u> • Would the project include a combination of the above two options? Check "N/A" only if the project does not include a roof component. The project will utilize metal roof panels with an SRI rating of 82	☑	☐	☐

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[5] Actions that are not subject to Step 2 would include, for example: 1) discretionary map actions that do not propose specific development, 2) permits allowing wireless communication facilities, 3) special events permits, 4) use permits or other permits that do not result in the expansion or enlargement of a building (e.g., decks, garages, etc.), and 5) non-building infrastructure projects such as roads and pipelines. Because such actions would not result in new occupancy buildings from which GHG emissions reductions could be achieved, the items contained in Step 2 would not be applicable.

2. *Plumbing fixtures and fittings* With respect to plumbing fixtures or fittings provided as part of the project, would those low-flow fixtures/appliances be consistent with each of the following: Residential buildings: • Kitchen faucets: maximum flow rate not to exceed 1.5 gallons per minute at 60 psi; • Standard dishwashers: 4.25 gallons per cycle; • Compact dishwashers: 3.5 gallons per cycle; and • Clothes washers: water factor of 6 gallons per cubic feet of drum capacity? Nonresidential buildings: • Plumbing fixtures and fittings that do not exceed the maximum flow rate specified in Table A5.303.2.3.1 (voluntary measures) of the California Green Building Standards Code (See Attachment A); and • Appliances and fixtures for commercial applications that meet the provisions of Section A5.303.3 (voluntary measures) of the California Green Building Standards Code (See Attachment A)? Check "N/A" only if the project does not include any plumbing fixtures or fittings. Low-flow plumbing fixtures and fitting shall meet or exceed the requirements listed in CAL Green Table A5.303.2.3.1. Appliances and fixtures will comply with California Green Building Standards	☑	☐	☐

Strategy 3: Bicycling, Walking, Transit & Land Use

3. *Electric Vehicle Charging*

- <u>Multiple-family projects of 17 dwelling units or less</u>: Would 3% of the total parking spaces required, or a minimum of one space, whichever is greater, be provided with a listed cabinet, box or enclosure connected to a conduit linking the parking spaces with the electrical service, in a manner approved by the building and safety official, to allow for the future installation of electric vehicle supply equipment to provide electric vehicle charging stations at such time as it is needed for use by residents?

- <u>Multiple-family projects of more than 17 dwelling units</u>: Of the total required listed cabinets, boxes or enclosures, would 50% have the necessary electric vehicle supply equipment installed to provide active electric vehicle charging stations ready for use by residents?

- <u>Non-residential projects</u>: Of the total required listed cabinets, boxes or enclosures, would 50% have the necessary electric vehicle supply equipment installed to provide active electric vehicle charging stations ready for use?

☑ ☐ ☐

Check "N/A" only if the project is a single-family project or would not require the provision of listed cabinets, boxes, or enclosures connected to a conduit linking the parking spaces with electrical service, e.g., projects requiring fewer than 10 parking spaces.

Of the 3% of the total required parking spaces (3% of 29= .087 spaces, or 1 space) half will be "ready for use". As such, one electric vehicle parking space is being provided "ready for use".

Strategy 3: Bicycling, Walking, Transit & Land Use
(Complete this section if project includes non-residential or mixed uses)

4. *Bicycle Parking Spaces*

Would the project provide more short- and long-term bicycle parking spaces than required in the City's Municipal Code (Chapter 14, Article 2, Division 5)?[6]

Check "N/A" only if the project is a residential project.

☑ ☐ ☐

Racks for 3 bicycles will be provided outside next to proposed main office entry, and 3 lockers are provided inside the building. The provided racks and lockers will exceed the Municipal Code requirements regarding short-and long-term bicycle parking spaces

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[6] Non-portable bicycle corrals within 600 feet of project frontage can be counted towards the project's bicycle parking requirements.

5. *Shower facilities*

If the project includes nonresidential development that would accommodate over 10 tenant occupants (employees), would the project include changing/shower facilities in accordance with the voluntary measures under the California Green Building Standards Code as shown in the table below?

Number of Tenant Occupants (Employees)	Shower/Changing Facilities Required	Two-Tier (12" X 15" X 72") Personal Effects Lockers Required
0-10	0	0
11-50	1 shower stall	2
51-100	1 shower stall	3
101-200	1 shower stall	4
Over 200	1 shower stall plus 1 additional shower stall for each 200 additional tenant-occupants	1 two-tier locker plus 1 two-tier locker for each 50 additional tenant-occupants

Check "N/A" only if the project is a residential project, or if it does not include nonresidential development that would accommodate over 10 tenant occupants (employees).

The project will meet the requirements for the current CAL-Green Code. 1 shower per sex will be provided. More than 2 lockers for each sex will be provided.

☑ ☐ ☐

6. *Designated Parking Spaces*

If the project includes a nonresidential use in a TPA, would the project provide designated parking for a combination of low-emitting, fuel-efficient, and carpool/vanpool vehicles in accordance with the following table?

Number of Required Parking Spaces	**Number of Designated Parking Spaces**
0-9	0
10-25	2
26-50	4
51-75	6
76-100	9
101-150	11
151-200	18
201 and over	At least 10% of total

This measure does not cover electric vehicles. See Question 4 for electric vehicle parking requirements.

Note: Vehicles bearing Clean Air Vehicle stickers from expired HOV lane programs may be considered eligible for designated parking spaces. The required designated parking spaces are to be provided within the overall minimum parking requirement, not in addition to it.

Check "N/A" only if the project is a residential project, or if it does not include nonresidential use in a TPA.

The project will include a combination of these for a total of 4 parking spaces for low-emitting/fuel-efficient, and carpool/vanpool vehicles.

☑ ☐ ☐

7. *Transportation Demand Management Program*

If the project would accommodate over 50 tenant-occupants (employees), would it include a transportation demand management program that would be applicable to existing tenants and future tenants that includes:

At least one of the following components:

- Parking cash out program
- Parking management plan that includes charging employees market-rate for single-occupancy vehicle parking and providing reserved, discounted, or free spaces for registered carpools or vanpools
- Unbundled parking whereby parking spaces would be leased or sold separately from the rental or purchase fees for the development for the life of the development

And at least three of the following components:

- Commitment to maintaining an employer network in the SANDAG iCommute program and promoting its RideMatcher service to tenants/employees
- On-site carsharing vehicle(s) or bikesharing
- Flexible or alternative work hours
- Telework program
- Transit, carpool, and vanpool subsidies
- Pre-tax deduction for transit or vanpool fares and bicycle commute costs
- Access to services that reduce the need to drive, such as cafes, commercial stores, banks, post offices, restaurants, gyms, or childcare, either onsite or within 1,320 feet (1/4 mile) of the structure/use?

Check "N/A" only if the project is a residential project or if it would not accommodate over 50 tenant-occupants (employees).

☐ ☐ ☐

The project will not have 50 or more occupants during any shift.

Step 3: Project CAP Conformance Evaluation (if applicable)

The third step of the CAP consistency review only applies if Step 1 is answered in the affirmative under option B. The purpose of this step is to determine whether a project that is located in a TPA but that includes a land use plan and/or zoning designation amendment is nevertheless consistent with the assumptions in the CAP because it would implement CAP Strategy 3 actions. In general, a project that would result in a reduction in density inside a TPA would not be consistent with Strategy 3.The following questions must each be answered in the affirmative and fully explained.

1. **Would the proposed project implement the General Plan's City of Villages strategy in an identified Transit Priority Area (TPA) that will result in an increase in the capacity for transit-supportive residential and/or employment densities?**

   Considerations for this question:
   - Does the proposed land use and zoning designation associated with the project provide capacity for transit-supportive residential densities within the TPA?
   - Is the project site suitable to accommodate mixed-use village development, as defined in the General Plan, within the TPA?
   - Does the land use and zoning associated with the project increase the capacity for transit-supportive employment intensities within the TPA?

2. **Would the proposed project implement the General Plan's Mobility Element in Transit Priority Areas to increase the use of transit?**

   Considerations for this question:
   - Does the proposed project support/incorporate identified transit routes and stops/stations?
   - Does the project include transit priority measures?

3. **Would the proposed project implement pedestrian improvements in Transit Priority Areas to increase walking opportunities?**

   Considerations for this question:
   - Does the proposed project circulation system provide multiple and direct pedestrian connections and accessibility to local activity centers (such as transit stations, schools, shopping centers, and libraries)?
   - Does the proposed project urban design include features for walkability to promote a transit supportive environment?

4. **Would the proposed project implement the City of San Diego's Bicycle Master Plan to increase bicycling opportunities?**

   Considerations for this question:
   - Does the proposed project circulation system include bicycle improvements consistent with the Bicycle Master Plan?
   - Does the overall project circulation system provide a balanced, multimodal, "complete streets" approach to accommodate mobility needs of all users?

5. **Would the proposed project incorporate implementation mechanisms that support Transit Oriented Development?**

   Considerations for this question:
   - Does the proposed project include new or expanded urban public spaces such as plazas, pocket parks, or urban greens in the TPA?
   - Does the land use and zoning associated with the proposed project increase the potential for jobs within the TPA?
   - Do the zoning/implementing regulations associated with the proposed project support the efficient use of parking through mechanisms such as: shared parking, parking districts, unbundled parking, reduced parking, paid or time-limited parking, etc.?

6. **Would the proposed project implement the Urban Forest Management Plan to increase urban tree canopy coverage?**

   Considerations for this question:
   - Does the proposed project provide at least three different species for the primary, secondary and accent trees in order to accommodate varying parkway widths?
   - Does the proposed project include policies or strategies for preserving existing trees?
   - Does the proposed project incorporate tree planting that will contribute to the City's 20% urban canopy tree coverage goal?

CLIMATE ACTION PLAN CONSISTENCY CHECKLIST
ATTACHMENT A

This attachment provides performance standards for applicable Climate Action Pan (CAP) Consistency Checklist measures.

Table 1 **Roof Design Values for Question 1: Cool/Green Roofs supporting Strategy 1: Energy & Water Efficient Buildings of the Climate Action Plan**

Land Use Type	Roof Slope	Minimum 3-Year Aged Solar Reflectance	Thermal Emittance	Solar Reflective Index
Low-Rise Residential	≤ 2:12	0.55	0.75	64
	> 2:12	0.20	0.75	16
High-Rise Residential Buildings, Hotels and Motels	≤ 2:12	0.55	0.75	64
	> 2:12	0.20	0.75	16
Non-Residential	≤ 2:12	0.55	0.75	64
	> 2:12	0.20	0.75	16

Source: Adapted from the California Green Building Standards Code (CALGreen) Tier 1 residential and non-residential voluntary measures shown in Tables A4.106.5.1 and A5.106.11.2.2, respectively. Roof installation and verification shall occur in accordance with the CALGreen Code.

CALGreen does not include recommended values for low-rise residential buildings with roof slopes of ≤ 2:12 for San Diego's climate zones (7 and 10). Therefore, the values for climate zone 15 that covers Imperial County are adapted here.

Solar Reflectance Index (SRI) equal to or greater than the values specified in this table may be used as an alternative to compliance with the aged solar reflectance values and thermal emittance.

Table 2 **Fixture Flow Rates for Non-Residential Buildings related to Question 2: Plumbing Fixtures and Fittings supporting Strategy 1: Energy & Water Efficient Buildings of the Climate Action Plan**

Fixture Type	Maximum Flow Rate
Showerheads	1.8 gpm @ 80 psi
Lavatory Faucets	0.35 gpm @60 psi
Kitchen Faucets	1.6 gpm @ 60 psi
Wash Fountains	1.6 [rim space(in.)/20 gpm @ 60 psi]
Metering Faucets	0.18 gallons/cycle
Metering Faucets for Wash Fountains	0.18 [rim space(in.)/20 gpm @ 60 psi]
Gravity Tank-type Water Closets	1.12 gallons/flush
Flushometer Tank Water Closets	1.12 gallons/flush
Flushometer Valve Water Closets	1.12 gallons/flush
Electromechanical Hydraulic Water Closets	1.12 gallons/flush
Urinals	0.5 gallons/flush

Source: Adapted from the California Green Building Standards Code (CALGreen) Tier 1 non-residential voluntary measures shown in Tables A5.303.2.3.1 and A5.106.11.2.2, respectively. See the California Plumbing Code for definitions of each fixture type.

Where complying faucets are unavailable, aerators rated at 0.35 gpm or other means may be used to achieve reduction.

Acronyms:
gpm = gallons per minute
psi = pounds per square inch (unit of pressure)
in. = inch

Table 3 **Standards for Appliances and Fixtures for Commercial Application related to Question 2: Plumbing Fixtures and Fittings supporting Strategy 1: Energy & Water Efficient Buildings of the Climate Action Plan**

Appliance/Fixture Type	Standard	
Clothes Washers	Maximum Water Factor (WF) that will reduce the use of water by 10 percent below the California Energy Commissions' WF standards for commercial clothes washers located in Title 20 of the *California Code of Regulations.*	
Conveyor-type Dishwashers	0.70 maximum gallons per rack (2.6 L) (High-Temperature)	0.62 maximum gallons per rack (4.4 L) (Chemical)
Door-type Dishwashers	0.95 maximum gallons per rack (3.6 L) (High-Temperature)	1.16 maximum gallons per rack (2.6 L) (Chemical)
Undercounter-type Dishwashers	0.90 maximum gallons per rack (3.4 L) (High-Temperature)	0.98 maximum gallons per rack (3.7 L) (Chemical)
Combination Ovens	Consume no more than 10 gallons per hour (38 L/h) in the full operational mode.	
Commercial Pre-rinse Spray Valves (manufactured on or after January 1, 2006)	Function at equal to or less than 1.6 gallons per minute (0.10 L/s) at 60 psi (414 kPa) and • Be capable of cleaning 60 plates in an average time of not more than 30 seconds per plate. • Be equipped with an integral automatic shutoff. • Operate at static pressure of at least 30 psi (207 kPa) when designed for a flow rate of 1.3 gallons per minute (0.08 L/s) or less.	

Source: Adapted from the California Green Building Standards Code (CALGreen) Tier 1 non-residential voluntary measures shown in Section A5.303.3. See the California Plumbing Code for definitions of each appliance/fixture type.

Acronyms:
L = liter
L/h = liters per hour
L/s = liters per second
psi = pounds per square inch (unit of pressure)
kPa = kilopascal (unit of pressure)

GEOCON
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GEOTECHNICAL
ENVIRONMENTAL
MATERIALS

GEOTECHNICAL INVESTIGATION

EDCO MATERIAL RECOVERY FACILITY AND TRANSFER STATION EXPANSION
3660 DALBERGIA STREET
SAN DIEGO, CALIFORNIA

PREPARED FOR

EDCO
SAN MARCOS, CALIFORNIA

SEPTEMBER 7, 2016
PROJECT NO. G2010-32-01

GEOCON
INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS

Project No. G2010-32-01
September 7, 2016

EDCO
224 Las Posas Road
San Marcos, California 92078

Attention: Mr. Steve South

Subject: GEOTECHNICAL INVESTIGATION
EDCO MATERIAL RECOVERY FACILITY AND
TRANSFER STATION EXPANSION
3660 DALBERGIA STREET
SAN DIEGO, CALIFORNIA

Dear Mr. South:

In accordance with your request, and our Proposal No. LG-16217 dated June 17, 2016, we have performed a geotechnical investigation for the proposed expansion to the existing facility on Dalbergia Street in San Diego, California. The accompanying report presents our conclusions and recommendations pertaining to the geotechnical aspects of expanding the proposed facility. The results of our study indicate that the site can be developed as planned, provided the recommendations of this report are followed.

If there are any questions regarding this report, or if we may be of further service, please contact the undersigned at your convenience.

Very truly yours,

GEOCON INCORPORATED

Joseph P. Pagnillo
PG 9290

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(3) Addressee
(e-mail) JRM&A
Attention: Mr. Don Amerson

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GEOTECHNICAL INVESTIGATION

1. PURPOSE AND SCOPE

This report presents the findings of a geotechnical investigation for a proposed expansion of the EDCO Material Recovery Facility and Transfer Station located in the City of San Diego, California (see Vicinity Map, Figure 1). The purpose of the study was to investigate the soil and geologic conditions at the site, as well as geotechnical constraints (if any) that may impact construction of the proposed improvements. This report provides recommendations pertinent to the geotechnical engineering aspects of constructing the expansion to the existing facility as proposed.

The scope of our study consisted of the following:

- Reviewing satellite imagery, and readily available published and unpublished geologic literature.
- Reviewing the conceptual site plan prepared by JRM&A.
- Drilling four exploratory borings using a truck mounted hollow-stem auger drill rig to evaluate the underlying geologic conditions across the site (see Appendix A for boring logs). Two infiltration tests were also performed to evaluate storm water BMP feasibility.
- Performing laboratory tests on selected soil samples collected to evaluate their physical properties (see Appendix B).
- Providing storm water BMP design information (see Appendix C).
- Preparing this report presenting our exploratory information and our conclusions and recommendations regarding the geotechnical aspects of expanding the site as presently proposed. The approximate locations of the subsurface excavations are shown on the *Geologic Map*, Figure 2.

2. SITE AND PROJECT DESCRIPTION

The existing facility and expansion area consists of two parcels encompassing approximately 2-acres of developed land located on Dalbergia Street in San Diego, California. The property is bounded by Dalbergia Street to the southwest, Vesta Street to the southeast, Interstate 5 to the northeast, and a commercial/light industrial business occupying a parcel to the northwest. The majority of the property is developed and currently used as a waste disposal and material transfer facility, with the exception of the parcel to the northwest, which is relatively vacant. This adjacent parcel was previously a residential development with several structures and a driveway. The structures have been removed but the driveway remains. This vacant parcel is part of the expansion area. The existing building is approximately 28,750 square feet with concrete pavement to the north, east, and south.

Topographically, the site is relatively flat. Elevations range between approximately 28 feet above Mean Sea Level (MSL) to the north to approximately 22 feet (MSL) to the south. An existing slope ascends to the northeast as part of the on-ramp to Interstate 5.

It is our understanding that the proposed expansion will consist of upgrading and expanding the existing waste disposal and transfer facility from approximately 200 to 750 tons per day. The main warehouse will be expanded approximately 12,250 square feet and the overall site increased by 21,000 square feet. In addition, the structures located at 3628 and 3636 Dalbergia Street will be removed, fully enclosing the main facility, relocating the scale and scale house, and adding an additional restroom and lunchroom. Landscaping improvements will be performed to accommodate proposed bioretention basins for storm water management. Concrete and asphalt concrete paving is shown surrounding the new building and expansion areas.

The locations and descriptions of the site and proposed development are based on a reconnaissance and our general understanding of the project as presently proposed. Once final grading plans are developed, Geocon Incorporated should be notified to review the plans and evaluate the need for possible revisions to this report.

3. SOIL AND GEOLOGIC CONDITIONS

Three surficial soil types and one geologic formation was encountered during the field investigation. The surficial deposits consist of undocumented fill, previously placed compacted fill, and alluvium. The formational unit consists of old paralic deposits, formerly identified as terrace deposits. Each of the geologic units is described below in order of increasing age. The approximate extent of the deposits is shown on the *Geologic Map*.

3.1 Undocumented Fill (Qudf)

Undocumented fill associated with the previous residential development underlies the adjacent parcel to the northwest that was added to the expansion area. Undocumented fill is generally considered unsuitable for the support of the proposed structures in its present condition. Remedial grading in the form of complete removal and recompaction will be required. We expect the undocumented fill to be approximately 2 to 3 feet thick across this parcel.

3.2 Previously-Placed Compacted Fill (Qpf)

Previously placed compacted fill was observed in all the borings beneath the PCC pavement within the existing facility. The fill was approximately 5 feet thick in all four borings and generally consisted of medium dense to dense, reddish-brown, clayey sand. Based on our test results, the fill is generally considered suitable for the support of the proposed improvements in its present condition.

However, this will require verification during grading and if loose and/or unsuitable soils are exposed, these soils will require removal and compaction.

3.3 Alluvium (Qal)

Alluvial soils were encountered beneath the fill materials. The alluvium generally consists of stiff to very stiff, brown, sandy clay. Based on our laboratory testing, the alluvial soils are considered suitable for the support of the proposed improvements.

3.4 Old Paralic Deposits (Qop_6)

The Quaternary-age Old Paralic Deposits, previously identified as Bay Point Formation, were encountered underlying the alluvial deposits across the site. This deposit generally consists of medium dense to very dense, light brown, silty, fine to coarse sand and is considered suitable for the support of the proposed improvements.

4. GROUNDWATER

Groundwater was encountered within the exploratory borings at depths ranging between approximately 24 to 27 feet below the ground surface. Groundwater is not expected to be encountered during site development.

5. GEOLOGIC HAZARDS

5.1 Faulting

Based on our reconnaissance and a review of published geologic maps and reports, the site is not located on any known "active," "potentially active" or "inactive" fault traces as defined by the California Geological Survey (CGS).

The Rose Canyon Fault zone and the Newport-Inglewood Fault, located approximately 3 miles west of the site, are the closest known active faults. The CGS considers a fault seismically active when evidence suggests seismic activity within roughly the last 11,000 years. The CGS has included portions of the Rose Canyon Fault zone within an Alquist-Priolo Earthquake Fault Zone.

5.2 Seismicity-Deterministic Analysis

According to the computer program *EZ-FRISK (Version 7.65),* 6 known active faults are located within a search radius of 50 miles from the property. We used the 2008 USGS fault database that provides several models and combinations of fault data to evaluate the fault information. The nearest active faults are the Newport-Inglewood and Rose Canyon Fault Zones, located approximately 3 miles west of the site and are the dominant sources of potential ground motion. Earthquakes that might occur on the Newport-Inglewood and Rose Canyon Fault Zones or other faults within the southern California and northern Baja California area are potential generators of significant ground motion at the site. The estimated maximum earthquake magnitude and peak ground acceleration for the Newport-Inglewood Fault are 7.5 and 0.47g, respectively. Table 5.2 lists the estimated maximum earthquake magnitude and peak ground acceleration for the most dominant faults in relationship to the site location. We used Boore-Atkinson (2008) NGA USGS 2008, Campbell-Bozorgnia (2008) NGA USGS 2008, and Chiou-Youngs (2007) NGA USGS 2008 acceleration-attenuation relationships in the calculation of the peak ground accelerations (PGA).

TABLE 5.2
DETERMINISTIC SPECTRA SITE PARAMETERS

Fault Name	Distance from Site (miles)	Maximum Earthquake Magnitude (Mw)	Peak Ground Acceleration		
			Boore-Atkinson 2008 (g)	Campbell-Bozorgnia 2008 (g)	Chiou-Youngs 2008 (g)
Newport-Inglewood	3	7.5	0.39	0.37	0.47
Rose Canyon	3	6.9	0.35	0.36	0.42
Coronado Bank	13	7.4	0.23	0.18	0.22
Palos Verdes Connected	13	7.7	0.25	0.19	0.25
Elsinore	41	7.85	0.14	0.09	0.11
Earthquake Valley	46	6.8	0.08	0.06	0.05

5.3 Seismicity-Probabilistic Analysis

We used the computer program *EZ-FRISK* (version 7.65) to perform a probablilistic seismic hazard analysis. *EZ-FRISK* operates under the assumption that the occurrence rate of earthquakes on each mapped Quaternary fault is proportional to the fault slip rate. The program accounts for earthquake magnitude as a function of rupture length. Site acceleration estimates are made using the earthquake magnitude and distance from the site to the rupture zone. The program also accounts for uncertainty in each of following: (1) earthquake magnitude, (2) rupture length for a given magnitude, (3) location of the rupture zone, (4) maximum possible magnitude of a given earthquake, and (5) acceleration at the site from a given earthquake along each fault. By calculating the expected accelerations from considered earthquake sources, the program calculates the total average annual expected number of occurrences of site acceleration greater than a specified value. We utilized acceleration-attenuation relationships suggested by Boore-Atkinson (2008) NGA USGS 2008, Campbell-Bozorgnia (2008) NGA USGS 2008, and Chiou-Youngs (2008) NGA USGS 2008 in the analysis. Table 5.3 presents the site-specific probabilistic seismic hazard parameters including acceleration-attenuation relationships and the probability of exceedence for Site Class D.

TABLE 5.3
PROBABILISTIC SEISMIC HAZARD PARAMETERS

Probability of Exceedence	Peak Ground Acceleration		
	Boore-Atkinson, 2008 (g)	Campbell-Bozorgnia, 2008 (g)	Chiou-Youngs, 2008 (g)
2% in a 50 Year Period	0.52	0.46	0.55
5% in a 50 Year Period	0.36	0.33	0.37
10% in a 50 Year Period	0.26	0.23	0.25

While listing peak accelerations is useful for comparison of potential effects of fault activity in a region, other considerations are important in seismic design, including frequency and duration of motion and soil conditions underlying the site. Seismic design of the structures should be evaluated in accordance with the California Building Code (CBC) or City of San Diego guidelines.

5.4 Landslides

No evidence of ancient landslide deposits was encountered at the site during the geotechnical investigation.

5.5 Liquefaction and Seismically Induced Settlement

Liquefaction typically occurs when a site is located in a zone with seismic activity, onsite soils are cohesionless, groundwater is encountered within 50 feet of the surface, and soil relative densities are less than about 70 percent. If all four previous criteria are met, a seismic event could result in a rapid pore-water pressure increase from the earthquake-generated ground accelerations. Seismically induced settlement is settlement that may occur whether the potential for liquefaction exists or not. The potential for liquefaction and seismically induced settlement occurring within the site soils is considered to be “low” due to the geologic conditions encountered. Specifically, the alluvial materials exposed between approximately 5 to 25 feet below the ground surface consist of stiff clay and the Old Paralic Deposits exposed beneath the clay exhibited relative densities that are not conducive to liquefaction. In addition, even if the old paralic deposits exhibited liquefaction, the 25 feet of clay and compacted fill above the groundwater table would prevent any surface manifestation from occurring.

5.6 Geologic Hazard Category

Based on our review of the 2008 City of San Diego Seismic Safety Study Map, Sheet No. 13, the site is located within Geologic Hazard Category 52. Category 52 indicates *Other Terrain: Other level areas, gently sloping to steep terrain, favorable geologic structure, low risk.*

6. CONCLUSIONS AND RECOMMENDATIONS

6.1 General

6.1.1 In our opinion, no soil or geologic conditions exist at the site that would preclude the development of the proposed building expansion and parking lot improvements as presently planned, provided the recommendations presented herein are implemented in design and construction of the project.

6.1.2 The site is underlain by undocumented fill, previously placed fill, alluvium, and old paralic deposits. The undocumented fill located beneath the parcel to the northwest is considered unsuitable in its present condition to support fill or structural loads and will require removal and compaction. The previously placed compacted fill, alluvium, and old paralic deposits are generally considered suitable in their present condition for support of fill or structural loads.

6.1.3 With the exception of possible strong seismic shaking, no geologic hazards were observed or are known to exist based on our study that would adversely affect the proposed project. No special seismic design considerations, other than those recommended herein, are required.

6.1.4 The proposed structure modifications can be supported by conventional continuous and isolated spread foundations supported entirely in compacted fill.

6.1.5 Any existing structures, foundation systems, pavement, utility lines should be removed and exported from the site prior to grading. Geocon Incorporated should observe the underlying geologic conditions and provide testing and observation services during the backfill of the resulting excavations where necessary.

6.2 Excavation and Soil Characteristics

6.2.1 Excavation of the undocumented fill, compacted fill, and underlying alluvium should be possible with light to moderate effort using conventional heavy-duty equipment.

6.2.2 The soils encountered in the field investigation are considered to be “expansive” (expansion index [EI] of 20 or more) as defined by 2013 California Building Code (CBC) Section 1803.5.3 based on laboratory testing. Table 6.2 presents soil classifications based on the expansion index. The soil materials collected and tested for expansion index indicate a “medium” expansion potential (expansion index of 90 or less).

TABLE 6.2
EXPANSION CLASSIFICATION BASED ON EXPANSION INDEX

Expansion Index (EI)	Expansion Classification	2013 CBC Expansion Classification
0 – 20	Very Low	Non-Expansive
21 – 50	Low	Expansive
51 – 90	Medium	
91 – 130	High	
Greater Than 130	Very High	

6.3 Corrosion

6.3.1 We performed laboratory tests on two samples of the site materials to evaluate the percentage of water-soluble sulfate content. Results from the laboratory water-soluble sulfate content tests are presented in Appendix B and indicate that the on-site materials at the locations tested possess “Not Applicable” and “S0” sulfate exposure to concrete structures as defined by 2013 CBC Section 1904 and ACI 318-11 Sections 4.2 and 4.3. The presence of water-soluble sulfates is not a visually discernible characteristic; therefore, other soil samples from the site could yield different concentrations. Additionally, over time landscaping activities (i.e., addition of fertilizers and other soil nutrients) may affect the concentration. Table 6.3 presents a summary of concrete requirements set forth by 2013 CBC Section 1904 and ACI 318.

TABLE 6.3
REQUIREMENTS FOR CONCRETE EXPOSED TO SULFATE-CONTAINING SOLUTIONS

Sulfate Severity	Exposure Class	Water-Soluble Sulfate (SO_4) Percent by Weight	Cement Type (ASTM C 150)	Maximum Water to Cement Ratio by Weight	Minimum Compressive Strength (psi)
Not Applicable	S0	$SO_4<0.10$	--	--	2,500
Moderate	S1	$0.10\leq SO_4<0.20$	II	0.50	4,000
Severe	S2	$0.20\leq SO_4\leq 2.00$	V	0.45	4,500
Very Severe	S3	$SO_4>2.00$	V+Pozzolan or Slag	0.45	4,500

6.3.2 Geocon Incorporated does not practice in the field of corrosion engineering. Therefore, if improvements that could be susceptible to corrosion are planned, it is recommended that further evaluation by a corrosion engineer be performed.

6.4 Grading Recommendations

6.4.1 All grading should be performed in accordance with the attached *Recommended Grading Specifications* (Appendix D). Where the recommendations of this section conflict with Appendix D, the recommendations of this section take precedence. All earthwork should be observed and all fills tested for proper compaction by Geocon Incorporated.

6.4.2 A pre-construction conference with the city inspector, owner, contractor, civil engineer, and soil engineer in attendance should be held at the site prior to the beginning of grading operations. Special soil handling requirements can be discussed at that time.

6.4.3 Grading of the site, where planned, should commence with the removal of all existing improvements from the areas to be graded. Deleterious debris such as wood, asphalt, brick, and concrete should be exported from the site and should not be mixed with the fill soils, if present. All existing underground improvements within proposed structural areas should be removed and the resulting depressions properly backfilled in accordance with the procedures described herein. If existing improvements are abandoned in-place, the suitability of the trench backfill should be evaluated or removed and re-compacted to at least 90 percent of the maximum dry density near to slightly over optimum moisture content as determined by ASTM Test Designation D1557.

6.4.4 Prior to placing fill or structural loads on previously-placed compacted fill within the existing property, the ground surface should be scarified, moisture conditioned, and compacted to a dry density of at least 90 percent of the laboratory maximum dry density near to slightly above optimum moisture content, as determined by ASTM Test Method D 1557. Deeper processing and/or removal may be necessary in areas where loose, wet or dry soils are encountered.

6.4.5 Prior to placing fill or structural loads on undocumented fill (i.e. expansion parcel to the northwest), the fill materials should be removed and replaced as compacted fill. Prior to placing compacted fill, the ground surface should be scarified, moisture conditioned, and compacted to a dry density of at least 90 percent of the laboratory maximum dry density near to slightly above optimum moisture content, as determined by ASTM Test Method D 1557.

6.4.6 If proposed foundations and/or slabs-on-grade are deeper than approximately 3 feet below existing grades (extending through the fill and bearing on alluvium), remedial grading is recommended so that the structure is supported on at least 2 feet of compacted fill. Excavations should extend 2 feet below deepest footing and at least five feet beyond the widest foundation element, except in the areas adjacent to the existing buildings.

Excavations in these areas should be performed in slots so as not to expose or undermine the existing building foundations across the entire length of the proposed additions at one time. Slot dimensions should be determined by the contractor so as to not impact the existing building. Backfill of any given slot should be completed before excavation of an adjacent slot begins.

6.4.7 Excavated soils generated from the cut operations free of deleterious debris and/or contaminants can be placed and compacted in layers to the design finish grade elevations. All fill and backfill soils should be placed in horizontal loose layers with a maximum thickness of 8 inches, moisture conditioned to near optimum moisture content and compacted to a dry density of at least 90 percent of the laboratory maximum dry density as determined by ASTM Test Method D 1557. Soils supporting slabs-on-grade and similar improvements should be compacted once subgrade elevations are achieved.

6.4.8 Any import fill soil, if needed, should consist of granular materials with a “low” expansion potential (EI less than 50) free of deleterious material or stones larger than 3 inches and compacted as recommended above. Geocon Incorporated should be notified of the import soil source so that laboratory testing can be performed to determine its suitability as fill material prior to its arrival at the site.

6.4.9 It is the responsibility of the contractor to ensure that all excavations and trenches are properly shored and maintained in accordance with applicable OSHA rules and regulations in order to maintain safety and maintain the stability of adjacent existing improvements.

6.5 Seismic Design Criteria

6.5.1 We used the computer program *U.S. Seismic Design Maps*, provided by the USGS. Table 6.5.1 summarizes site-specific design criteria obtained from the 2013 California Building Code (CBC; Based on the 2012 International Building Code [IBC] and ASCE 7-10), Chapter 16 Structural Design, Section 1613 Earthquake Loads. The short spectral response uses a period of 0.2 seconds. The values presented in Table 6.5.1 are for the risk-targeted maximum considered earthquake (MCE_R). Based on soil conditions and planned grading, the building should be designed using a Site Class D. We evaluated the Site Class based on the discussion in Section 1613.3.2 of the 2013 CBC and Table 20.3-1 of ASCE 7-10.

TABLE 6.5.1
2013 CBC SEISMIC DESIGN PARAMETERS

Parameter	Value	2013 CBC Reference
Site Class	D	Section 1613.3.2
MCE_R Ground Motion Spectral Response Acceleration – Class B (short), S_S	1.097g	Figure 1613.3.1(1)
MCE_R Ground Motion Spectral Response Acceleration – Class B (1 sec), S_1	0.419g	Figure 1613.3.1(2)
Site Coefficient, F_A	1.061	Table 1613.3.3(1)
Site Coefficient, F_V	1.581	Table 1613.3.3(2)
Site Class Modified MCE_R Spectral Response Acceleration (short), S_{MS}	1.164g	Section 1613.3.3 (Eqn 16-37)
Site Class Modified MCE_R Spectral Response Acceleration (1 sec), S_{M1}	0.662g	Section 1613.3.3 (Eqn 16-38)
5% Damped Design Spectral Response Acceleration (short), S_{DS}	0.776g	Section 1613.3.4 (Eqn 16-39)
5% Damped Design Spectral Response Acceleration (1 sec), S_{D1}	0.441g	Section 1613.3.4 (Eqn 16-40)

6.5.2 Table 6.5.2 presents additional seismic design parameters for projects located in Seismic Design Categories of D through F in accordance with ASCE 7-10 for the mapped maximum considered geometric mean (MCE_G).

TABLE 6.5.2
2013 CBC SITE ACCELERATION PARAMETERS

Parameter	Value, Site Class D	ASCE 7-10 Reference
Mapped MCE_G Peak Ground Acceleration, PGA	0.474g	Figure 22-7
Site Coefficient, F_{PGA}	1.026	Table 11.8-1
Site Class Modified MCE_G Peak Ground Acceleration, PGA_M	0.486g	Section 11.8.3 (Eqn 11.8-1)

6.5.3 Conformance to the criteria for seismic design does not constitute any guarantee or assurance that significant structural damage or ground failure will not occur in the event of a maximum level earthquake. The primary goal of seismic design is to protect life and not to avoid all damage, since such design may be economically prohibitive.

6.6 Foundations

6.6.1 The proposed structure modifications can be supported on a shallow foundation system founded entirely in compacted fill. Foundations for the structure should consist of continuous strip footings and/or isolated spread footings. Continuous footings should be at least 12 inches wide and extend at least 18 inches below lowest adjacent pad grade. Isolated spread footings should have a minimum width of 2 feet and should extend at least 18 inches below lowest adjacent pad grade. Steel reinforcement for continuous footings should consist of at least four No. 4 steel reinforcing bars placed horizontally in the footings, two near the top and two near the bottom. Steel reinforcement for the spread footings should be designed by the project structural engineer. A footing dimension detail, depicting the depth to lowest adjacent grade, is presented in Figure 3.

6.6.2 The minimum reinforcement recommended above is based on soil characteristics only (Expansion Index of 90 or less) and is not intended to replace reinforcement required for structural considerations.

6.6.3 The recommended allowable bearing capacity for foundations with minimum dimensions described above and bearing in compacted fill is 2,000 pounds per square foot (psf). This allowable soil bearing pressure may be increased by an additional 400 psf for each additional foot of depth and 200 psf for each additional foot of width, to a maximum allowable bearing capacity of 4,000 psf. The values presented above are for dead plus live loads and may be increased by one-third when considering transient loads due to wind or seismic forces.

6.6.4 Settlement due to footing loads conforming to the above recommended allowable soil bearing pressures are expected to be less than 1-inch total and ½-inch differential across the building.

6.6.5 If new concrete foundations are planned adjacent to existing foundations, dowels are recommended and should be designed by the project Structural Engineer in accordance with ACI guidelines.

6.6.6 Foundation excavations should be observed by the geotechnical engineer (a representative of Geocon Incorporated) prior to the placement of reinforcing steel and concrete to verify that the exposed soil conditions are consistent with those anticipated and have been extended to appropriate bearing strata. If unanticipated soil conditions are encountered, foundation modifications may be required.

6.7 Concrete Slabs-on-Grade

6.7.1 Concrete slabs-on-grade for the structure modifications should be at least 5 inches thick and reinforced with No. 3 steel reinforcing bars at 18 inches on center in both horizontal directions.

6.7.2 Slabs that may receive moisture-sensitive floor coverings or may be used to store moisture-sensitive materials should be underlain by a vapor retarder. The vapor retarder design should be consistent with the guidelines presented in the American Concrete Institute's (ACI) *Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials* (ACI 302.2R-06). In addition, the membrane should be installed in accordance with manufacturer's recommendations and ASTM requirements and installed in a manner that prevents puncture. The vapor retarder used should be specified by the project architect or developer based on the type of floor covering that will be installed and if the structure will possess a humidity-controlled environment.

6.7.3 The bedding sand thickness should be determined by the project foundation engineer, architect, and/or developer. However, we should be contacted to provide recommendations if the bedding sand is thicker than 6 inches. Typically, four inches of bedding sand with a vapor retarder placed at the midpoint is used. The foundation design engineer should provide appropriate concrete mix design criteria and curing measures to assure proper curing of the slab by reducing the potential for rapid moisture loss and subsequent cracking and/or slab curl. We suggest that the foundation design engineer present the concrete mix design and proper curing methods on the foundation plans. It is critical that the foundation contractor understands and follows the recommendations presented on the foundation plans.

6.7.4 The concrete slab-on-grade recommendations are based on soil support characteristics only. The project structural engineer should evaluate the structural requirements of the concrete slabs for supporting vehicle, equipment and storage loads.

6.7.5 Exterior concrete flatwork not subject to vehicular traffic should be constructed in accordance with the recommendations herein. Slab panels should be a minimum of 4 inches thick and, when in excess of 8 feet square, should be reinforced with 6 x 6 - W2.9/W2.9 (6 x 6 - 6/6) welded wire mesh or No. 3 reinforcing bars at 18 inches on center in both directions to reduce the potential for cracking. In addition, concrete flatwork should be provided with crack control joints to reduce and/or control shrinkage cracking. Crack control spacing should be determined by the project structural engineer based upon the slab thickness and intended usage. Criteria of the American Concrete Institute (ACI) should be taken into consideration when establishing crack control spacing. A 4-inch-thick slab should have a maximum joint spacing of 10 feet. Subgrade soil for exterior slabs not subjected to vehicle loads should be compacted in accordance with criteria presented in the grading section prior to concrete placement. Subgrade soil should be properly compacted and the moisture content of subgrade soil should be checked prior to placing concrete.

6.7.6 The recommendations presented herein are intended to reduce the potential for cracking of slabs and foundations as a result of differential movement. However, even with the incorporation of the recommendations presented herein, foundations and slabs-on-grade will still exhibit some cracking. The occurrence of concrete shrinkage cracks is independent of the soil supporting characteristics. Their occurrence may be reduced and/or controlled by limiting the slump of the concrete, the use of crack-control joints and proper concrete placement and curing. Literature provided by the Portland Concrete Association (PCA) and American Concrete Institute (ACI) present recommendations for proper concrete mix, construction and curing practices, and should be incorporated into project construction.

6.8 Preliminary Pavement Recommendations

6.8.1 We calculated the preliminary flexible pavement sections in general conformance with the *Caltrans Method of Flexible Pavement Design* (Highway Design Manual, Section 608.4) using estimated Traffic Indices (TI) of 4.5, 5.0, 6.0, and 7.0 for light-duty parking stalls, light-duty driveways, medium-duty, and heavy-duty traffic areas, respectively. The project civil engineer, architect, and owner should review the pavement designations to determine appropriate locations for pavement thickness. It is our opinion that a TI of 6.0 is appropriate to evaluate trash truck roadway areas. The final pavement sections should be based on the R-Value of the subgrade soil encountered at final subgrade elevation. For preliminary design purposes, we have utilized an assumed R-value of 5. Table 6.8.1 presents the preliminary flexible pavement sections. Public roadways, if any, should be designed in accordance with the City of San Diego Pavement Design Standards, Schedule J, Drawing No. SDG-113.

TABLE 6.8.1
PRELIMINARY FLEXIBLE PAVEMENT SECTIONS

Location	Assumed Traffic Index	Assumed Subgrade R-Value	Asphalt Concrete (inches)	Class 2 Aggregate Base (inches)
Parking stalls for light-duty vehicles	4.5	5	3	8
Driveways for light-duty vehicles	5.0	5	3	10
Medium-duty truck traffic areas	6.0	5	3.5	13
Heavy-duty truck traffic areas	7.0	5	4	15.5

6.8.2 Prior to placing base materials, the upper 12 inches of the subgrade soil should be scarified, moisture conditioned as necessary, and recompacted to a dry density of at least 95 percent of the laboratory maximum dry density near to slightly above optimum moisture content as determined by ASTM D 1557. Similarly, the base material should be compacted to a dry density of at least 95 percent of the laboratory maximum dry density near to slightly above optimum moisture content. Asphalt concrete should be compacted to a density of at least 95 percent of the laboratory Hveem density in accordance with ASTM D 2726.

6.8.3 Base materials should conform to Section 26-1.028 of the *Standard Specifications for The State of California Department of Transportation (Caltrans)* with a ¾-inch maximum size aggregate. The asphalt concrete should conform to Section 203-6 of the *Standard Specifications for Public Works Construction (Greenbook).*

6.8.4 A rigid Portland Cement concrete (PCC) pavement section should be placed in driveway entrance aprons, trash bin loading/storage areas and loading dock areas. The concrete pad for trash truck areas should be large enough such that the truck wheels will be positioned on the concrete during loading. We calculated the rigid pavement section in general conformance with the procedure recommended by the American Concrete Institute report ACI 330R-08 *Guide for Design and Construction of Concrete Parking Lots* using the parameters presented in Table 6.8.2.

TABLE 6.8.2
RIGID PAVEMENT DESIGN PARAMETERS

Design Parameter	Design Value
Modulus of subgrade reaction, k	50 pci
Modulus of rupture for concrete, M_R	500 psi
Traffic Category, TC	A and B
Average daily truck traffic, ADTT	10 and 300

6.8.5 Based on the criteria presented herein, the PCC pavement sections should have a minimum thickness as presented in Table 6.8.3.

TABLE 6.8.3
RIGID PAVEMENT RECOMMENDATIONS

Location	Portland Cement Concrete (inches)
Light-Duty Vehicles (TC=A, ADTT = 10)	6.0
Trash Truck/Fire Lane Areas (TC=B, ADTT =300)	7.5

6.8.6 The PCC pavement should be placed over subgrade soil that is compacted to a dry density of at least 95 percent of the laboratory maximum dry density near to slightly above optimum moisture content. This pavement section is based on a minimum concrete compressive strength of approximately 3,000 psi (pounds per square inch).

6.8.7 A thickened edge or integral curb should be constructed on the outside of concrete slabs subjected to wheel loads. The thickened edge should be 1.2 times the slab thickness or a minimum thickness of 2 inches, whichever results in a thicker edge, and taper back to the recommended slab thickness 4 feet behind the face of the slab (e.g., a 7-inch-thick slab would have a 9-inch-thick edge).

6.8.8 Reinforcing steel should consist of No. 3 rebar placed at 18-inches on center, both directions, or 6x6-6/6 welded wire mesh.

6.8.9 To control the location and spread of concrete shrinkage cracks, crack-control joints (weakened plane joints) should be included in the design of the concrete pavement slab. Criteria of the American Concrete Institute (ACI) should be taken into consideration when establishing crack control spacing. However, we recommend a spacing not to exceed 10 feet. The depth of the crack-control joints should be determined by the referenced ACI report.

6.8.10 The performance of pavement is highly dependent on providing positive surface drainage away from the edge of the pavement. Ponding of water on or adjacent to the pavement will likely result in pavement distress and subgrade failure. Drainage from landscaped areas should be directed to controlled drainage structures. Landscape areas adjacent to the edge of asphalt pavements are not recommended due to the potential for surface or irrigation water to infiltrate the underlying permeable aggregate base and cause distress. Where such a condition cannot be avoided, consideration should be given to incorporating measures that will significantly reduce the potential for subsurface water migration into the aggregate base. If planter islands are planned, the perimeter curb should extend at least six inches below the level of the base materials.

6.9 Retaining Walls and Lateral Loads

6.9.1 Retaining walls not restrained at the top and having a level backfill surface should be designed for an active soil pressure equivalent to the pressure exerted by a fluid with a density of 35 pounds per cubic foot (pcf). Where the backfill will be inclined at 2:1 (horizontal:vertical), an active soil pressure of 50 pcf is recommended. These soil pressures assume that the backfill materials within an area bounded by the wall and a 1:1 plane extending upward from the base of the wall possess an Expansion Index ≤50. Geocon Incorporated should be consulted for additional recommendations if backfill materials have an EI >50.

6.9.2 Where walls are restrained from movement at the top, an additional uniform pressure of 8H psf (where H equals the height of the retaining wall portion of the wall in feet) should be added to the active soil pressure where the wall possesses a height of 8 feet or less and 12H where the wall is greater than 8 feet. For retaining walls subject to vehicular loads within a horizontal distance equal to two-thirds the wall height, a surcharge equivalent to two feet of fill soil should be added (total unit weight of soil should be taken as 130 pcf).

6.9.3 Soil contemplated for use as retaining wall backfill, including import materials, should be identified in the field prior to backfill. At that time Geocon Incorporated should obtain samples for laboratory testing to evaluate its suitability. Modified lateral earth pressures may be necessary if the backfill soil does not meet the required expansion index or shear strength. City or regional standard wall designs, if used, are based on a specific active lateral earth pressure and/or soil friction angle. In this regard, on-site soil to be used as backfill may or may not meet the values for standard wall designs. Geocon Incorporated should be consulted to assess the suitability of the on-site soil for use as wall backfill if standard wall designs will be used.

6.9.4 Unrestrained walls will move laterally when backfilled and loading is applied. The amount of lateral deflection is dependent on the wall height, the type of soil used for backfill, and loads acting on the wall. The wall designer should provide appropriate lateral deflection quantities for planned retaining walls structures, if applicable. These lateral values should be considered when planning types of improvements above retaining wall structures.

6.9.5 Retaining walls should be provided with a drainage system adequate to prevent the buildup of hydrostatic forces and should be waterproofed as required by the project architect. The use of drainage openings through the base of the wall (weep holes) is not recommended where the seepage could be a nuisance or otherwise adversely affect the property adjacent to the base of the wall. The above recommendations assume a properly compacted granular (EI ≤50) free-draining backfill material with no hydrostatic forces or imposed surcharge load. A typical retaining wall drainage detail is presented on Figure 4. If conditions different than those described are expected, or if specific drainage details are desired, Geocon Incorporated should be contacted for additional recommendations.

6.9.6 In general, wall foundations having a minimum depth and width of one foot may be designed for an allowable soil bearing pressure of 2,000 psf, provided the soil within three feet below the base of the wall has an Expansion Index ≤ 90. The recommended allowable soil bearing pressure may be increased by 200 psf and 400 psf for each additional foot of foundation width and depth, respectively, up to a maximum allowable soil bearing pressure of 4,000 psf.

6.9.7 The proximity of the foundation to the top of a slope steeper than 3:1 could impact the allowable soil bearing pressure. Therefore, Geocon Incorporated should be consulted where such a condition is anticipated. As a minimum, wall footings should be deepened such that the bottom outside edge of the footing is at least seven feet from the face of slope when located adjacent and/or at the top of descending slopes.

6.9.8 The structural engineer should determine the seismic design category for the project in accordance with Section 1613 of the CBC. If the project possesses a seismic design category of D, E, or F, retaining walls that support more than 6 feet of backfill should be designed with seismic lateral pressure in accordance with Section 18.3.5.12 of the 2013 CBC. The seismic load is dependent on the retained height where H is the height of the wall, in feet, and the calculated loads result in pounds per square foot (psf) exerted at the base of the wall and zero at the top of the wall. A seismic load of 22H should be used for design. We used the peak ground acceleration adjusted for Site Class effects, PGA_M, of 0.486g calculated from ASCE 7-10 Section 11.8.3 and applied a pseudo-static coefficient of 0.33.

6.9.9 For resistance to lateral loads, a passive earth pressure equivalent to a fluid density of 300 pcf is recommended for footings or shear keys poured neat against properly compacted granular fill soils or undisturbed formation materials. The passive pressure assumes a horizontal surface extending away from the base of the wall at least five feet or three times the surface generating the passive pressure, whichever is greater. The upper 12 inches of material not protected by floor slabs or pavement should not be included in the design for lateral resistance. Where walls are planned adjacent to and/or on descending slopes, a passive pressure of 150 pcf should be used in design.

6.9.10 An ultimate friction coefficient of 0.35 may be used for resistance to sliding between soil and concrete. This friction coefficient may be combined with the passive earth pressure when determining resistance to lateral loads.

6.9.11 The recommendations presented above are generally applicable to the design of rigid concrete or masonry retaining walls having a maximum height of 12 feet. In the event that walls higher than 12 feet are planned, Geocon Incorporated should be consulted for additional recommendations.

6.10 Site Drainage and Moisture Protection

6.10.1 Adequate site drainage is critical to reduce the potential for differential soil movement, erosion and subsurface seepage. Under no circumstances should water be allowed to pond adjacent to footings. The site should be graded and maintained such that surface drainage is directed away from structures in accordance with 2013 CBC 1804.3 or other applicable standards. In addition, surface drainage should be directed away from the top of slopes into swales or other controlled drainage devices. Roof and pavement drainage should be directed into conduits that carry runoff away from the proposed structure.

6.10.2 In the case of basement walls or building walls retaining landscaping areas, a waterproofing system should be used on the wall and joints, and a Miradrain drainage panel (or similar) should be placed over the waterproofing. The project architect or civil engineer should provide detailed specifications on the plans for all waterproofing and drainage.

6.10.3 Underground utilities should be leak free. Utility and irrigation lines should be checked periodically for leaks, and detected leaks should be repaired promptly. Detrimental soil movement could occur if water is allowed to infiltrate the soil for prolonged periods of time.

6.11 Slope Maintenance

6.11.1 Slopes that are steeper than 3:1 (horizontal:vertical) may, under conditions that are both difficult to prevent and predict, be susceptible to near-surface (surficial) slope instability. The instability is typically limited to the outer 3 feet of a portion of the slope and usually does not directly impact the improvements on the pad areas above or below the slope. The occurrence of surficial instability is more prevalent on fill slopes and is generally preceded by a period of heavy rainfall, excessive irrigation, or the migration of subsurface seepage. The disturbance and/or loosening of the surficial soils, as might result from root growth, soil expansion, or excavation for irrigation lines and slope planting, may also be a significant contributing factor to surficial instability. It is therefore recommended that, to the maximum extent practical: (a) disturbed/loosened surficial soils be either removed or properly recompacted, (b) irrigation systems be periodically inspected and maintained to eliminate leaks and excessive irrigation, and (c) surface drains on and adjacent to slopes be periodically maintained to preclude ponding or erosion. Although the incorporation of the above recommendations should reduce the potential for surficial slope instability, it will not eliminate the possibility and, therefore, it may be necessary to rebuild or repair a portion of the project's slopes in the future.

6.12 Grading and Foundation Plan Review

6.12.1 The geotechnical engineer and engineering geologist should review the grading and foundation plans prior to final City submittal to check their compliance with the recommendations of this report and to determine the need for additional comments, recommendations and/or analysis.

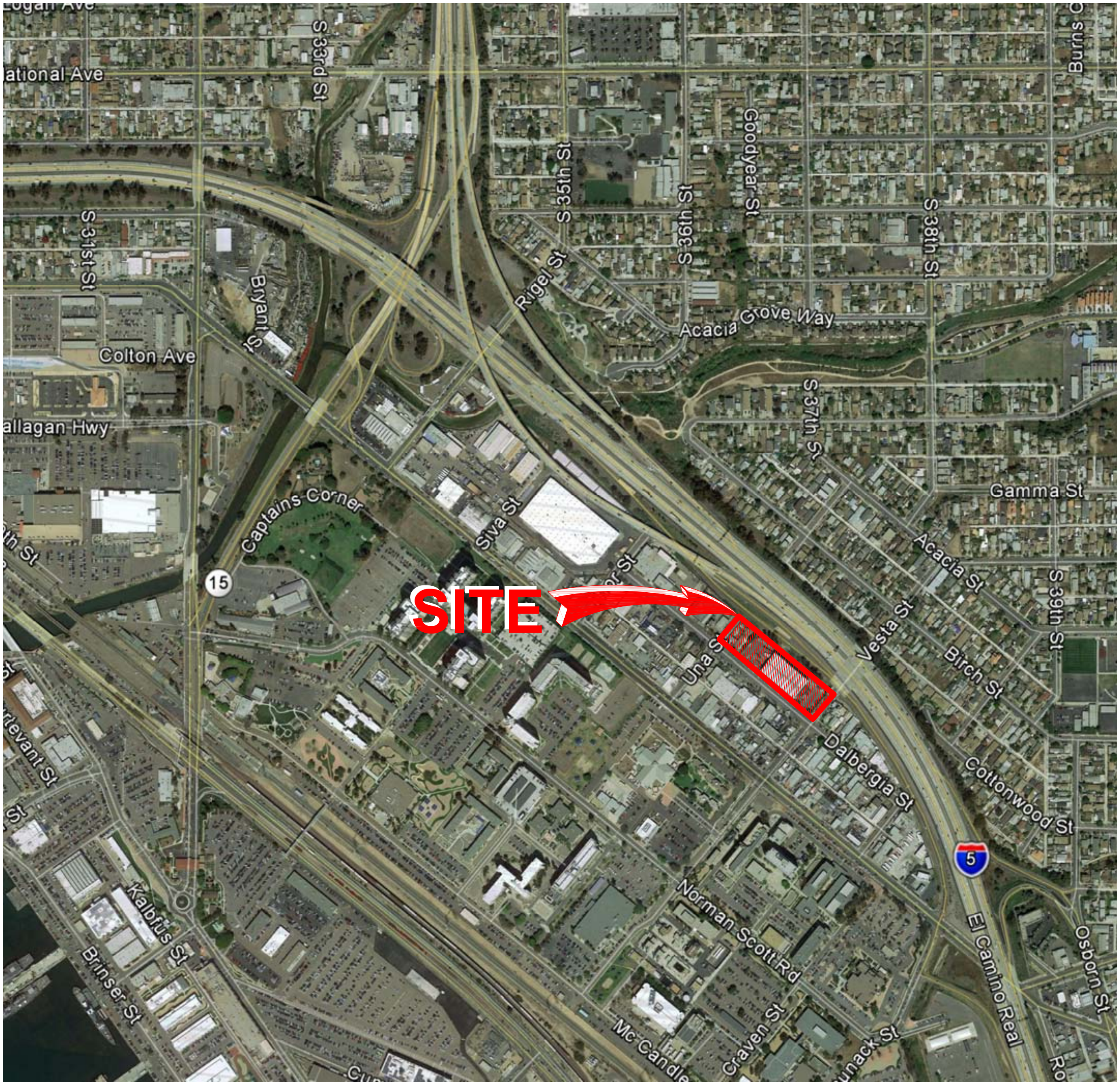
LIMITATIONS AND UNIFORMITY OF CONDITIONS

1. The firm that performed the geotechnical investigation for the project should be retained to provide testing and observation services during construction to provide continuity of geotechnical interpretation and to check that the recommendations presented for geotechnical aspects of site development are incorporated during site grading, construction of improvements, and excavation of foundations. If another geotechnical firm is selected to perform the testing and observation services during construction operations, that firm should prepare a letter indicating their intent to assume the responsibilities of project geotechnical engineer of record. A copy of the letter should be provided to the regulatory agency for their records. In addition, that firm should provide revised recommendations concerning the geotechnical aspects of the proposed development, or a written acknowledgement of their concurrence with the recommendations presented in our report. They should also perform additional analyses deemed necessary to assume the role of Geotechnical Engineer of Record.

2. The recommendations of this report pertain only to the site investigated and are based upon the assumption that the soil conditions do not deviate from those disclosed in the investigation. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that anticipated herein, Geocon Incorporated should be notified so that supplemental recommendations can be given. The evaluation or identification of the potential presence of hazardous or corrosive materials was not part of the scope of services provided by Geocon Incorporated.

3. This report is issued with the understanding that it is the responsibility of the owner, or of his representative, to ensure that the information and recommendations contained herein are brought to the attention of the architect and engineer for the project and incorporated into the plans, and that the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.

4. The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they are due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and should not be relied upon after a period of three years.



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NO SCALE

VICINITY MAP

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EDCO MATERIAL RECOVERY FACILITY
AND TRANSFER STATION EXPANSION
3660 DALBERGIA STREET
SAN DIEGO, CALIFORNIA

TM / CW		DSK/GTYPD	DATE 09 - 07 - 2016	PROJECT NO. G2010 - 32 - 01	FIG. 1

Plotted:09/07/2016 9:38AM \| By:ALVIN LADRILLONO \| File Location:Y:\PROJECTS\G2010-32-01 Dalbergia Street\DETAILS\G2010-32-01_Vicinity Map.dwg

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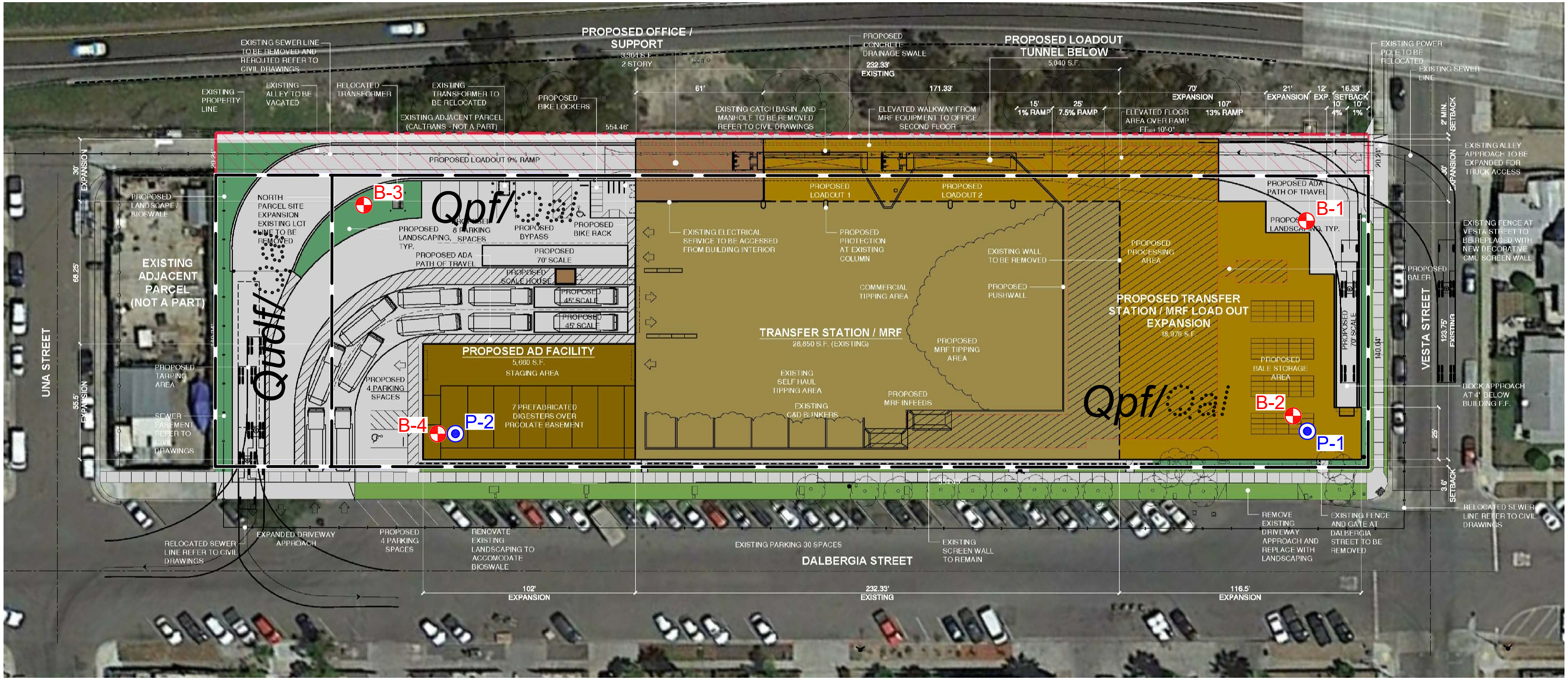
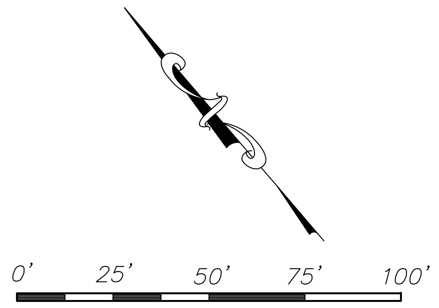
SAN DIEGO, CALIFORNIA





SCALE 1"=50'(on 11x17)

GEOCON LEGEND

Qudf ........UNDOCUMENTED FILL

Qpf ....PREVIOUSLY PLACED FILL

Qal ....ALLUVIUM (Dotted Where Buried)

〜 ....APPROX. LOCATION OF GEOLOGIC CONTACT

B-4 ⊕ ....APPROX. LOCATION OF EXPLORATORY BORING

P-2 ⦿ ....APPROX. LOCATION OF PERMEABILITY TEST

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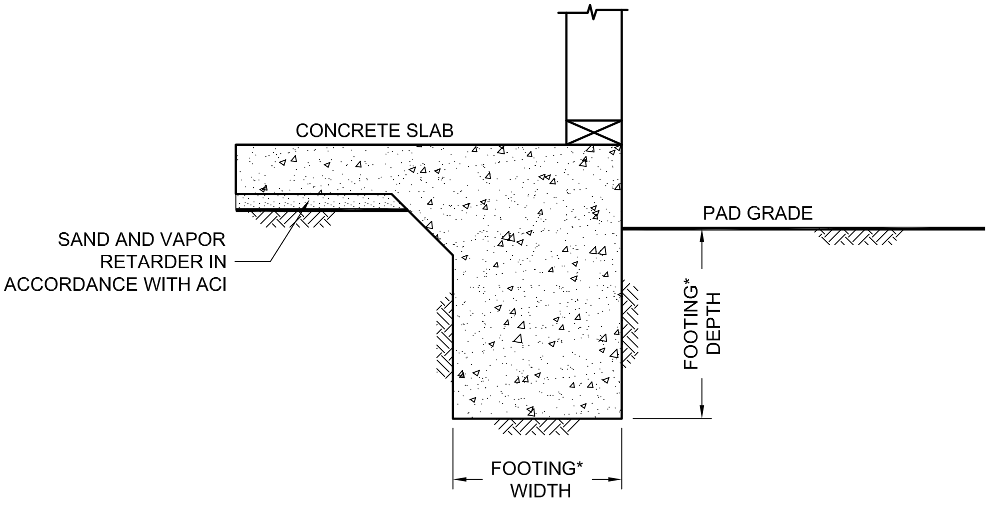
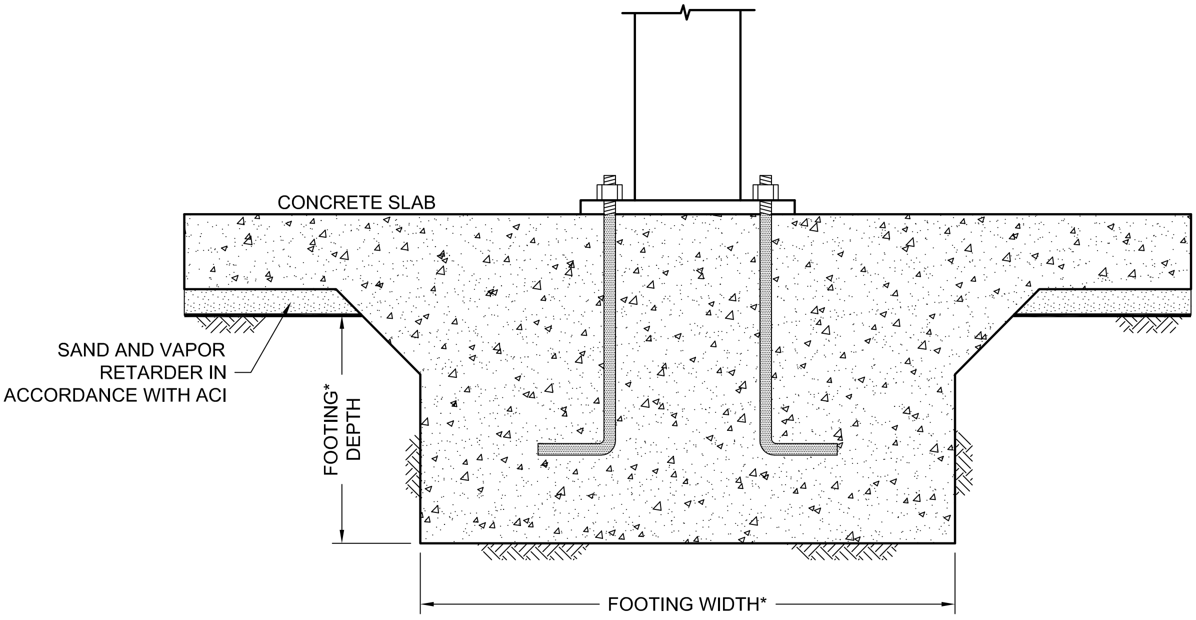
GEOLOGIC MAP

PROJECT NO. G2010 - 32 - 01
FIGURE 2
DATE 09 - 07 - 2016

Ladrillono

Plotted:09/07/2016 9:36AM | By:ALVIN LADRILLONO | File Location:Y:\PROJECTS\G2010-32-01 Dalbergia Street\SHEETS\G2010-32-01 Site Plan.dwg





*....SEE REPORT FOR FOUNDATION WIDTH AND DEPTH RECOMMENDATION

NO SCALE

WALL / COLUMN FOOTING DIMENSION DETAIL

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EDCO MATERIAL RECOVERY FACILITY
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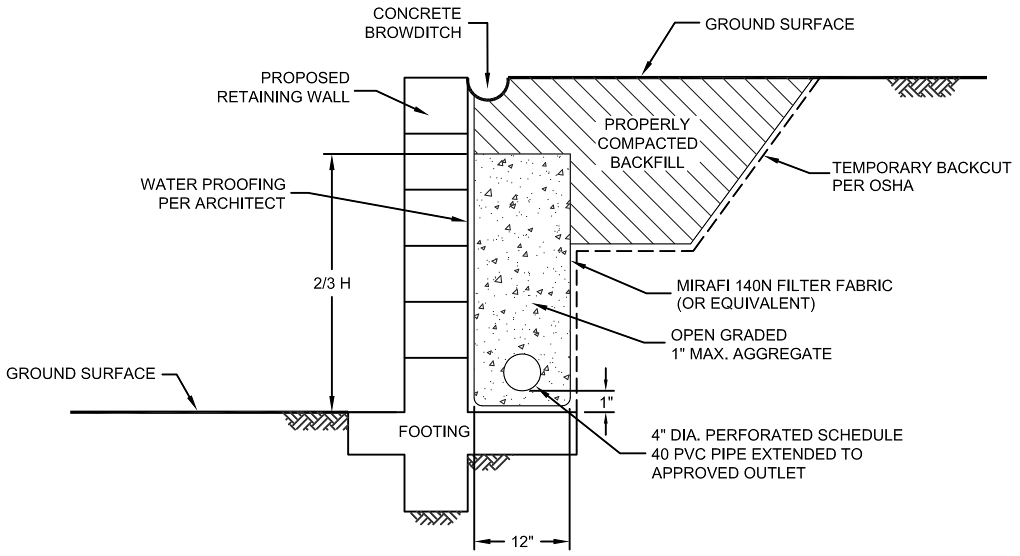
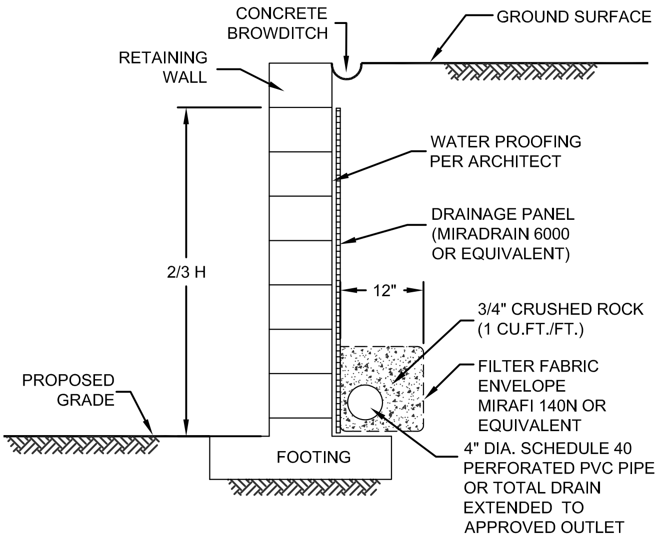
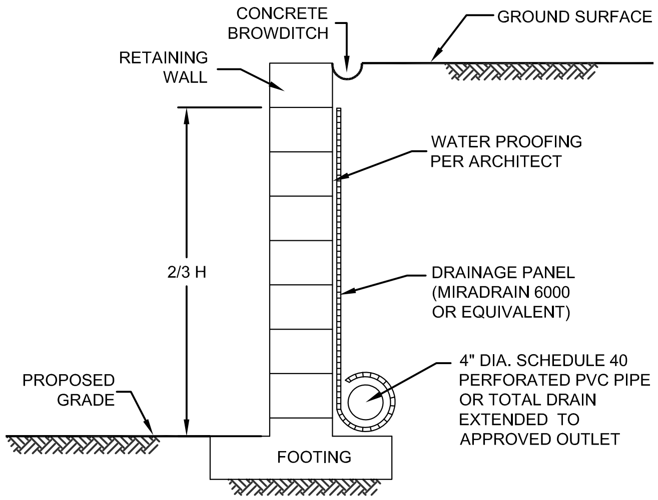
SAN DIEGO, CALIFORNIA

TM / CW		DSK/GTYPD	DATE 09 - 07 - 2016	PROJECT NO. G2010 - 32 - 01	FIG. 3

Plotted:09/07/2016 9:37AM | By:ALVIN LADRILLONO | File Location:Y:\PROJECTS\G2010-32-01 Dalbergia Street\DETAILS\Wall-Column Footing Dimension Detail (COLFOOT2).dwg







NOTE :

DRAIN SHOULD BE UNIFORMLY SLOPED TO GRAVITY OUTLET
OR TO A SUMP WHERE WATER CAN BE REMOVED BY PUMPING

NO SCALE

TYPICAL RETAINING WALL DRAIN DETAIL

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EDCO MATERIAL RECOVERY FACILITY
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SAN DIEGO, CALIFORNIA

TM / CW		DSK/GTYPD	DATE 09 - 07 - 2016	PROJECT NO. G2010 - 32 - 01	FIG. 4

Plotted:09/07/2016 9:37AM | By:ALVIN LADRILLONO | File Location:Y:\PROJECTS\G2010-32-01 Dalbergia Street\DETAILS\Typical Retaining Wall Drainage Detail (RWDD7A).dwg

APPENDIX A

APPENDIX A

FIELD INVESTIGATION

The field investigation was performed on July 13, 2016, and consisted of drilling 4 hollow stem auger borings at the approximate locations shown on Figure 2. In addition, two infiltration tests (Infiltration Test Nos. P-1 and P-2) were performed to evaluate proposed storm water infiltration feasibility. The borings were excavated by Baja Drilling to depths of approximately 41.5 feet below existing grade using a CME 75 truck mounted drill rig. Relatively undisturbed and disturbed bulk samples were obtained from the borings for laboratory testing. The approximate locations of the borings and infiltration tests are shown on the *Geologic Map*, Figure 2. The results and discussion of the infiltration testing is discussed in *Appendix C* of this report.

The soils encountered in the excavations were visually classified and logged in general accordance with American Society for Testing and Materials (ASTM) practice for Description and Identification of Soils (Visual Manual Procedure D 2488).

PROJECT NO. G2010-32-01

BORING B 1

ELEV. (MSL.) 22' DATE COMPLETED 07-13-2016

EQUIPMENT CME 75 DRILL RIG BY: J. PAGNILLO

DEPTH IN FEET	SAMPLE NO.	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				**6-INCHES-PCC PAVEMENT**			
			SC	**PREVIOUSLY PLACED FILL (Qpf)** Medium dense, damp, reddish brown, Clayey, fine to medium SAND			
2							
	B1-1 ■				52	127.7	9.4
4							
	B1-2 ■		CL	**ALLUVIUM (Qal)** Very stiff, damp, brown, fine to medium Sandy CLAY	44	111.6	17.0
6							
	B1-3 ⊠						
8							
10							
	B1-4 ■			-Stiff, moist, brown, fine to medium Sandy CLAY	33	117.4	15.2
12							
14							
	B1-5 ■			-Stiff, moist, brown to medium Sandy CLAY	32	107.3	20.2
16							
18							
20							
	B1-6 ■			-Stiff, moist, brown, fine to medium Sandy CLAY	17	102.5	22.1
22							
24							
	B1-7 ■		SM	**OLD PARALIC DEPOSITS (Qop)** Medium dense, wet, light brown, Silty, fine to medium, SAND	31	108.9	19.7
26							
		▼		-Groundwater			
28							
30							
	B1-8 ◧			-Medium dense, wet, light brown, Silty, fine to coarse SAND	25		
32							
34							

Figure A-1,
Log of Boring B 1, Page 1 of 2

G2010-32-01.GPJ

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
⊠ ... DISTURBED OR BAG SAMPLE
◣ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2010-32-01

BORING B 1

ELEV. (MSL.) 22' DATE COMPLETED 07-13-2016

EQUIPMENT CME 75 DRILL RIG BY: J. PAGNILLO

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
36	B1-9 ■			SM	-Medium dense, wet, light brown, Silty, fine to coarse SAND	30		
38								
40	B1-10 ◧				-Medium dense, wet, light brown, Silty, fine to coarse SAND	20		
					BORING TERMINATED AT 41.5 FEET Groundwater at 27 feet Boring backfilled with approx. 10 cu. ft. of bentonite/cement slurry			

Figure A-1,
Log of Boring B 1, Page 2 of 2

G2010-32-01.GPJ

SAMPLE SYMBOLS			
	☐ ... SAMPLING UNSUCCESSFUL	◧ ... STANDARD PENETRATION TEST	■ ... DRIVE SAMPLE (UNDISTURBED)
	▨ ... DISTURBED OR BAG SAMPLE	◣ ... CHUNK SAMPLE	▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

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PROJECT NO. G2010-32-01

BORING B 2

ELEV. (MSL.) **22'** DATE COMPLETED **07-13-2016**

EQUIPMENT **CME 75 DRILL RIG** BY: **J. PAGNILLO**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					**6-INCHES PCC PAVEMENT**			
				SC	**PREVIOUSLY PLACED FILL (Qpf)** Dense, damp, reddish brown, Clayey, fine to medium, SAND			
2								
	■ B2-1					70	126.4	10.1
4								
	■ B2-2			SC	**ALLUVIUM (Qal)** Medium dense, damp, dark brown, Clayey, fine to medium SAND	40	117.3	14.6
6								
	⊠ B2-3							
8								
				CL				
10								
	■ B2-4				-Stiff, moist, dark brown, Sandy CLAY	33	120.2	14.0
12								
14								
	■ B2-5				-Stiff, moist, dark brown, Sandy CLAY	27	107.1	21.1
16								
18								
20								
	■ B2-6				-Stiff, moist, dark brown, Sandy CLAY	18	115.9	19.7
22								
24								
	■ B2-7		▼		-Groundwater -Stiff, wet, brown, Sandy CLAY	34	108.6	22.2
26								
28								
30								
	■ B2-8				-Very stiff, wet, brown, Sandy CLAY	17		
32								
34								

Figure A-2,
Log of Boring B 2, Page 1 of 2

G2010-32-01.GPJ

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
⊠ ... DISTURBED OR BAG SAMPLE
◣ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

BORING B 2

ELEV. (MSL.) **22'** DATE COMPLETED **07-13-2016**

EQUIPMENT **CME 75 DRILL RIG** BY: **J. PAGNILLO**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
36 38	■ B2-9	▨		CL	-Very stiff, wet, brown, Sandy CLAY	53		
40	■ B2-10	▨		SM	**OLD PARALIC DEPOSITS (Qop)** Very dense, wet, light brown, Silty, fine to coarse SAND	61		
					BORING TERMINATED AT 41.5 FEET Groundwater at 25 feet Boring backfilled with approx. 10 cu. ft. of bentonite/cement slurry			

Figure A-2,
Log of Boring B 2, Page 2 of 2

SAMPLE SYMBOLS			
	☐ ... SAMPLING UNSUCCESSFUL	◧ ... STANDARD PENETRATION TEST	■ ... DRIVE SAMPLE (UNDISTURBED)
	⊠ ... DISTURBED OR BAG SAMPLE	◪ ... CHUNK SAMPLE	▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

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PROJECT NO. G2010-32-01

BORING B 3

ELEV. (MSL.) 22' DATE COMPLETED 07-13-2016

EQUIPMENT CME 75 DRILL RIG BY: J. PAGNILLO

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					**6-INCHES PCC PAVEMENT**			
2				SC	**PREVIOUSLY PLACED FILL (Qpf)** Medium dense, damp, dark gray, Clayey, fine to medium SAND			
	B3-1 ■					25		
4								
	B3-2 ■			CL	**ALLUVIUM (Qal)** Stiff, moist, dark brown, Sandy CLAY	35	109.6	19.8
6								
	B3-3 ▨							
8								
				SC				
10	B3-4 ■				-Very dense, moist, Clayey, fine to medium SAND	>50	118.7	11.4
12								
				SM				
14								
	B3-5 ■				-Dense, damp, light yellowish brown, Silty, fine to medium SAND	65	105.8	3.2
16								
18								
20	B3-6 ■				-Very dense, moist, light yellowish brown, Silty, fine to medium SAND	>50	107.6	12.8
22								
24			▼		-Groundwater			
	B3-7 ■			SM	**OLD PARALIC DEPOSITS (Qop)** Very dense, wet, light brown, Silty, fine to coarse SAND with gravel	>50		
26								

BORING TERMINATED AT 26.5 FEET
Groundwater at 24 feet
Boring backfilled with approx. 5 cu. ft. of bentonite/cement slurry

Figure A-3,
Log of Boring B 3, Page 1 of 1

G2010-32-01.GPJ

SAMPLE SYMBOLS			
	☐ ... SAMPLING UNSUCCESSFUL	◧ ... STANDARD PENETRATION TEST	■ ... DRIVE SAMPLE (UNDISTURBED)
	▨ ... DISTURBED OR BAG SAMPLE	◣ ... CHUNK SAMPLE	▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2010-32-01

BORING B 4

ELEV. (MSL.) 22' DATE COMPLETED 07-13-2016

EQUIPMENT CME 75 DRILL RIG BY: J. PAGNILLO

DEPTH IN FEET	SAMPLE NO.		LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0						**6-INCHES PCC PAVEMENT**			
					SC	**PREVIOUSLY PLACED FILL (Qpf)** Medium dense, damp, light brown, Clayey, fine to medium SAND			
	B4-1	■					41	114.4	8.5
	B4-2	■			SM	Dense, dry, light yellowish brown, Silty, fine to medium SAND	55	119.2	13.7
	B4-3	⊠							
10	B4-4	■			SC	**ALLUVIUM (Qal)** Dense, moist, light brown, Clayey, fine to medium SAND	58	114.3	16.3
					CL	Very stiff, moist, brown, Sandy CLAY			
	B4-5	■					62	110.7	17.5
	B4-6	■				-Stiff, moist, brown, Sandy CLAY	35	110.2	18.1
24				▼	SC	-Groundwater			
	B4-7	■				Medium dense, wet, brown, Clayey, fine to medium SAND	46	115.7	16.1
30	B4-8	◧			SM	**OLD PARALIC DEPOSITS (Qop)** Medium dense, wet, yellowish brown, Silty, fine to coarse SAND	27		

Depth scale: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34

Figure A-4,
Log of Boring B 4, Page 1 of 2

G2010-32-01.GPJ

SAMPLE SYMBOLS			
	☐ ... SAMPLING UNSUCCESSFUL	◧ ... STANDARD PENETRATION TEST	■ ... DRIVE SAMPLE (UNDISTURBED)
	⊠ ... DISTURBED OR BAG SAMPLE	◣ ... CHUNK SAMPLE	▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. G2010-32-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING B 4** ELEV. (MSL.) **22'** DATE COMPLETED **07-13-2016** EQUIPMENT **CME 75 DRILL RIG** BY: **J. PAGNILLO**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
	B4-9			SC	-Medium dense, wet, brown, Clayey, fine to medium SAND	39		
36								
38				SM				
40	B4-10				-Dense, wet, brown, Silty, fine to coarse SAND -No sample recovery	34		

BORING TERMINATED AT 41.5 FEET
Groundwater encountered at 24 feet
Boring backfilled with approx. 10 cu. ft. of bentonite/cement slurry

Figure A-4,
Log of Boring B 4, Page 2 of 2

SAMPLE SYMBOLS			
	☐ ... SAMPLING UNSUCCESSFUL	◧ ... STANDARD PENETRATION TEST	■ ... DRIVE SAMPLE (UNDISTURBED)
	⊠ ... DISTURBED OR BAG SAMPLE	◣ ... CHUNK SAMPLE	▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

APPENDIX B

APPENDIX B

LABORATORY TESTING

Laboratory tests were performed in accordance with generally accepted test methods of the American Society for Testing and Materials (ASTM) or other suggested procedures. Selected samples were tested for shear strength, grain size, consolidation, expansion potential, R-Value, and water-soluble sulfate content. The results of our laboratory tests are presented on Tables B-I through B-IV and Figures B-1 and B-2. The results of the dry density and moisture content tests are presented on the boring logs, Figures A-1 to A-4.

TABLE B-I
SUMMARY OF LABORATORY DIRECT SHEAR TEST RESULTS
ASTM D 3080

Sample No.	Geologic Unit (Soil Class)	Dry Density (pcf)	Moisture Content (%)	Peak [Ultimate] Cohesion (psf)	Peak [Ultimate] Angle of Shear Resistance (degrees)
B2-2	Qal (SC)	117.3	14.6	550 [140]	34 [35]
B3-2	Qal (CL)	109.6	19.8	1270 [550]	22 [27]

TABLE B-II
SUMMARY OF LABORATORY EXPANSION INDEX TEST RESULTS
ASTM D 4829

Sample No.	Moisture Content		Dry Density (pcf)	Expansion Index
	Before Test (%)	After Test (%)		
B1-3	9.4	22.4	110.6	59
B4-3	10.0	20.7	107.6	56

TABLE B-III
SUMMARY OF LABORATORY WATER-SOLUBLE SULFATE TEST RESULTS
CALIFORNIA TEST NO. 417

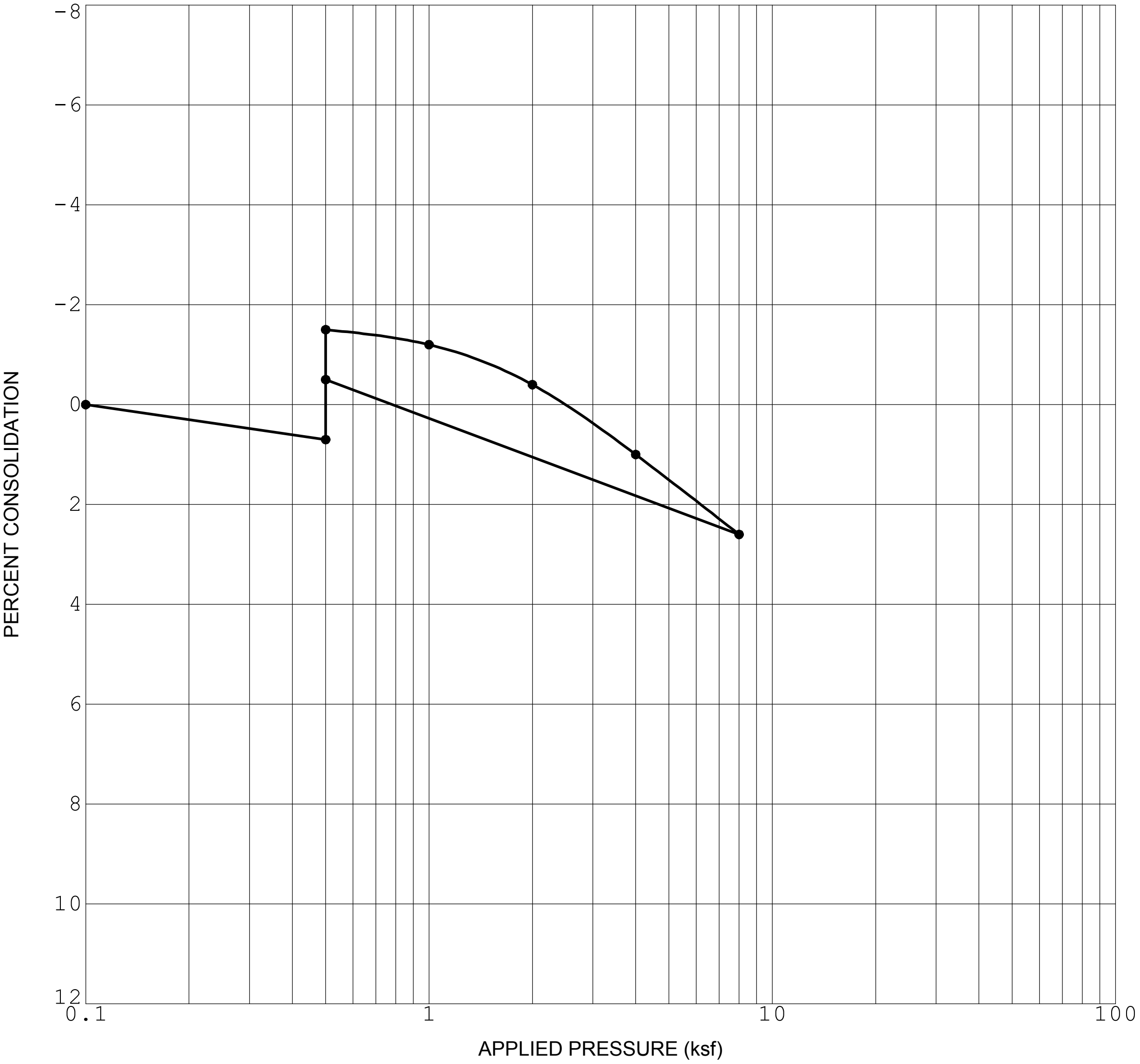
Sample No.	Water-Soluble Sulfate (%)	Sulfate Severity	Sulfate Class
B1-3	0.020	Not Applicable	S0
B4-3	0.007	Not Applicable	S0

TABLE B-IV
SUMMARY OF LABORATORY RESISTANCE VALUE (R-VALUE) TEST RESULTS
ASTM D 2844

Sample No.	Description	R-Value
B1-3	Sandy Clay (Qal)	7
B4-3	Silty Sand (Qpf)	5

PROJECT NO. G2010-32-01

SAMPLE NO. B3-1



Initial Dry Density (pcf)	108.6
Initial Water Content (%)	19.8

Initial Saturation (%)	99.9
Sample Saturated at (ksf)	.5

CONSOLIDATION CURVE

DALBERGIA STREET

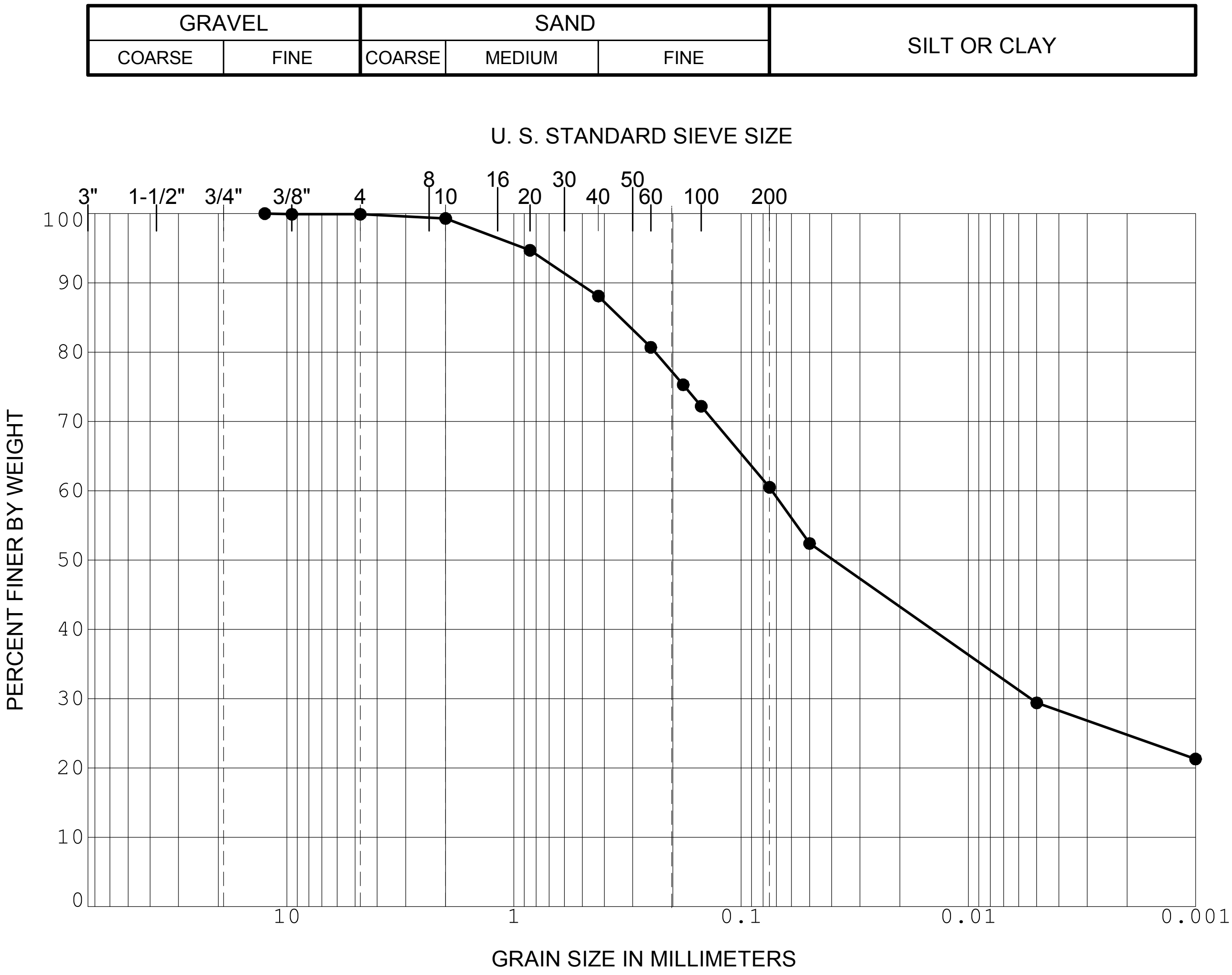
SAN DIEGO, CALIFORNIA

G2010-32-01.GPJ

Figure B-1

GEOCON

PROJECT NO. G2010-32-01



	SAMPLE	DEPTH (ft)	CLASSIFICATION	NAT WC	LL	PL	PI
●	B1-3	7.0	CL- Sandy, lean CLAY				
⧗							
▲							

GRADATION CURVE

DALBERGIA STREET

SAN DIEGO, CALIFORNIA

G2010-32-01.GPJ

Figure B-2

GEOCON

APPENDIX C

APPENDIX C

INFILTRATION INVESTIGATION

FOR

EDCO MATERIAL RECOVERY FACILITY AND TRANSFER STATION EXPANSION

3660 DALBERGIA STREET
SAN DIEGO, CALIFORNIA

PROJECT NO. G2010-32-01

APPENDIX C

STORM WATER MANAGEMENT INVESTIGATION

We understand storm water management devices are being proposed in accordance with the *2016 Model BMP Design Manual, San Diego Region*, commonly referred to as the *Storm Water Standards* (SWS). If not properly constructed, there is a potential for distress to improvements and properties located hydrologically down gradient or adjacent to these devices. Factors such as the amount of water to be detained, its residence time, and soil permeability have an important effect on seepage transmission and the potential adverse impacts that may occur if the storm water management features are not properly designed and constructed. We have not performed a hydrogeological study at the site. If infiltration of storm water runoff occurs, downstream properties may be subjected to seeps, springs, slope instability, raised groundwater, movement of foundations and slabs, or other undesirable impacts as a result of water infiltration.

Hydrologic Soil Group

The United States Department of Agriculture (USDA), Natural Resources Conservation Services, possesses general information regarding the existing soil conditions for areas within the United States. The USDA website also provides the Hydrologic Soil Group. Table C-1 presents the descriptions of the hydrologic soil groups. If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. In addition, the USDA website also provides an estimated saturated hydraulic conductivity for the existing soil.

TABLE C-1
HYDROLOGIC SOIL GROUP DEFINITIONS

Soil Group	Soil Group Definition
A	Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.
B	Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.
C	Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.
D	Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

The property is classified as urban land. No other pertinent information is provided for urban land. Table C-2 presents the information from the USDA website for the subject property.

TABLE C-2
USDA WEB SOIL SURVEY – HYDROLOGIC SOIL GROUP

Map Unit Name	**Map Unit Symbol**	**Approximate Percentage of Property**	**Hydrologic Soil Group**	**k_{SAT} of Most Limiting Layer (Inches/ Hour)**
Urban Land	Ur	100	Not Available	Not Available

In-Situ Testing

The infiltration rate, percolation rates and saturated hydraulic conductivity are different and have different meanings. Percolation rates tend to overestimate infiltration rates and saturated hydraulic conductivities by a factor of 10 or more. Table C-3 describes the differences in the definitions.

TABLE C-3
SOIL PERMEABILITY DEFINITIONS

Term	**Definition**
Infiltration Rate	The observation of the flow of water through a material into the ground downward into a given soil structure under long term conditions. This is a function of layering of soil, density, pore space, discontinuities and initial moisture content.
Percolation Rate	The observation of the flow of water through a material into the ground downward and laterally into a given soil structure under long term conditions. This is a function of layering of soil, density, pore space, discontinuities and initial moisture content.
Saturated Hydraulic Conductivity (k_{SAT}, Permeability)	The volume of water that will move in a porous medium under a hydraulic gradient through a unit area. This is a function of density, structure, stratification, fines content and discontinuities. It is also a function of the properties of the liquid as well as of the porous medium.

The degree of soil compaction or in-situ density has a significant impact on soil permeability and infiltration. Based on our experience and other studies we performed, an increase in compaction results in a decrease in soil permeability.

We performed 2 Aardvark Permeameter Tests, P-1 and P-2, at locations shown on the attached Geologic Map, Figure 2. The test borings were 4 inches in diameter. The results of the tests provide parameters regarding the saturated hydraulic conductivity characteristics of on-site soil and geologic units. Table C-4 presents the results of the estimated field saturated hydraulic conductivity and estimated infiltration rates obtained from the Aardvark Permeameter tests. The field sheets are also attached herein. We applied a feasibility factor of safety of 2 to the field results for use in preparation of Worksheet C.4-1. The results of the testing indicate an adjusted soil infiltration rate ranging between 0.002 and 0.007 inches per hour after applying a Factor of Safety of 2. Based on a discussion in the County of Riverside *Design Handbook for Low Impact Development Best Management Practices*, the infiltration rate should be considered equal to the saturated hydraulic conductivity rate.

TABLE C-4
FIELD PERMEAMETER INFILTRATION TEST RESULTS

Test No.	Geologic Unit	Test Depth (feet)	Field-Saturated Hydraulic Conductivity, k_{sat} (inch/hour)	Worksheet[1] Saturated Hydraulic Conductivity, k_{sat} (inch/hour)
P-1	Qal	5.0	0.004	0.002
P-2	Qpf	4.25	0.014	0.007

[1] Using a factor of safety of 2 for Worksheet C.4-1.

STORM WATER MANAGEMENT CONCLUSIONS

The Geologic Map, Figure 2, depicts the existing property, proposed development, the locations of the field excavations and the in-situ infiltration test locations.

Soil Types

Compacted Fill – Compacted fill exists across the existing facility or will be placed above competent alluvial materials for proper structural support (i.e. expansion parcel). The proposed storm water BMP's will be founded in compacted fill placed above native alluvial soils. The compacted fill is comprised of clayey sand. The fill has been or will be compacted to a dry density of at least 90 percent of the laboratory maximum dry density. In our experience, compacted fill does not possess infiltration rates appropriate for infiltration BMP's, as demonstrated by the in-situ testing. Hazards that occur as a result of fill soil saturation include a potential for hydro-consolidation of the granular fill soils and/or swelling of the expansive soils, long-term fill settlement, differential fill settlement, and lateral movement associated with saturated fill relaxation. The potential for lateral water migration to adversely impact existing or proposed structures, foundations, utilities, and roadways, is high. Therefore, full and partial infiltration should be considered infeasible.

Section D.4.2 of the *2016 Storm Water Standards* (SWS) provides a discussion regarding fill materials used for infiltration. The SWS states:

- *For engineered fills, infiltration rates may still be quite uncertain due to layering and heterogeneities introduced as part of construction that cannot be precisely controlled.* Due to these uncertainties, full and partial infiltration should be considered geotechnically infeasible and liners and subdrains should be used in areas where infiltration BMP's are founded in compacted fill.

- *Where possible, infiltration BMPs on fill material should be designed such that their infiltrating surface extends into native soils.* The underlying granitic rock below the compacted fill is expected between 5 to 30 feet below proposed finish grades after remedial grading is performed. Full and partial infiltration should be considered geotechnically infeasible within the compacted fill and liners and subdrains should be used. If the infiltration BMP's extended below the compacted fill, partial infiltration may be feasible.

- *Because of the uncertainty of fill parameters as well as potential compaction of the native soils, an infiltration BMP may not be feasible.* Therefore, full and partial infiltration should be considered geotechnically infeasible and liners and subdrains should be used in the fill areas.

- *If the source of fill material is defined and this material is known to be of a granular nature and that the native soils below are permeable and will not be highly compacted, infiltration through compacted fill materials may still be feasible. In this case, a project phasing approach could be used including the following general steps, (1) collect samples from areas expected to be used for fill, (2) remold samples to approximately the proposed degree of compaction and measure the saturated hydraulic conductivity of remolded samples using laboratory methods, (3) if infiltration rates appear adequate for infiltration, then apply an appropriate factor of safety and use the initial rates for preliminary design, (4) following placement of fill, conduct in-situ testing to refine design infiltration rates and adjust the design as needed.* However, based on the discussion above, it is our opinion that infiltrating into compacted fill should be considered geotechnically infeasible and liners and subdrains should be used.

Infiltration Rates

The results of the infiltration rates obtained within the compacted fill and/or alluvial materials ranged between 0.002 and 0.007 inches per hour. Therefore, based on the results of the infiltration testing, full and partial infiltration should be considered infeasible.

Groundwater Elevations

Groundwater was encountered during our field exploration at depths of approximately 24 to 27 feet below existing grades, or elevations of approximately 0.0 feet above Mean Sea Level (MSL). Groundwater is not expected to be a geotechnical constraint.

Soil or Groundwater Contamination

Based on review of the Geotracker website, soil or groundwater contamination is not expected beneath this property, however, several open and/or closed case files exist in the near vicinity. The closest active cleanup site is located at 3698 Main Street where monitoring wells are currently detecting free product (diesel, oil, and grease) after removal of several underground storage tanks. Clean-up efforts and monitoring are ongoing. Therefore, it is our opinion that infiltration BMP's could increase the mobility of nearby contamination that could adversely impact the shallow groundwater. As such, infiltration BMP's should be considered infeasible.

New or Existing Utilities

Existing utilities are present within right of ways adjacent to the existing streets, generally beneath sidewalks and roadways. We expect that all on-site utilities would be removed prior to site development. Full or partial infiltration near existing or proposed utilities should be avoided to prevent lateral water migration into the permeable trench backfill materials.

Existing and Planned Structures

Commercial, light industrial, and residential developments exist surrounding the property. Public streets are located immediately adjacent to the property boundaries. If water is allowed to infiltrate into the soil, the water could migrate laterally and into other properties and public right of ways in the vicinity of the subject site. The water migration may negatively affect other buildings and improvements in the area.

Slopes and Other Geologic Hazards

The site is relatively flat and significant slopes do not exist adjacent to the site.

Recommendations

Liners and subdrains should be incorporated into the design and construction of the planned storm water devices. The liners should be impermeable (e.g. High-density polyethylene, HDPE, with a thickness of about 30 mil or equivalent Polyvinyl Chloride**,** PVC) to prevent water migration. The subdrains should be perforated within the liner area, installed at the base and above the liner, be at least 3 inches in diameter and consist of Schedule 40 PVC pipe. The subdrains outside of the liner should consist of solid pipe. Seams and penetrations of the liners should be properly waterproofed. The subdrains should be connected to a proper outlet. The devices should also be installed in accordance with the manufacturer’s recommendations.

Storm Water Standard Worksheets

The SWS requests the geotechnical engineer complete the *Categorization of Infiltration Feasibility Condition* (Worksheet C.4-1 or I-8) worksheet information to help evaluate the potential for infiltration on the property. The attached Worksheet C.4-1 presents the completed information for the submittal process.

The regional storm water standards also have a worksheet (Worksheet D.5-1 or Form I-9) that helps the project civil engineer estimate the factor of safety based on several factors. Table C-5 describes the suitability assessment input parameters related to the geotechnical engineering aspects for the factor of safety determination.

TABLE C-5
SUITABILITY ASSESSMENT RELATED CONSIDERATIONS FOR INFILTRATION FACILITY SAFETY FACTORS

Consideration	High Concern – 3 Points	Medium Concern – 2 Points	Low Concern – 1 Point
Assessment Methods	Use of soil survey maps or simple texture analysis to estimate short-term infiltration rates. Use of well permeameter or borehole methods without accompanying continuous boring log. Relatively sparse testing with direct infiltration methods	Use of well permeameter or borehole methods with accompanying continuous boring log. Direct measurement of infiltration area with localized infiltration measurement methods (e.g., Infiltrometer). Moderate spatial resolution	Direct measurement with localized (i.e. small-scale) infiltration testing methods at relatively high resolution or use of extensive test pit infiltration measurement methods.
Predominant Soil Texture	Silty and clayey soils with significant fines	Loamy soils	Granular to slightly loamy soils
Site Soil Variability	Highly variable soils indicated from site assessment or unknown variability	Soil boring/test pits indicate moderately homogenous soils	Soil boring/test pits indicate relatively homogenous soils
Depth to Groundwater/ Impervious Layer	<5 feet below facility bottom	5-15 feet below facility bottom	>15 feet below facility bottom

Based on our geotechnical investigation and the Table C-5, Table C-6 presents the estimated factor values for the evaluation of the factor of safety. This table only presents the suitability assessment safety factor (Part A) of the worksheet. The project civil engineer should evaluate the safety factor for design (Part B) and use the combined safety factor for the design infiltration rate.

TABLE C-6
FACTOR OF SAFETY WORKSHEET DESIGN VALUES – PART A[1]

Suitability Assessment Factor Category	Assigned Weight (w)	Factor Value (v)	Product (p = w x v)
Assessment Methods	0.25	2	0.50
Predominant Soil Texture	0.25	3	0.75
Site Soil Variability	0.25	2	0.50
Depth to Groundwater/ Impervious Layer	0.25	1	0.25
Suitability Assessment Safety Factor, $S_A = \sum p$			2.00

[1] The project civil engineer should complete Worksheet D.5-1 or Form I-9 using the data on this table. Additional information is required to evaluate the design factor of safety.

Categorization of Infiltration Feasibility Condition		Worksheet C.4-1	
Part 1 - Full Infiltration Feasibility Screening Criteria **Would infiltration of the full design volume be feasible from a physical perspective without any undesirable consequences that cannot be reasonably mitigated?**			
Criteria	Screening Question	Yes	No
1	**Is the estimated reliable infiltration rate below proposed facility locations greater than 0.5 inches per hour?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.		X
Provide basis: Based on results of permeability testing in two locations at the property, the unfactored infiltration rates were measured to be 0.004 inches/hour and 0.014 inches/hour using a constant head borehole permeameter. If applying a feasibility factor of safety of 2.0, the infiltration rate would be 0.002 iph and 0.007 iph. Information collected from the USDA website is attached. The Aardvark Permeameter test results are attached. In accordance with the Riverside County storm water procedures, which reference the United States Bureau of Reclamation Well Permeameter Method (USBR 7300), the saturated hydraulic conductivity is equal to the unfactored infiltration rate.			
2	**Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.		X
Provide basis: No slopes greater than 25% are proposed in the vicinity of the proposed basins, a liquefaction potential is low, and the landslide potential is very low to negligible. However, groundwater mounding is likely to occur, and existing utilities would be in close proximity to the proposed BMP's. The potential for lateral water migration is high.			

<table>
<tr><th colspan="4">Worksheet C.4-1 Page 2 of 4</th></tr>
<tr><th>Criteria</th><th>Screening Question</th><th>Yes</th><th>No</th></tr>
<tr><td>3</td><td>Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.</td><td></td><td>X</td></tr>
<tr><td colspan="4">Provide basis: Groundwater is not located within 10 feet from any proposed infiltration BMP, however, an active clean-up site was noted on the Geotracker website in the vicinity of the property. Monitoring wells are currently observing soil contamination (diesel, oil, and grease), therefore, the risk of storm water infiltration BMP’s adversely impacting groundwater does exist.</td></tr>
<tr><td>4</td><td>Can infiltration greater than 0.5 inches per hour be allowed without causing potential water balance issues such as change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.</td><td>X</td><td></td></tr>
<tr><td colspan="4">Provide basis: We are not aware of any wells within 100 feet of the site, and given the amount of water that would infiltrate into the ground, it is our opinion there are no adverse impacts to water balance impacts to stream flow, or impacts on any downstream water rights. It should be noted that researching downstream water rights or evaluating water balance issues to stream flows is beyond the scope of the geotechnical consultant.</td></tr>
<tr><td>Part 1 Result*</td><td colspan="2">If all answers to rows 1 - 4 are “Yes” a full infiltration design is potentially feasible. The feasibility screening category is Full Infiltration

If any answer from row 1-4 is “No”, infiltration may be possible to some extent but would not generally be feasible or desirable to achieve a “full infiltration” design. Proceed to Part 2</td><td>No Infiltration</td></tr>
</table>

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by the City to substantiate findings.

Worksheet C.4-1 Page 3 of 4

Part 2 – Partial Infiltration vs. No Infiltration Feasibility Screening Criteria

Would infiltration of water in any appreciable amount be physically feasible without any negative consequences that cannot be reasonably mitigated?

Criteria	Screening Question	**Yes**	**No**
5	**Do soil and geologic conditions allow for infiltration in any appreciable rate or volume?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.		X

Provide basis: Based on results of permeability testing in two locations at the property, the unfactored infiltration rates were measured to be 0.004 inches/hour and 0.014 inches/hour using a constant head borehole permeameter. If applying a feasibility factor of safety of 2.0, the infiltration rates would be 0.002 iph and 0.007 iph, which are below the current thresholds for partial infiltration.

6	**Can Infiltration in any appreciable quantity be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.		X

Provide basis: No slopes greater than 25% are proposed in the vicinity of the proposed basins, a liquefaction potential is very low, and the landslide potential is very low to negligible. However, groundwater mounding could occur, and existing utilities are in close proximity to the proposed BMP's. The potential for lateral water migration is high.

Worksheet C.4-1 Page 4 of 4			
Criteria	Screening Question	**Yes**	**No**
7	**Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)?** The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
Provide basis: Groundwater is not located within 10 feet from any proposed infiltration BMP, therefore the risk of storm water partial infiltration BMP's adversely impacting groundwater is considered low due to the low volume of water expected to percolate into the ground beneath the subdrain.			
8	**Can infiltration be allowed without violating downstream water rights**? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.	X	
Provide basis: Geocon is not aware of any downstream water rights that would be affected by incidental infiltration of storm water. Researching downstream water rights is beyond the scope of the geotechnical consultant.			
Part 2 Result*	If all answers from row 1-4 are yes then partial infiltration design is potentially feasible. The feasibility screening category is **Partial Infiltration.** If any answer from row 5-8 is no, then infiltration of any volume is considered to be **infeasible** within the drainage area. The feasibility screening category is **No Infiltration.**	No Partial Infiltration	

*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by the City to substantiate findings.

GEOCON

Aardvark Permeameter Data Analysis

Project Name: 3660 Dalbergia
Project Number: G2010-32-01
Borehole Location: P-1
Date: 7/14/2016
By: JPP
Ref. EL (feet, MSL): 22.0
Bottom EL (feet, MSL): 17.0

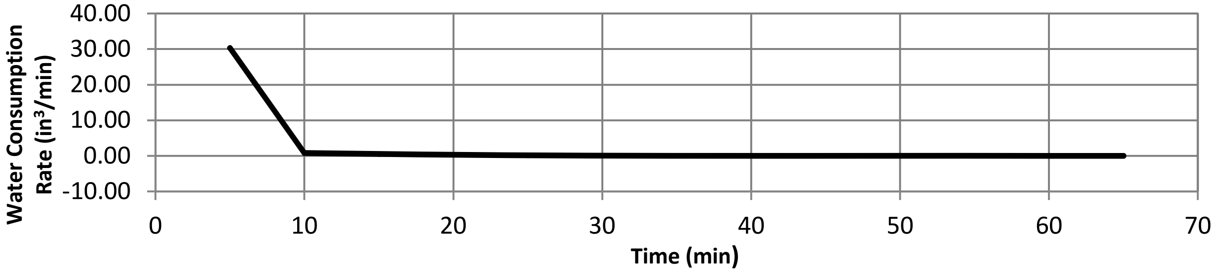
Borehole Diameter (inches): 7.00
Borehole Depth, **H** (feet): 5.00
Distance Between Reservoir & Top of Borehole (feet) 2.42
Depth to Water Table, **s** (feet): 24
Height APM Raised from Bottom (inches): 1.00

Wetted Area, **A** (in^2): 170.43

Distance Between Resevoir and APM, **D** (feet): 6.73
Head Height, **h** (inches): 6.00
Distance Between Constant Head and Water Table, **L** (inches): 234

Reading	**Time (min)**	**Time Elapsed (min)**	**Reservoir Water Weight (g)**	**Resevoir Water Weight (lbs)**	**Interval Water Consumption (lbs)**	**Total Water Consumption (lbs)**	***Water Consumption Rate (in^3/min)**
1	0.00			20.944			
2	5.00	5.00		15.472	5.47	5.47	30.34
3	10.00	5.00		15.327	0.15	5.62	0.80
4	15.00	5.00		15.234	0.09	5.71	0.52
5	20.00	5.00		15.181	0.05	5.76	0.29
6	25.00	5.00		15.155	0.03	5.79	0.14
7	30.00	5.00		15.137	0.02	5.81	0.10
8	35.00	5.00		15.119	0.02	5.83	0.10
9	40.00	5.00		15.110	0.01	5.83	0.05
10	45.00	5.00		15.106	0.00	5.84	0.02
11	50.00	5.00		15.097	0.01	5.85	0.05
12	55.00	5.00		15.093	0.00	5.85	0.02
13	60.00	5.00		15.084	0.01	5.86	0.05
14	65.00	5.00		15.080	0.00	5.86	0.02
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							

Steady Flow Rate, Q (in^3/min): 0.02



Field-Saturated Hydraulic Conductivity - Infiltration Rate

Case 1: L/h > 3 K_{sat} = 0.0001 in/min 0.004 in/hr

GEOCON

Aardvark Permeameter Data Analysis

Project Name: 3660 Dalbergia
Project Number: G2010-32-01
Borehole Location: P-2
Date: 7/14/2016
By: JPP
Ref. EL (feet, MSL): 22.0
Bottom EL (feet, MSL): 17.8

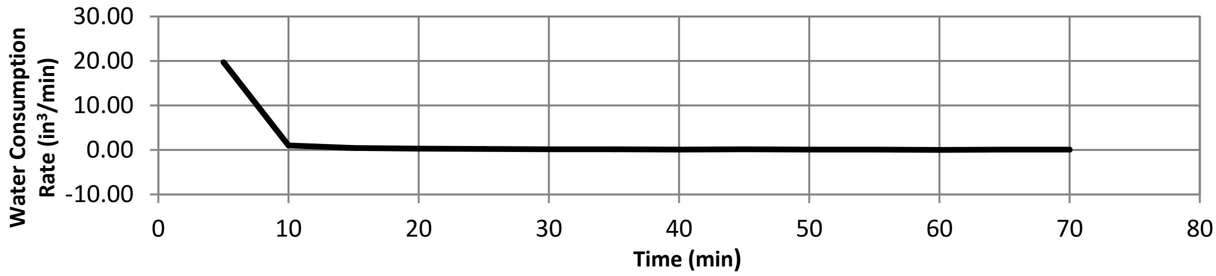
Borehole Diameter (inches): 7.00
Borehole Depth, **H** (feet): 4.25
Distance Between Reservoir & Top of Borehole (feet) 2.42
Depth to Water Table, **s** (feet): 24
Height APM Raised from Bottom (inches): 1.00

Wetted Area, **A** (in^2): 170.43

Distance Between Resevoir and APM, **D** (feet): 5.98
Head Height, **h** (inches): 6.00
Distance Between Constant Head and Water Table, **L** (inches): 243

Reading	Time (min)	Time Elapsed (min)	Reservoir Water Weight (g)	Resevoir Water Weight (lbs)	Interval Water Consumption (lbs)	Total Water Consumption (lbs)	*Water Consumption Rate (in^3/min)
1	0.00			20.313			
2	5.00	5.00		16.760	3.55	3.55	19.70
3	10.00	5.00		16.570	0.19	3.74	1.05
4	15.00	5.00		16.486	0.08	3.83	0.47
5	20.00	5.00		16.424	0.06	3.89	0.34
6	25.00	5.00		16.376	0.05	3.94	0.27
7	30.00	5.00		16.345	0.03	3.97	0.17
8	35.00	5.00		16.319	0.03	3.99	0.14
9	40.00	5.00		16.297	0.02	4.02	0.12
10	45.00	5.00		16.270	0.03	4.04	0.15
11	50.00	5.00		16.252	0.02	4.06	0.10
12	55.00	5.00		16.235	0.02	4.08	0.09
13	60.00	5.00		16.226	0.01	4.09	0.05
14	65.00	5.00		16.213	0.01	4.10	0.07
15	70.00	5.00		16.200	0.01	4.11	0.07
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							

Steady Flow Rate, Q (in^3/min): 0.07



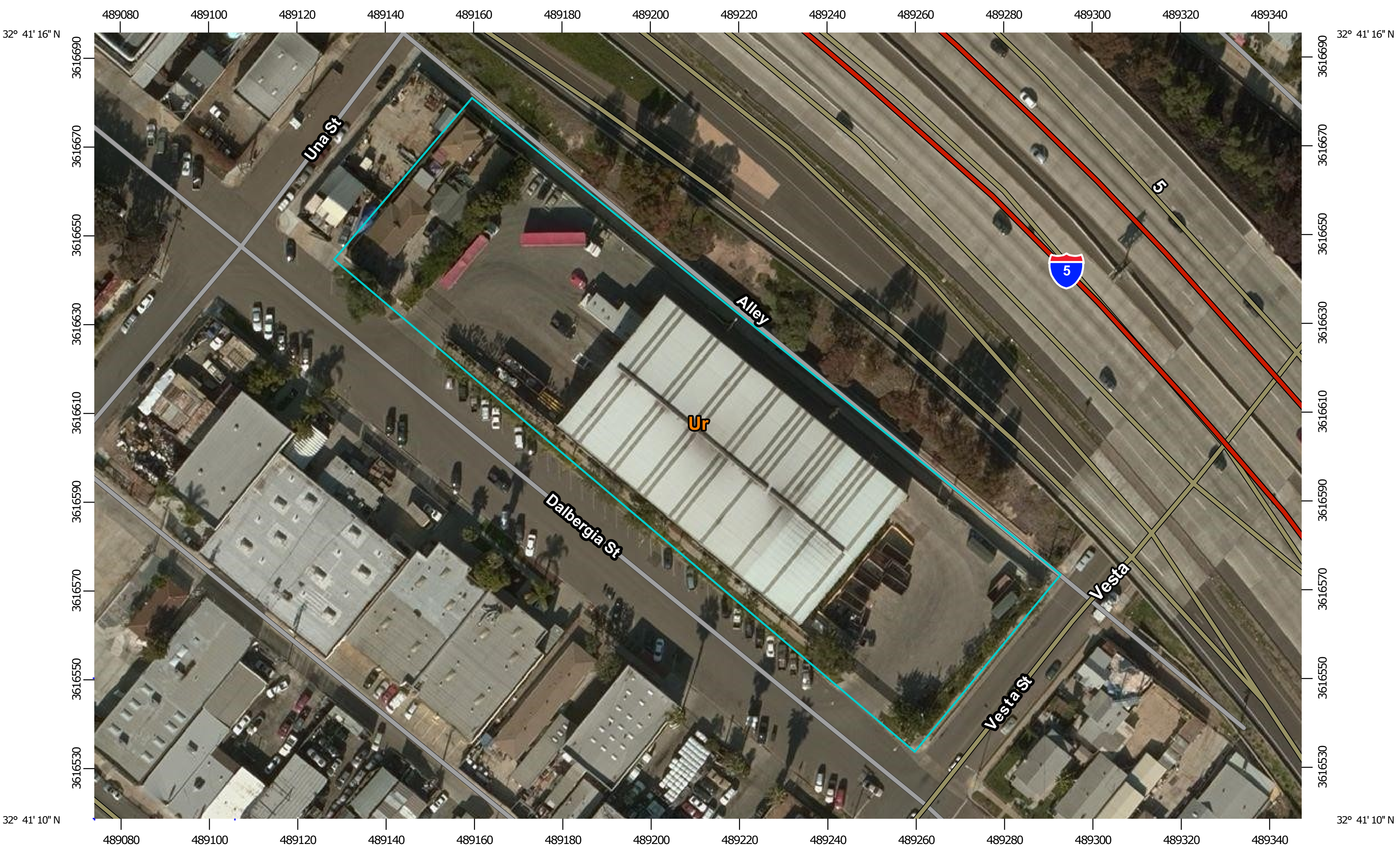
Field-Saturated Hydraulic Conductivity - Infiltration Rate

Case 1: L/h > 3 K_{sat} = 0.0002 in/min 0.014 in/hr

Soil Map—San Diego County Area, California
(3660 Dalbergia Street)

117° 6' 59" W

117° 6' 49" W



117° 6' 59" W

117° 6' 49" W

Map Scale: 1:1,250 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0, 15, 30, 60, 90

Feet: 0, 50, 100, 200, 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

- □ Area of Interest (AOI)

Soils

- □ Soil Map Unit Polygons
- 〰 Soil Map Unit Lines
- ■ Soil Map Unit Points

Special Point Features

- ◉ Blowout
- ⊠ Borrow Pit
- ✳ Clay Spot
- ◇ Closed Depression
- ✕ Gravel Pit
- ∴ Gravelly Spot
- ⊗ Landfill
- Λ Lava Flow
- ⊥ Marsh or swamp
- ⚒ Mine or Quarry
- ◉ Miscellaneous Water
- ◎ Perennial Water
- ∨ Rock Outcrop
- + Saline Spot
- ⁙ Sandy Spot
- ═ Severely Eroded Spot
- ◈ Sinkhole
- ≫ Slide or Slip
- ⊘ Sodic Spot
- ≡ Spoil Area
- ◌ Stony Spot
- ∞ Very Stony Spot
- ψ Wet Spot
- △ Other
- ╌ Special Line Features

Water Features

- ∼ Streams and Canals

Transportation

- ┼┼┼ Rails
- 〰 Interstate Highways
- 〰 US Routes
- 〰 Major Roads
- 〰 Local Roads

Background

- 🟩 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Diego County Area, California
Survey Area Data: Version 9, Sep 17, 2015

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 7, 2014—Jan 4, 2015

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

San Diego County Area, California (CA638)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
Ur	Urban land	2.1	100.0%
Totals for Area of Interest		**2.1**	**100.0%**

San Diego County Area, California

Ur—Urban land

Map Unit Composition

Urban land: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Typical profile

H1 - 0 to 6 inches: variable

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

Data Source Information

Soil Survey Area: San Diego County Area, California
Survey Area Data: Version 9, Sep 17, 2015

APPENDIX D

APPENDIX D

RECOMMENDED GRADING SPECIFICATIONS

FOR

EDCO MATERIAL RECOVERY FACILITY AND TRANSFER STATION EXPANSION
3660 DALBERGIA STREET
SAN DIEGO, CALIFORNIA

PROJECT NO. G2010-32-01

RECOMMENDED GRADING SPECIFICATIONS

1. GENERAL

1.1 These Recommended Grading Specifications shall be used in conjunction with the Geotechnical Report for the project prepared by Geocon. The recommendations contained in the text of the Geotechnical Report are a part of the earthwork and grading specifications and shall supersede the provisions contained hereinafter in the case of conflict.

1.2 Prior to the commencement of grading, a geotechnical consultant (Consultant) shall be employed for the purpose of observing earthwork procedures and testing the fills for substantial conformance with the recommendations of the Geotechnical Report and these specifications. The Consultant should provide adequate testing and observation services so that they may assess whether, in their opinion, the work was performed in substantial conformance with these specifications. It shall be the responsibility of the Contractor to assist the Consultant and keep them apprised of work schedules and changes so that personnel may be scheduled accordingly.

1.3 It shall be the sole responsibility of the Contractor to provide adequate equipment and methods to accomplish the work in accordance with applicable grading codes or agency ordinances, these specifications and the approved grading plans. If, in the opinion of the Consultant, unsatisfactory conditions such as questionable soil materials, poor moisture condition, inadequate compaction, and/or adverse weather result in a quality of work not in conformance with these specifications, the Consultant will be empowered to reject the work and recommend to the Owner that grading be stopped until the unacceptable conditions are corrected.

2. DEFINITIONS

2.1 **Owner** shall refer to the owner of the property or the entity on whose behalf the grading work is being performed and who has contracted with the Contractor to have grading performed.

2.2 **Contractor** shall refer to the Contractor performing the site grading work.

2.3 **Civil Engineer** or **Engineer of Work** shall refer to the California licensed Civil Engineer or consulting firm responsible for preparation of the grading plans, surveying and verifying as-graded topography.

2.4 **Consultant** shall refer to the soil engineering and engineering geology consulting firm retained to provide geotechnical services for the project.

2.5 **Soil Engineer** shall refer to a California licensed Civil Engineer retained by the Owner, who is experienced in the practice of geotechnical engineering. The Soil Engineer shall be responsible for having qualified representatives on-site to observe and test the Contractor's work for conformance with these specifications.

2.6 **Engineering Geologist** shall refer to a California licensed Engineering Geologist retained by the Owner to provide geologic observations and recommendations during the site grading.

2.7 **Geotechnical Report** shall refer to a soil report (including all addenda) which may include a geologic reconnaissance or geologic investigation that was prepared specifically for the development of the project for which these Recommended Grading Specifications are intended to apply.

3. MATERIALS

3.1 Materials for compacted fill shall consist of any soil excavated from the cut areas or imported to the site that, in the opinion of the Consultant, is suitable for use in construction of fills. In general, fill materials can be classified as *soil* fills, *soil-rock* fills or *rock* fills, as defined below.

3.1.1 **Soil fills** are defined as fills containing no rocks or hard lumps greater than 12 inches in maximum dimension and containing at least 40 percent by weight of material smaller than ¾ inch in size.

3.1.2 **Soil-rock fills** are defined as fills containing no rocks or hard lumps larger than 4 feet in maximum dimension and containing a sufficient matrix of soil fill to allow for proper compaction of soil fill around the rock fragments or hard lumps as specified in Paragraph 6.2. **Oversize rock** is defined as material greater than 12 inches.

3.1.3 **Rock fills** are defined as fills containing no rocks or hard lumps larger than 3 feet in maximum dimension and containing little or no fines. Fines are defined as material smaller than ¾ inch in maximum dimension. The quantity of fines shall be less than approximately 20 percent of the rock fill quantity.

3.2 Material of a perishable, spongy, or otherwise unsuitable nature as determined by the Consultant shall not be used in fills.

3.3 Materials used for fill, either imported or on-site, shall not contain hazardous materials as defined by the California Code of Regulations, Title 22, Division 4, Chapter 30, Articles 9 and 10; 40CFR; and any other applicable local, state or federal laws. The Consultant shall not be responsible for the identification or analysis of the potential presence of hazardous materials. However, if observations, odors or soil discoloration cause Consultant to suspect the presence of hazardous materials, the Consultant may request from the Owner the termination of grading operations within the affected area. Prior to resuming grading operations, the Owner shall provide a written report to the Consultant indicating that the suspected materials are not hazardous as defined by applicable laws and regulations.

3.4 The outer 15 feet of *soil-rock* fill slopes, measured horizontally, should be composed of properly compacted *soil* fill materials approved by the Consultant. *Rock* fill may extend to the slope face, provided that the slope is not steeper than 2:1 (horizontal:vertical) and a soil layer no thicker than 12 inches is track-walked onto the face for landscaping purposes. This procedure may be utilized provided it is acceptable to the governing agency, Owner and Consultant.

3.5 Samples of soil materials to be used for fill should be tested in the laboratory by the Consultant to determine the maximum density, optimum moisture content, and, where appropriate, shear strength, expansion, and gradation characteristics of the soil.

3.6 During grading, soil or groundwater conditions other than those identified in the Geotechnical Report may be encountered by the Contractor. The Consultant shall be notified immediately to evaluate the significance of the unanticipated condition.

4. CLEARING AND PREPARING AREAS TO BE FILLED

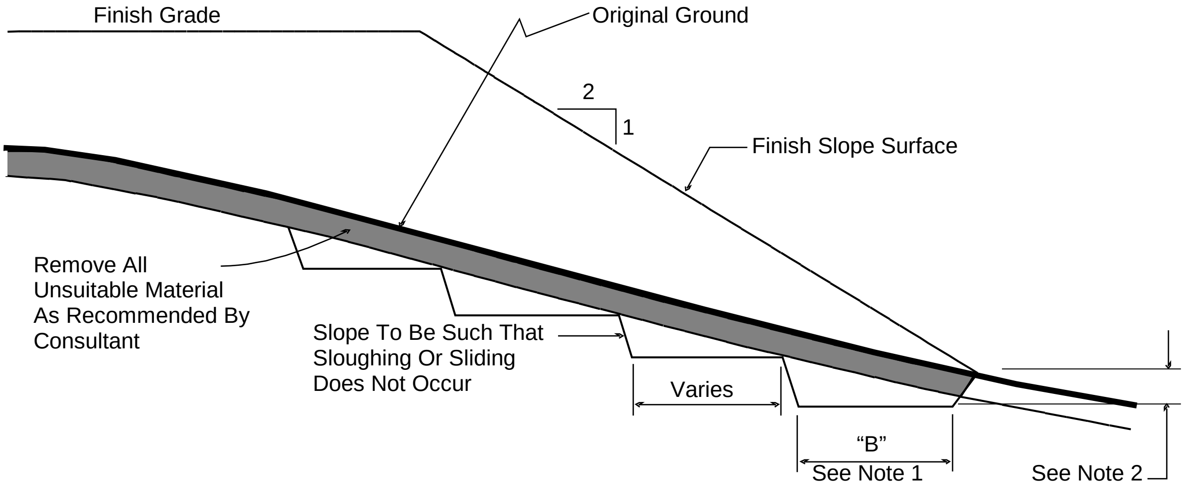
4.1 Areas to be excavated and filled shall be cleared and grubbed. Clearing shall consist of complete removal above the ground surface of trees, stumps, brush, vegetation, man-made structures, and similar debris. Grubbing shall consist of removal of stumps, roots, buried logs and other unsuitable material and shall be performed in areas to be graded. Roots and other projections exceeding 1½ inches in diameter shall be removed to a depth of 3 feet below the surface of the ground. Borrow areas shall be grubbed to the extent necessary to provide suitable fill materials.

4.2 Asphalt pavement material removed during clearing operations should be properly disposed at an approved off-site facility or in an acceptable area of the project evaluated by Geocon and the property owner. Concrete fragments that are free of reinforcing steel may be placed in fills, provided they are placed in accordance with Section 6.2 or 6.3 of this document.

4.3 After clearing and grubbing of organic matter and other unsuitable material, loose or porous soils shall be removed to the depth recommended in the Geotechnical Report. The depth of removal and compaction should be observed and approved by a representative of the Consultant. The exposed surface shall then be plowed or scarified to a minimum depth of 6 inches and until the surface is free from uneven features that would tend to prevent uniform compaction by the equipment to be used.

4.4 Where the slope ratio of the original ground is steeper than 5:1 (horizontal:vertical), or where recommended by the Consultant, the original ground should be benched in accordance with the following illustration.

TYPICAL BENCHING DETAIL



No Scale

DETAIL NOTES: (1) Key width "B" should be a minimum of 10 feet, or sufficiently wide to permit complete coverage with the compaction equipment used. The base of the key should be graded horizontal, or inclined slightly into the natural slope.

(2) The outside of the key should be below the topsoil or unsuitable surficial material and at least 2 feet into dense formational material. Where hard rock is exposed in the bottom of the key, the depth and configuration of the key may be modified as approved by the Consultant.

4.5 After areas to receive fill have been cleared and scarified, the surface should be moisture conditioned to achieve the proper moisture content, and compacted as recommended in Section 6 of these specifications.

5. COMPACTION EQUIPMENT

5.1 Compaction of *soil* or *soil-rock* fill shall be accomplished by sheepsfoot or segmented-steel wheeled rollers, vibratory rollers, multiple-wheel pneumatic-tired rollers, or other types of acceptable compaction equipment. Equipment shall be of such a design that it will be capable of compacting the *soil* or *soil-rock* fill to the specified relative compaction at the specified moisture content.

5.2 Compaction of *rock* fills shall be performed in accordance with Section 6.3.

6. PLACING, SPREADING AND COMPACTION OF FILL MATERIAL

6.1 *Soil* fill, as defined in Paragraph 3.1.1, shall be placed by the Contractor in accordance with the following recommendations:

6.1.1 *Soil* fill shall be placed by the Contractor in layers that, when compacted, should generally not exceed 8 inches. Each layer shall be spread evenly and shall be thoroughly mixed during spreading to obtain uniformity of material and moisture in each layer. The entire fill shall be constructed as a unit in nearly level lifts. Rock materials greater than 12 inches in maximum dimension shall be placed in accordance with Section 6.2 or 6.3 of these specifications.

6.1.2 In general, the *soil* fill shall be compacted at a moisture content at or above the optimum moisture content as determined by ASTM D 1557.

6.1.3 When the moisture content of *soil* fill is below that specified by the Consultant, water shall be added by the Contractor until the moisture content is in the range specified.

6.1.4 When the moisture content of the *soil* fill is above the range specified by the Consultant or too wet to achieve proper compaction, the *soil* fill shall be aerated by the Contractor by blading/mixing, or other satisfactory methods until the moisture content is within the range specified.

6.1.5 After each layer has been placed, mixed, and spread evenly, it shall be thoroughly compacted by the Contractor to a relative compaction of at least 90 percent. Relative compaction is defined as the ratio (expressed in percent) of the in-place dry density of the compacted fill to the maximum laboratory dry density as determined in accordance with ASTM D 1557. Compaction shall be continuous over the entire area, and compaction equipment shall make sufficient passes so that the specified minimum relative compaction has been achieved throughout the entire fill.

6.1.6 Where practical, soils having an Expansion Index greater than 50 should be placed at least 3 feet below finish pad grade and should be compacted at a moisture content generally 2 to 4 percent greater than the optimum moisture content for the material.

6.1.7 Properly compacted *soil* fill shall extend to the design surface of fill slopes. To achieve proper compaction, it is recommended that fill slopes be over-built by at least 3 feet and then cut to the design grade. This procedure is considered preferable to track-walking of slopes, as described in the following paragraph.

6.1.8 As an alternative to over-building of slopes, slope faces may be back-rolled with a heavy-duty loaded sheepsfoot or vibratory roller at maximum 4-foot fill height intervals. Upon completion, slopes should then be track-walked with a D-8 dozer or similar equipment, such that a dozer track covers all slope surfaces at least twice.

6.2 *Soil-rock* fill, as defined in Paragraph 3.1.2, shall be placed by the Contractor in accordance with the following recommendations:

6.2.1 Rocks larger than 12 inches but less than 4 feet in maximum dimension may be incorporated into the compacted *soil* fill, but shall be limited to the area measured 15 feet minimum horizontally from the slope face and 5 feet below finish grade or 3 feet below the deepest utility, whichever is deeper.

6.2.2 Rocks or rock fragments up to 4 feet in maximum dimension may either be individually placed or placed in windrows. Under certain conditions, rocks or rock fragments up to 10 feet in maximum dimension may be placed using similar methods. The acceptability of placing rock materials greater than 4 feet in maximum dimension shall be evaluated during grading as specific cases arise and shall be approved by the Consultant prior to placement.

6.2.3 For individual placement, sufficient space shall be provided between rocks to allow for passage of compaction equipment.

6.2.4 For windrow placement, the rocks should be placed in trenches excavated in properly compacted *soil* fill. Trenches should be approximately 5 feet wide and 4 feet deep in maximum dimension. The voids around and beneath rocks should be filled with approved granular soil having a Sand Equivalent of 30 or greater and should be compacted by flooding. Windrows may also be placed utilizing an "open-face" method in lieu of the trench procedure, however, this method should first be approved by the Consultant.

6.2.5 Windrows should generally be parallel to each other and may be placed either parallel to or perpendicular to the face of the slope depending on the site geometry. The minimum horizontal spacing for windrows shall be 12 feet center-to-center with a 5-foot stagger or offset from lower courses to next overlying course. The minimum vertical spacing between windrow courses shall be 2 feet from the top of a lower windrow to the bottom of the next higher windrow.

6.2.6 Rock placement, fill placement and flooding of approved granular soil in the windrows should be continuously observed by the Consultant.

6.3 *Rock* fills, as defined in Section 3.1.3, shall be placed by the Contractor in accordance with the following recommendations:

6.3.1 The base of the *rock* fill shall be placed on a sloping surface (minimum slope of 2 percent). The surface shall slope toward suitable subdrainage outlet facilities. The *rock* fills shall be provided with subdrains during construction so that a hydrostatic pressure buildup does not develop. The subdrains shall be permanently connected to controlled drainage facilities to control post-construction infiltration of water.

6.3.2 *Rock* fills shall be placed in lifts not exceeding 3 feet. Placement shall be by rock trucks traversing previously placed lifts and dumping at the edge of the currently placed lift. Spreading of the *rock* fill shall be by dozer to facilitate *seating* of the rock. The *rock* fill shall be watered heavily during placement. Watering shall consist of water trucks traversing in front of the current rock lift face and spraying water continuously during rock placement. Compaction equipment with compactive energy comparable to or greater than that of a 20-ton steel vibratory roller or other compaction equipment providing suitable energy to achieve the required compaction or deflection as recommended in Paragraph 6.3.3 shall be utilized. The number of passes to be made should be determined as described in Paragraph 6.3.3. Once a *rock* fill lift has been covered with *soil* fill, no additional *rock* fill lifts will be permitted over the *soil* fill.

6.3.3 Plate bearing tests, in accordance with ASTM D 1196, may be performed in both the compacted *soil* fill and in the *rock* fill to aid in determining the required minimum number of passes of the compaction equipment. If performed, a minimum of three plate bearing tests should be performed in the properly compacted *soil* fill (minimum relative compaction of 90 percent). Plate bearing tests shall then be performed on areas of *rock* fill having two passes, four passes and six passes of the compaction equipment, respectively. The number of passes required for the *rock* fill shall be determined by comparing the results of the plate bearing tests for the *soil* fill and the *rock* fill and by evaluating the deflection variation with number of passes. The required number of passes of the compaction equipment will be performed as necessary until the plate bearing deflections are equal to or less than that determined for the properly compacted *soil* fill. In no case will the required number of passes be less than two.

6.3.4 A representative of the Consultant should be present during *rock* fill operations to observe that the minimum number of "passes" have been obtained, that water is being properly applied and that specified procedures are being followed. The actual number of plate bearing tests will be determined by the Consultant during grading.

6.3.5 Test pits shall be excavated by the Contractor so that the Consultant can state that, in their opinion, sufficient water is present and that voids between large rocks are properly filled with smaller rock material. In-place density testing will not be required in the *rock* fills.

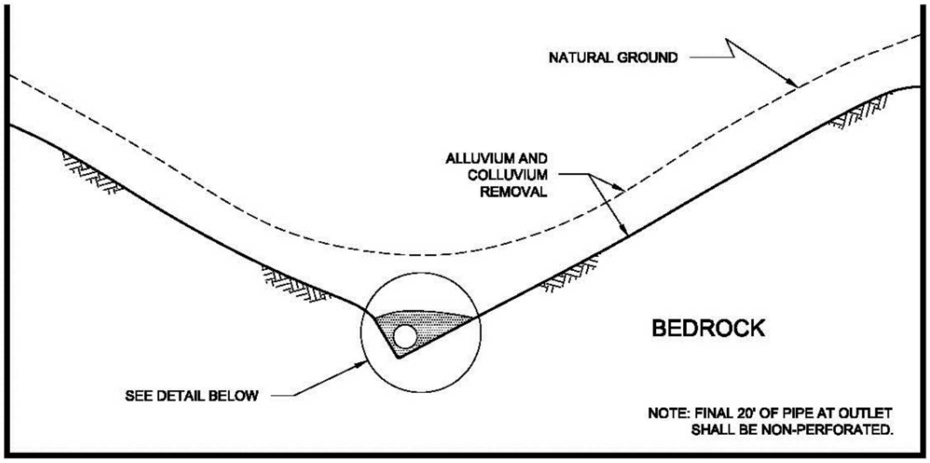
6.3.6 To reduce the potential for "piping" of fines into the *rock* fill from overlying *soil* fill material, a 2-foot layer of graded filter material shall be placed above the uppermost lift of *rock* fill. The need to place graded filter material below the *rock* should be determined by the Consultant prior to commencing grading. The gradation of the graded filter material will be determined at the time the *rock* fill is being excavated. Materials typical of the *rock* fill should be submitted to the Consultant in a timely manner, to allow design of the graded filter prior to the commencement of *rock* fill placement.

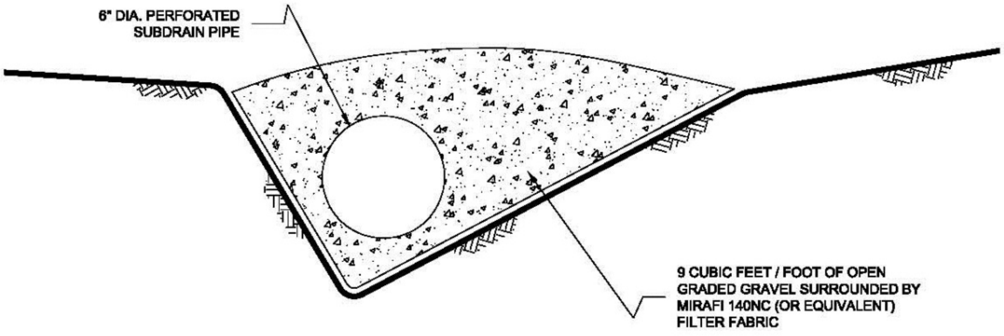
6.3.7 *Rock* fill placement should be continuously observed during placement by the Consultant.

7. SUBDRAINS

7.1 The geologic units on the site may have permeability characteristics and/or fracture systems that could be susceptible under certain conditions to seepage. The use of canyon subdrains may be necessary to mitigate the potential for adverse impacts associated with seepage conditions. Canyon subdrains with lengths in excess of 500 feet or extensions of existing offsite subdrains should use 8-inch-diameter pipes. Canyon subdrains less than 500 feet in length should use 6-inch-diameter pipes.

TYPICAL CANYON DRAIN DETAIL





NOTES:

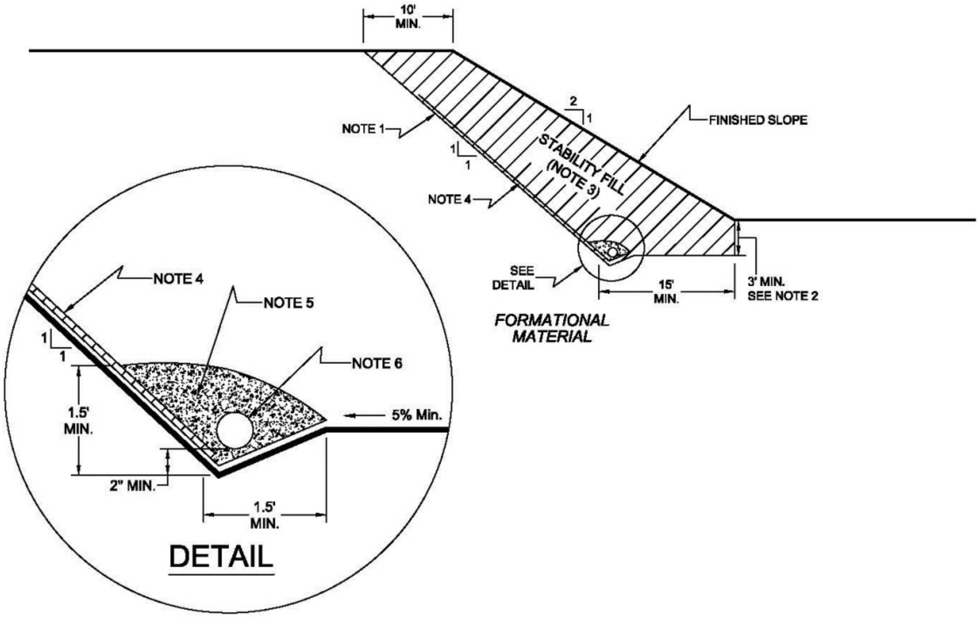
1......8-INCH DIAMETER, SCHEDULE 80 PVC PERFORATED PIPE FOR FILLS IN EXCESS OF 100-FEET IN DEPTH OR A PIPE LENGTH OF LONGER THAN 500 FEET.

2......6-INCH DIAMETER, SCHEDULE 40 PVC PERFORATED PIPE FOR FILLS LESS THAN 100-FEET IN DEPTH OR A PIPE LENGTH SHORTER THAN 500 FEET.

NO SCALE

7.2 Slope drains within stability fill keyways should use 4-inch-diameter (or lager) pipes.

TYPICAL STABILITY FILL DETAIL



NOTES:

1.....EXCAVATE BACKCUT AT 1:1 INCLINATION (UNLESS OTHERWISE NOTED).

2.....BASE OF STABILITY FILL TO BE 3 FEET INTO FORMATIONAL MATERIAL, SLOPING A MINIMUM 5% INTO SLOPE.

3.....STABILITY FILL TO BE COMPOSED OF PROPERLY COMPACTED GRANULAR SOIL.

4.....CHIMNEY DRAINS TO BE APPROVED PREFABRICATED CHIMNEY DRAIN PANELS (MIRADRAIN G200N OR EQUIVALENT) SPACED APPROXIMATELY 20 FEET CENTER TO CENTER AND 4 FEET WIDE. CLOSER SPACING MAY BE REQUIRED IF SEEPAGE IS ENCOUNTERED.

5.....FILTER MATERIAL TO BE 3/4-INCH, OPEN-GRADED CRUSHED ROCK ENCLOSED IN APPROVED FILTER FABRIC (MIRAFI 140NC).

6.....COLLECTOR PIPE TO BE 4-INCH MINIMUM DIAMETER, PERFORATED, THICK-WALLED PVC SCHEDULE 40 OR EQUIVALENT, AND SLOPED TO DRAIN AT 1 PERCENT MINIMUM TO APPROVED OUTLET.

NO SCALE

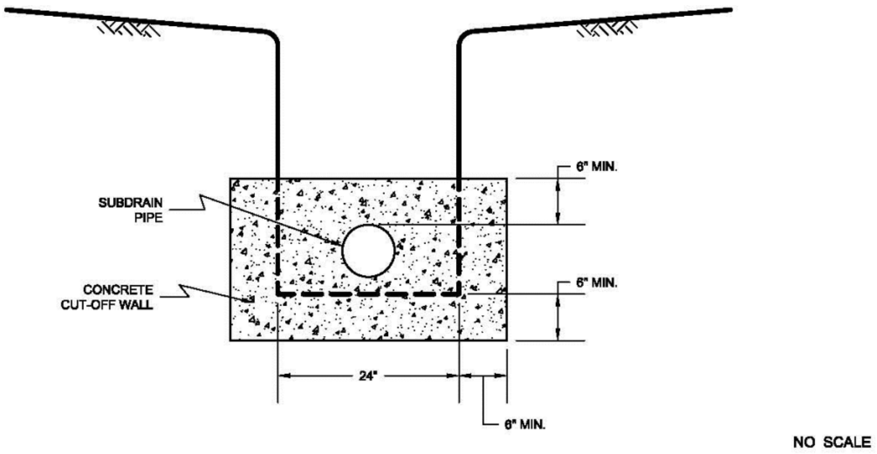
7.3 The actual subdrain locations will be evaluated in the field during the remedial grading operations. Additional drains may be necessary depending on the conditions observed and the requirements of the local regulatory agencies. Appropriate subdrain outlets should be evaluated prior to finalizing 40-scale grading plans.

7.4 *Rock* fill or *soil-rock* fill areas may require subdrains along their down-slope perimeters to mitigate the potential for buildup of water from construction or landscape irrigation. The subdrains should be at least 6-inch-diameter pipes encapsulated in gravel and filter fabric. *Rock* fill drains should be constructed using the same requirements as canyon subdrains.

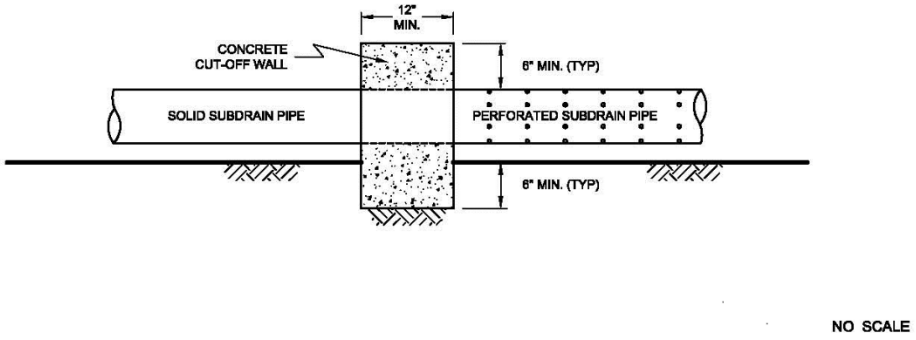
7.5 Prior to outletting, the final 20-foot segment of a subdrain that will not be extended during future development should consist of non-perforated drainpipe. At the non-perforated/ perforated interface, a seepage cutoff wall should be constructed on the downslope side of the pipe.

TYPICAL CUT OFF WALL DETAIL

FRONT VIEW



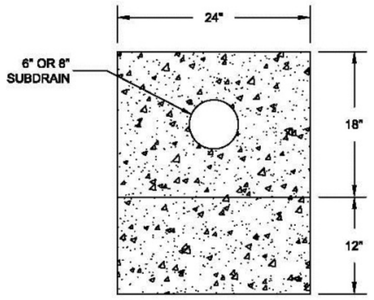
SIDE VIEW



7.6 Subdrains that discharge into a natural drainage course or open space area should be provided with a permanent headwall structure.

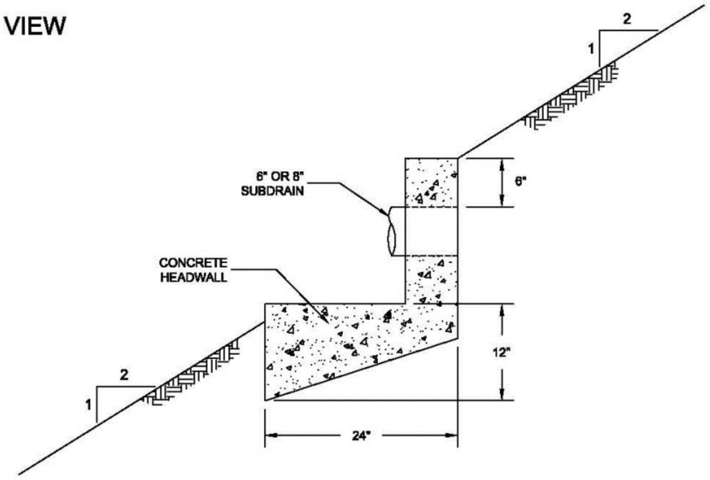
TYPICAL HEADWALL DETAIL

FRONT VIEW



NO SCALE

SIDE VIEW



NOTE: HEADWALL SHOULD OUTLET AT TOE OF FILL SLOPE
OR INTO CONTROLLED SURFACE DRAINAGE

NO SCALE

7.7 The final grading plans should show the location of the proposed subdrains. After completion of remedial excavations and subdrain installation, the project civil engineer should survey the drain locations and prepare an “as-built” map showing the drain locations. The final outlet and connection locations should be determined during grading operations. Subdrains that will be extended on adjacent projects after grading can be placed on formational material and a vertical riser should be placed at the end of the subdrain. The grading contractor should consider videoing the subdrains shortly after burial to check proper installation and functionality. The contractor is responsible for the performance of the drains.

8. OBSERVATION AND TESTING

8.1 The Consultant shall be the Owner’s representative to observe and perform tests during clearing, grubbing, filling, and compaction operations. In general, no more than 2 feet in vertical elevation of *soil* or *soil-rock* fill should be placed without at least one field density test being performed within that interval. In addition, a minimum of one field density test should be performed for every 2,000 cubic yards of *soil* or *soil-rock* fill placed and compacted.

8.2 The Consultant should perform a sufficient distribution of field density tests of the compacted *soil* or *soil-rock* fill to provide a basis for expressing an opinion whether the fill material is compacted as specified. Density tests shall be performed in the compacted materials below any disturbed surface. When these tests indicate that the density of any layer of fill or portion thereof is below that specified, the particular layer or areas represented by the test shall be reworked until the specified density has been achieved.

8.3 During placement of *rock* fill, the Consultant should observe that the minimum number of passes have been obtained per the criteria discussed in Section 6.3.3. The Consultant should request the excavation of observation pits and may perform plate bearing tests on the placed *rock* fills. The observation pits will be excavated to provide a basis for expressing an opinion as to whether the *rock* fill is properly seated and sufficient moisture has been applied to the material. When observations indicate that a layer of *rock* fill or any portion thereof is below that specified, the affected layer or area shall be reworked until the *rock* fill has been adequately seated and sufficient moisture applied.

8.4 A settlement monitoring program designed by the Consultant may be conducted in areas of *rock* fill placement. The specific design of the monitoring program shall be as recommended in the Conclusions and Recommendations section of the project Geotechnical Report or in the final report of testing and observation services performed during grading.

8.5 We should observe the placement of subdrains, to check that the drainage devices have been placed and constructed in substantial conformance with project specifications.

8.6 Testing procedures shall conform to the following Standards as appropriate:

8.6.1 Soil and Soil-Rock Fills:

8.6.1.1 Field Density Test, ASTM D 1556, *Density of Soil In-Place By the Sand-Cone Method.*

8.6.1.2 Field Density Test, Nuclear Method, ASTM D 6938, *Density of Soil and Soil-Aggregate In-Place by Nuclear Methods (Shallow Depth).*

8.6.1.3 Laboratory Compaction Test, ASTM D 1557, *Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-Pound Hammer and 18-Inch Drop.*

8.6.1.4. Expansion Index Test, ASTM D 4829, *Expansion Index Test*.

9. PROTECTION OF WORK

9.1 During construction, the Contractor shall properly grade all excavated surfaces to provide positive drainage and prevent ponding of water. Drainage of surface water shall be controlled to avoid damage to adjoining properties or to finished work on the site. The Contractor shall take remedial measures to prevent erosion of freshly graded areas until such time as permanent drainage and erosion control features have been installed. Areas subjected to erosion or sedimentation shall be properly prepared in accordance with the Specifications prior to placing additional fill or structures.

9.2 After completion of grading as observed and tested by the Consultant, no further excavation or filling shall be conducted except in conjunction with the services of the Consultant.

10. CERTIFICATIONS AND FINAL REPORTS

10.1 Upon completion of the work, Contractor shall furnish Owner a certification by the Civil Engineer stating that the lots and/or building pads are graded to within 0.1 foot vertically of elevations shown on the grading plan and that all tops and toes of slopes are within 0.5 foot horizontally of the positions shown on the grading plans. After installation of a section of subdrain, the project Civil Engineer should survey its location and prepare an *as-built* plan of the subdrain location. The project Civil Engineer should verify the proper outlet for the subdrains and the Contractor should ensure that the drain system is free of obstructions.

10.2 The Owner is responsible for furnishing a final as-graded soil and geologic report satisfactory to the appropriate governing or accepting agencies. The as-graded report should be prepared and signed by a California licensed Civil Engineer experienced in geotechnical engineering and by a California Certified Engineering Geologist, indicating that the geotechnical aspects of the grading were performed in substantial conformance with the Specifications or approved changes to the Specifications.

LIST OF REFERENCES

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2. Chiou, B. S. J., and R. R. Youngs (2008), *A NGA Model for the Average Horizontal Component of Peak Ground Motion and Response Spectra*, preprint for article to be published in NGA Special Edition for Earthquake Spectra.

3. California Geological Survey (2003), *Seismic Shaking Hazards in California, Based on the USGS/CGS Probabilistic Seismic Hazards Assessment (PSHA) Model, 2002 (revised April 2003). 10% probability of being exceeded in 50 years.* (http://redirect.conservation.ca.gov/cgs/rghm/pshamap/pshamain.html).

4. Campbell, K. W., Y. Bozorgnia (2008), *NGA Ground Motion Model for the Geometric Mean Horizontal Component of PGA, PGV, PGD and 5% Damped Linear Elastic Response Spectra for Periods Ranging from 0.01 to 10 s*, Earthquake Spectra, Volume 24, Issue 1, pages 139-171, February 2008.

5. City of San Diego, Seismic Safety Study, Geologic Hazards and Faults, 2008 edition, Map Sheet 13.

6. *Fault Activity Map of California and Adjacent Areas*, California Division of Mines and Geology, compiled by C. W. Jennings, 1994.

7. http://www.historicaerials.com.

8. *http://www.water.ca.gov*.

9. *http://websoilsurvey.nrcs.usda.gov*.

10. *http://earthquake.usgs.gov/designmaps/us/application.php*.

11. Kennedy, M. P., and S. S. Tan, *Geologic Map of the San Diego 30'x60' Quadrangle, California*, USGS Regional Map Series Map No. 3, Scale 1:100,000, 2008.

12. *Report of Field Density Testing, EDCO Recycling Facility, 3660 Dalbergia Street, San Diego, California*, prepared by C. W. La Monte Company, dated March 21, 2000.

13. Risk Engineering (2015), *EZ-FRISK (version 7.65).*

14. Unpublished reports and maps on file with Geocon Incorporated.

15. USGS (2011), Seismic Hazard Curves and Uniform Hazard Response Spectra (version 5.1.0, dated February 2, 2011), http://earthquake.usgs.gov/research/hazmaps/design/.

HYDROLOGY REPORT

Preliminary Drainage Study
For The
Enhancement of EDCO Facility

Prepared for:
EDCO Disposal Corporation
3660 Dalbergia Street
San Diego, CA 92113

Paul J Hacunda

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September 30, 2016
Revised July 11, 2017
Revised October 21, 2017
Revised December 19, 2017

TABLE OF CONTENTS

SECTION 1 INTRODUCTION/PROJECT DESCRIPTION

Introduction:

The project consists of expanding an existing recycling and transfer station located on the site. The Owner, EDCO Disposal Corporation has acquired additional adjoining land and has also proposed vacating the existing alley. The City agrees to vacate the alley.

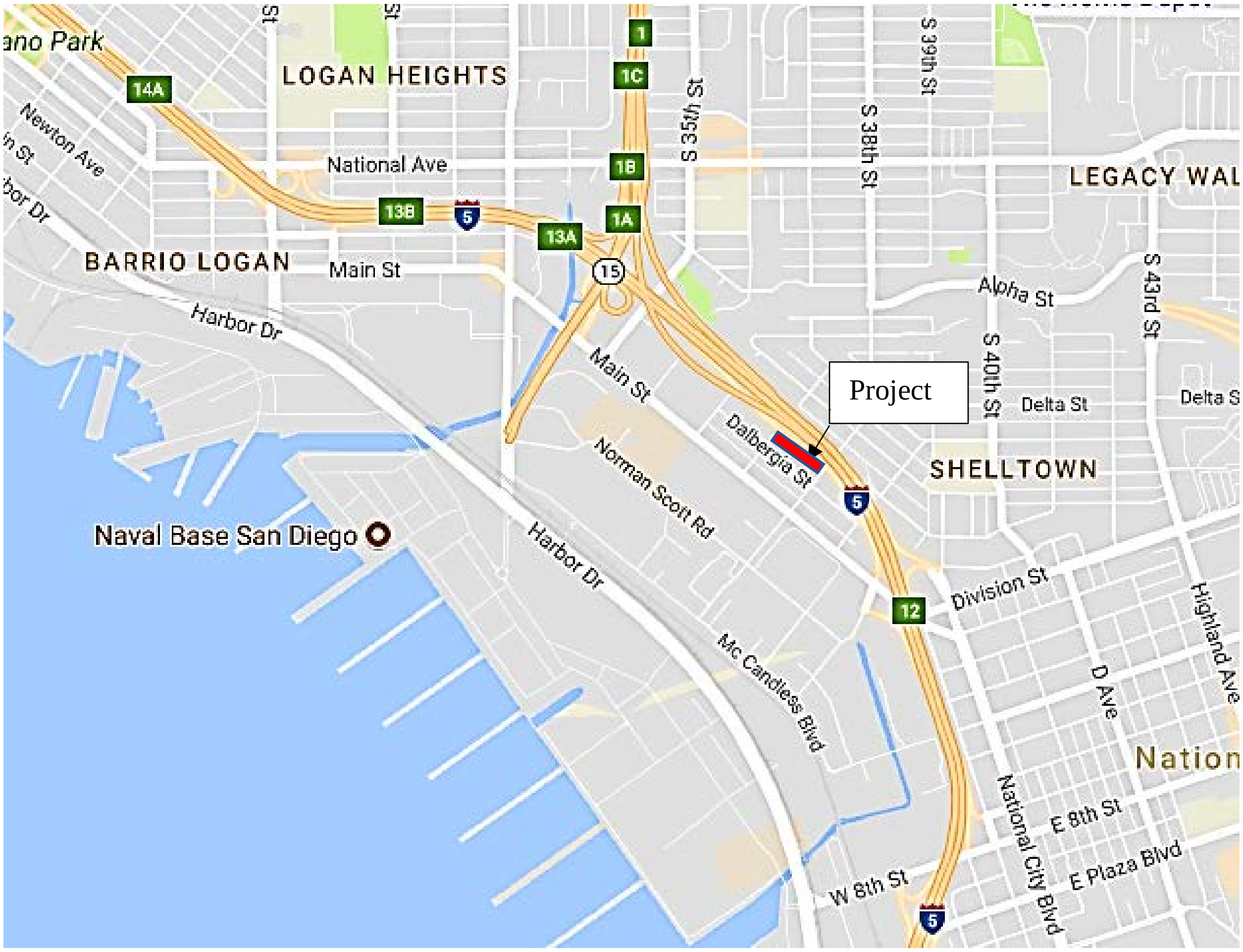

Figure 1 Regional Map

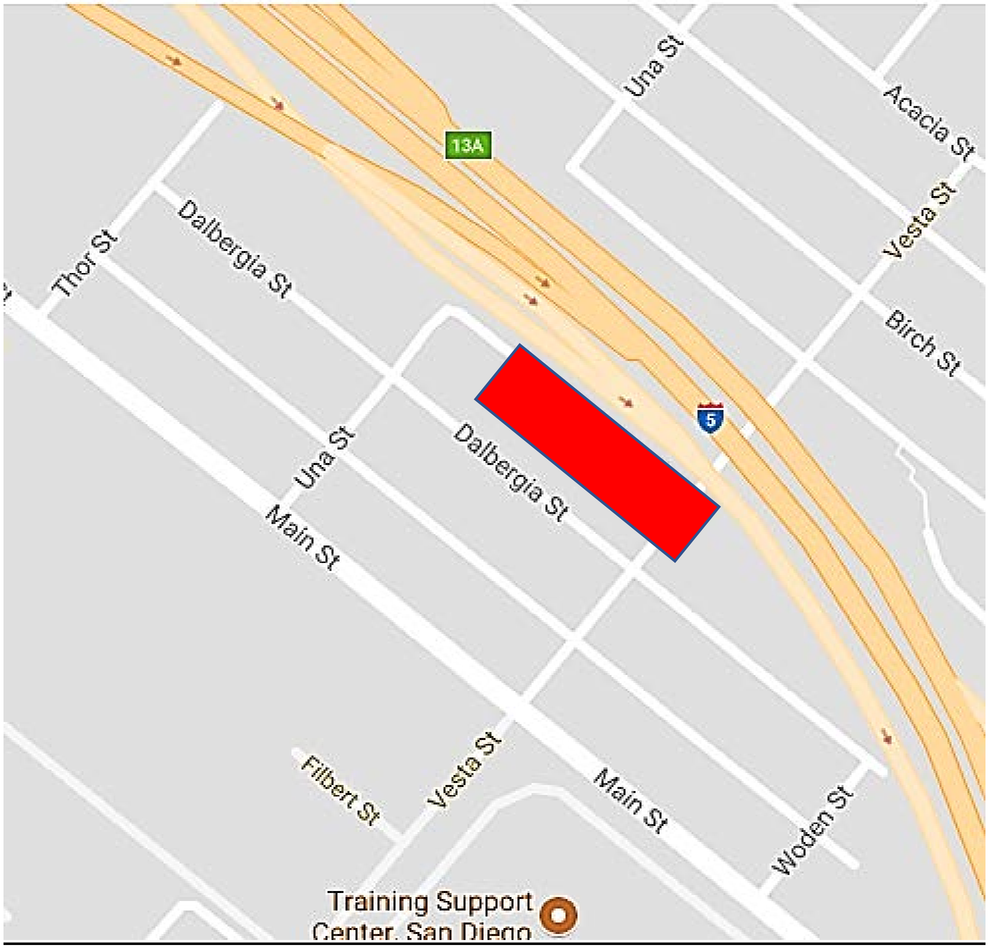

Figure 2 Vicinity Map

Existing Conditions:

Most of the site surface drains to an existing catch basin located midway in the existing alley. The catch basin is drained by an existing 15-inch concrete pipe that flows under the I-5 Freeway in a northerly direction until it reaches an existing 36-inch concrete pipe in Birch Street. That line proceeds in a northerly direction discharging into Chollas Creek and eventually into the San Diego Bay. The off-site Caltrans slope to the east of the project also drains to the alley and into the existing catch basin. The total drainage basin area including off-site contribution is 2.04-acres.

A small amount of the site (0.45-acres) drains to the west, discharging over the surface onto Dalbergia Street. The drainage then proceeds in curb and gutters and cross-gutters, southerly and westerly on Woden Street and Main Street before sheet flowing across the intersection of Main Street and Yama Street and into Paleta Creek. Paleta Creek is an unlined, earth channel that traverses the Navy Facility eventually reaching the San Diego Bay.

Proposed Conditions:

It is proposed to intercept most of the off-site Caltrans slope (Existing Drainage Areas E-8 & E-9, 0.48-acres) with a concrete v-ditch along the project's easterly boundary and divert most of the flow south to Vesta Street. A small amount of the Caltrans slope (0.05-acres) will be intercepted by a concrete v-ditch and diverted north to Una Street. To compensate for this minor diversion to the Paleta Creek watershed, it is proposed to divert some of the existing roof area (a portion of Drainage Area E-6, 0.34-acres) that currently drains to Dalbergia Street and redirect those flows into the Chollas Creek Basin.

SECTION 2 CRITERIA

The site hydrology for both the existing site condition and the re-developed condition are evaluated to assure that there is no increase in the peak storm water discharge rate due to the site improvements and the intended minor diversion of drainage area.

The City of San Diego Drainage Manual has been used as a guide in the preparation of this report.

HydroCAD® was used for the hydrology analysis of existing and proposed conditions. This program performs both the Rational, Modified Rational and SCS methods of hydrologic evaluation. As this project area is only a few acres in size the Rational Method was used. The program also calculates hydrographs and routes the hydrographs as necessary.

Precipitation: Design storms and intensities were imported from the NOAA Atlas 14 "Precipitation Frequency Data Server". An inspection of the rainfall amounts created in the software match the Rainfall Isopluvial Maps contained in the San Diego County Hydrology Manual.

Runoff Coefficient: Runoff coefficients were derived from Table 2 of the City of San Diego Drainage Manual except for the existing Caltrans slopes where a weighted c-factor was calculated. A c-factor of 0.35 was used for the slopes and a c-factor of 0.95 for the impervious area. The weighted c-factor was calculated to be 0.50.

Time of Concentration: HydroCAD® utilizes several methods to calculate Tc, including TR-55 Sheet Flow, TR-55 Shallow Concentrated Flow, Channel Flow (based on velocity) and Upland Method. As the site is so small in area, a minimum Tc of 5-minutes was used. If the time calculated is longer, it will appear in the calculations.

Intensity-Duration-Frequency: HydroCAD® calculates the IDF curves from the rainfall data downloaded from NOAA. As this project is so small in area, the 2-yr 1-hr, 10-yr 1-h, and 100-yr 1- hr. storm events were selected for design.

Tributary Areas: The contributing areas for the existing and proposed conditions are shown on the relevant maps contained in pockets in the relevant sections.

SECTION 3 PEAK RUNOFF ANALYSIS

3.1 EXISTING CONDITION PEAK RUNOFF

The existing site is made up of nine local drainage basins. The results of the hydrology analysis for the existing site conditions is summarized below:

Basin	Area (acres)	Runoff Coefficient	Time of Concentration (minutes)	2-yr 1-hr Discharge (cfs)	10-yr 1hr Discharge (cfs)	100-yr 1-h Discharge (cfs)
	A	C	Tc	Q_2	Q_{10}	Q_{100}
E-1	0.07	0.70	5	0.03	0.05	0.07
E-2	0.11	0.70	25	0.04	0.07	0.11
E-3	0.41	0.95	5	0.22	0.37	0.56
E-4	0.21	0.95	5	0.11	0.19	0.29
E-5	0.39	0.95	5	0.21	0.35	0.53
E-6	0.34	0.95	5	0.18	0.30	0.46
E-7	0.19	0.95	0	0.10	0.17	0.26
E-8	0.44	0.50	5	0.12	0.21	0.32
E-9	0.33	0.50	0	0.09	0.15	0.24

E-8 and E-9 “C”-factors were weighted (see Appendix E). All other areas were not weighted as the entire sub-area is described with one run-off factor.

The flows at the discharge points from the project are as follows:

Point of Compliance No. 1: Discharge into Existing 15-inch Concrete Pipe Under I-5 Freeway
(Includes Areas designated as E-1, E-3, E-4, E-5, E-7, E-8 and E-9)

Q_2 1-hr = 0.62 cfs
Q_{10} 1-hr = 1.48 cfs
Q_{100} 1-hr = 2.25 cfs

Point of Compliance No.2: Discharge into Dalbergia Street (at Vesta Street)
(Includes Areas designated as E-2 and E-6)

Q_2 1-hr = 0.16 cfs
Q_{10} 1-hr = 0.37 cfs
Q_{100} 1-hr = 0.57 cfs

3.2 PROPOSED CONDITION PEAK RUNOFF

The proposed site is made up of ten local drainage basins. The results of the hydrology analysis for the proposed condition is summarized as follows:

Basin	Area (acres)	Runoff Coefficient	Time of Concentration (minutes)	2-yr 1-hr Discharge (cfs)	10-yr 1hr Discharge (cfs)	100-yr 1-h Discharge (cfs)
	A	C	Tc	Q_2	Q_{10}	Q_{100}
P-1	0.21	0.95	12.0	0.11	0.19	0.29
P-2	0.19	0.95	17.1	0.10	0.17	0.26
P-3	0.28	0.95	18.7	0.15	0.25	0.38
P-4	0.10	0.95	5.0	0.05	0.09	0.14
P-5	0.65	0.95	5.0	0..35	0.58	0.88
P-6	0.34	0.95	5.0	0.18	0.30	0.46
P-7	0.10	0.95	5.0	0.05	0.09	0.14
P-8	0.10	0.95	5.1	0.05	0.09	0.14
O-1	0.05	0.35	13.5	0.01	0.02	0.03
O-2	0.48	0.35	17.1	0.09	0.16	0.24

The two areas Labeled as X-1 and X-2 are intended to be constructed as catchment areas with no discharge. The landscape architect has proposed crushed rock in these areas.

The flows at the discharge points from the proposed project are as follows:

Point of Compliance No. 1: Discharge into Existing 15-inch Concrete Pipe Under I-5 Freeway
(Includes Areas designated as P-1, P-2, P-3, P-4, P-5, P-6, P-7 and P-8)

Q_2 1-hr = 0.61-cfs
Q_{10} 1-hr = 1.22-cfs
Q_{100} 1-hr = 1.96-cfs

The above calculated flows are those flows entering the pumping station in the tunnel. The flows will be discharged via three pumps. A single pump will discharge at 0 to 275-gpm or a maximum of 0.61-cfs and then a second 275-gpm pump will begin pumping to a combined flow of 550-gpm or 1.22-cfs and finally a third pump will begin pumping for a combined flow of 880-gpm or 1.96-cfs. The discharge rates from the pumping plant will decrease due to the storage provided in the wet well and combined heads.

Point of Compliance No.2: Discharge into Dalbergia Street (at Vesta Street)
(Includes Areas designated as O-1 and O-2)

Q_2 1-hr = 0.10 cfs
Q_{10} 1-hr = 0.18 cfs
Q_{100} 1-hr = 0.27 cfs

SECTION 4 RUNOFF RATE INCREASE EVALUATION

The following table provides a comparison of the existing and proposed flows at the points of concern (POC):

	Storm Event	Existing Discharge	Proposed Discharge
POC No. 1	Q_2	0.62-cfs	0.61-cfs*
	Q_{10}	1.48-cfs	1.22-cfs*
	Q_{100}	2.25-cfs	1.96-cfs*
POC No. 2	Q_2	0.16-cfs	0.10-cfs
	Q_{10}	0.37-cfs	0.18-cfs
	Q_{100}	0.57-cfs	0.27-cfs

*Pumped Discharge

SECTION 5 401/404 PERMITS

The project does not require any modifications to existing drainage improvements nor any proposed drainage improvements located within any waters of the United States. No Permit is required.

SECTION 6 SUMMARY & CONCLUSIONS

This report concludes that the proposed re-development project which includes, vacating the existing alley and existing storm drainage, can be designed to comply with the relevant City Drainage Codes, Policies and General Permits. Although the proposed re-development project increases the size of the existing facilities, the percent of impervious surface is unchanged from the existing facility to the re-developed facility. The Caltrans right-of-way runoff can be re-directed to the City Streets (Una and Vesta) without impacting downstream facilities, i.e. the existing curb and gutter in Dalbergia Street, Woden Street, Main Street and Yama Street, nor the Paleta Creek channel. The discharge to Chollas Creek has been detained through the Rainwater Harvest System and the pump system storage facility such that the proposed discharge flows are less than the existing flows.

SECTION 7 REFERENCES

San Diego County Hydrology Manual dated June 2013
City of San Diego Drainage Manual dated 2017
Model BMP Design Manual, San Diego Region, dated February 2016

SECTION 8 APPENDICES

Appendix A	Existing Conditions Hydrology Map
Appendix B	Existing Conditions HydroCAD® Results
Appendix C	Proposed Conditions Hydrology Map
Appendix D	Proposed Conditions HydroCAD® Results
Appendix E	C-Factor Calculations

Appendix A
Existing Conditions Hydrology Map

SCALE: 1"=20'
0 10' 20' 40' 60'

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A PUBLIC SERVICE BY UNDERGROUND SERVICE ALERT

NOTE: WORK CONTAINED WITHIN THESE PLANS SHALL NOT COMMENCE UNTIL AN ENCROACHMENT PERMIT AND/OR A GRADING PERMIT HAS BEEN ISSUED.

THE PRIVATE ENGINEER SIGNING THESE PLANS IS RESPONSIBLE FOR ASSURING THE ACCURACY AND ACCEPTABILITY OF THE DESIGN HEREON. IN THE EVENT OF DISCREPANCIES ARISING AFTER COUNTY APPROVAL OR DURING CONSTRUCTION, THE PRIVATE ENGINEER SHALL BE RESPONSIBLE FOR DETERMINING AN ACCEPTABLE SOLUTION AND REVISING THE PLANS FOR APPROVAL BY THE COUNTY.

MARK	BY	DATE	REVISIONS	APPR.	DATE
ENGINEER				COUNTY	

SEAL-ENGINEER
PAUL J. HACUNDA
No. 41627

PAUL J. HACUNDA, PE
16 LAKERIDGE TRABUCO CANYON, CA 92679
CA PE LIC No 41627

PREPARED BY:
R.C.E. NO.
DATE Jul. 31, 16

BENCHMARK:
SEE ABOVE

SCALE:
AS SHOWN

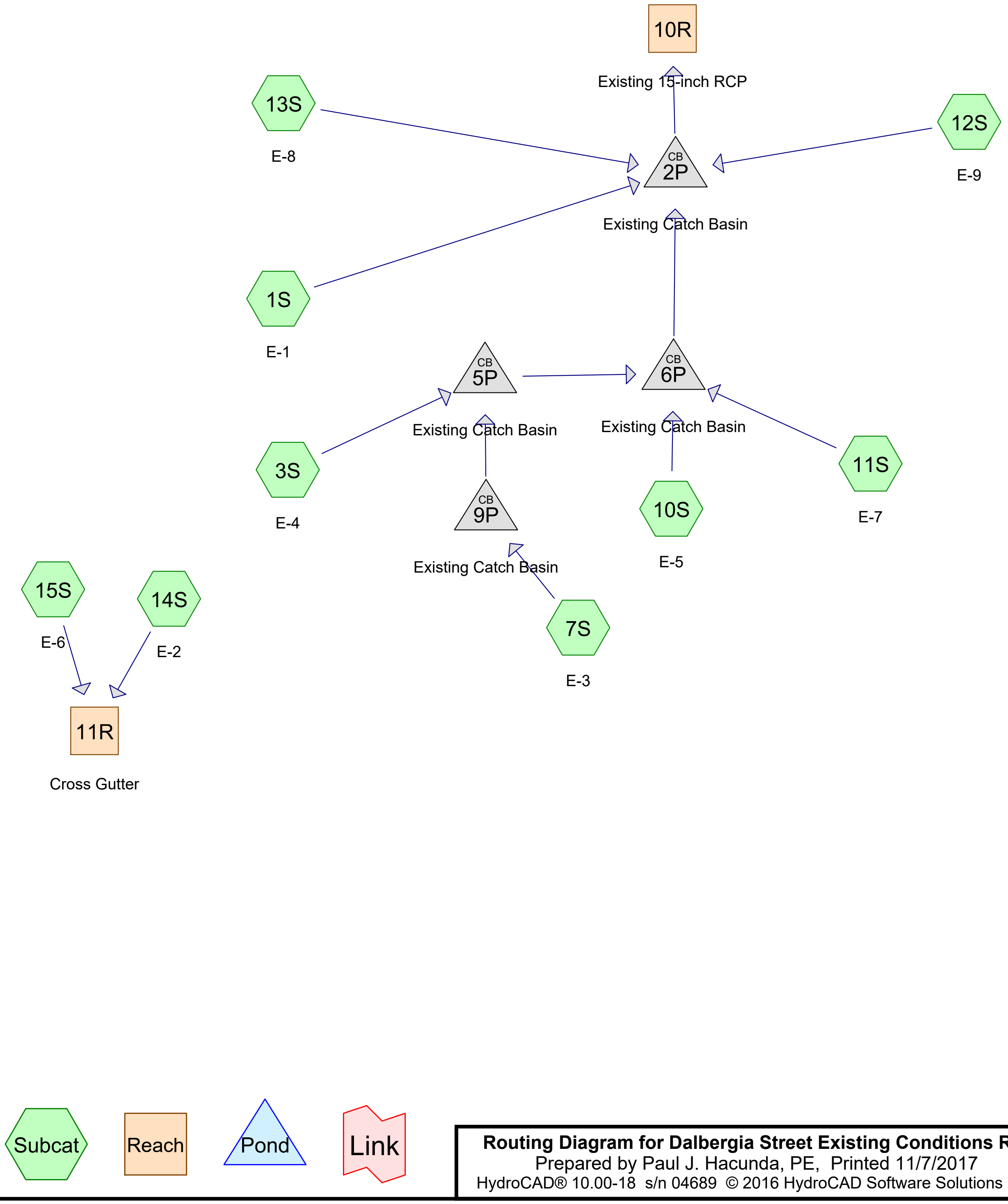
EXISTING DRAINAGE CONDITIONS
3608–3688 DALBERGIA STREET
SAN DIEGO, CA 92113

FOR:
W.O.
COUNTY FILE NO.

SHEET NO.
1
OF X SHTS

Drawing: C:\Users\ray\Desktop\My Work\Dalbergia Street\Existing Drainage Conditions.dwg Layout: Layout1 Last Saved: Sun Jul 31, 2016 – 10:38am Last Plotted: Sun Jul 31, 2016 – 11:35am By: ray

Appendix B
Existing Conditions
HydroCAD® Results
2-year, 1-hour
10-year, 1-hour
100-year, 1-hour



Routing Diagram for Dalbergia Street Existing Conditions Rev 1
Prepared by Paul J. Hacunda, PE, Printed 11/7/2017
HydroCAD® 10.00-18 s/n 04689 © 2016 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	C	Description (subcatchment-numbers)
0.180	0.70	City of San Diego Table 2 (1S, 14S)
1.540	0.95	City of San Diego Table 2 (3S, 7S, 10S, 11S, 15S)
0.770	0.50	City of San Diego Table 2 (12S, 13S)
2.490	**0.79**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
2.490	Other	1S, 3S, 7S, 10S, 11S, 12S, 13S, 14S, 15S
2.490		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	2.490	2.490	City of San Diego Table 2	1S, 3S, 7S, 10S, 11S, 12S, 13S, 14S, 15S
0.000	**0.000**	**0.000**	**0.000**	**2.490**	**2.490**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	10R	17.46	11.00	520.0	0.0124	0.013	15.0	0.0	0.0
2	2P	16.00	13.25	550.0	0.0050	0.011	15.0	0.0	0.0
3	5P	19.50	17.10	100.0	0.0240	0.010	10.0	0.0	0.0
4	6P	17.70	17.00	15.0	0.0467	0.010	10.0	0.0	0.0
5	9P	21.00	19.50	85.0	0.0176	0.010	8.0	0.0	0.0

Time span=0.00-6.00 hrs, dt=0.01 hrs, 601 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: E-1 Runoff Area=0.070 ac 0.00% Impervious Runoff Depth=0.39"
Flow Length=340' Tc=5.0 min C=0.70 Runoff=0.03 cfs 0.002 af

Subcatchment 3S: E-4 Runoff Area=0.210 ac 100.00% Impervious Runoff Depth=0.53"
Flow Length=155' Slope=0.0200 '/' Tc=5.0 min C=0.95 Runoff=0.11 cfs 0.009 af

Subcatchment 7S: E-3 Runoff Area=0.410 ac 100.00% Impervious Runoff Depth=0.53"
Flow Length=240' Tc=5.0 min C=0.95 Runoff=0.22 cfs 0.018 af

Subcatchment 10S: E-5 Runoff Area=0.390 ac 100.00% Impervious Runoff Depth=0.53"
Flow Length=215' Tc=5.0 min C=0.95 Runoff=0.21 cfs 0.017 af

Subcatchment 11S: E-7 Runoff Area=0.190 ac 100.00% Impervious Runoff Depth=0.53"
Flow Length=120' Slope=0.0050 '/' Tc=5.0 min C=0.95 Runoff=0.10 cfs 0.008 af

Subcatchment 12S: E-9 Runoff Area=0.330 ac 0.00% Impervious Runoff Depth=0.28"
Flow Length=260' Tc=5.0 min C=0.50 Runoff=0.09 cfs 0.008 af

Subcatchment 13S: E-8 Runoff Area=0.440 ac 0.00% Impervious Runoff Depth=0.28"
Flow Length=335' Tc=5.0 min C=0.50 Runoff=0.12 cfs 0.010 af

Subcatchment 14S: E-2 Runoff Area=0.110 ac 0.00% Impervious Runoff Depth=0.39"
Flow Length=105' Slope=0.0050 '/' Tc=25.1 min C=0.70 Runoff=0.04 cfs 0.004 af

Subcatchment 15S: E-6 Runoff Area=0.340 ac 100.00% Impervious Runoff Depth=0.53"
Flow Length=255' Tc=5.0 min C=0.95 Runoff=0.18 cfs 0.015 af

Reach 10R: Existing 15-inch RCP Avg. Flow Depth=0.30' Max Vel=3.99 fps Inflow=0.89 cfs 0.073 af
15.0" Round Pipe n=0.013 L=520.0' S=0.0124 '/' Capacity=7.20 cfs Outflow=0.89 cfs 0.073 af

Reach 11R: Cross Gutter Avg. Flow Depth=0.09' Max Vel=1.00 fps Inflow=0.23 cfs 0.019 af
n=0.013 L=100.0' S=0.0050 '/' Capacity=1.33 cfs Outflow=0.23 cfs 0.019 af

Pond 2P: Existing Catch Basin Peak Elev=16.46' Inflow=0.89 cfs 0.073 af
15.0" Round Culvert n=0.011 L=550.0' S=0.0050 '/' Outflow=0.89 cfs 0.073 af

Pond 5P: Existing Catch Basin Peak Elev=19.80' Inflow=0.33 cfs 0.027 af
10.0" Round Culvert n=0.010 L=100.0' S=0.0240 '/' Outflow=0.33 cfs 0.027 af

Pond 6P: Existing Catch Basin Peak Elev=18.13' Inflow=0.64 cfs 0.053 af
10.0" Round Culvert n=0.010 L=15.0' S=0.0467 '/' Outflow=0.64 cfs 0.053 af

Pond 9P: Existing Catch Basin Peak Elev=21.26' Inflow=0.22 cfs 0.018 af
8.0" Round Culvert n=0.010 L=85.0' S=0.0176 '/' Outflow=0.22 cfs 0.018 af

Total Runoff Area = 2.490 ac Runoff Volume = 0.092 af Average Runoff Depth = 0.44"
38.15% Pervious = 0.950 ac 61.85% Impervious = 1.540 ac

Summary for Subcatchment 1S: E-1

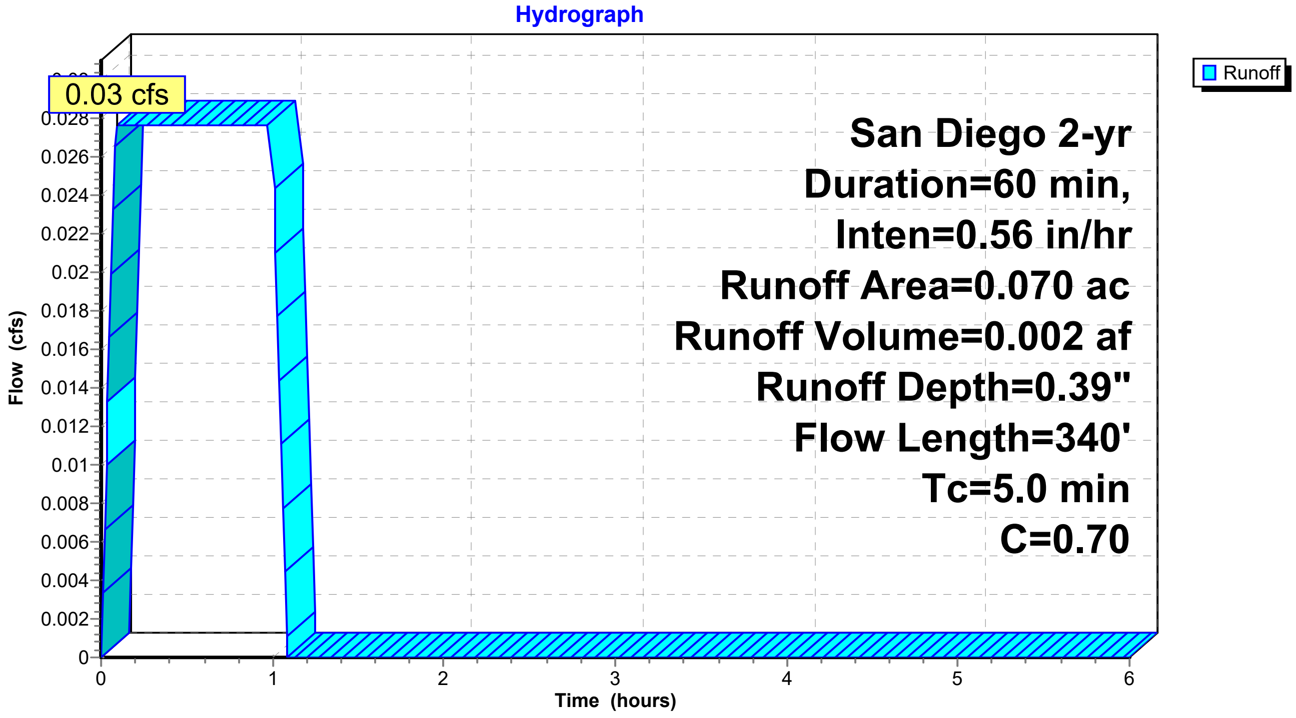
Runoff = 0.03 cfs @ 0.09 hrs, Volume= 0.002 af, Depth= 0.39"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
San Diego 2-yr Duration=60 min, Inten=0.56 in/hr

Area (ac)	C	Description
0.070	0.70	City of San Diego Table 2
0.070		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	90	0.0200	0.95		**Sheet Flow, Residential Lot** Smooth surfaces n= 0.011 P2= 1.60"
1.6	250	0.0160	2.57		**Shallow Concentrated Flow, Alley Flow** Paved Kv= 20.3 fps
3.2	340	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 1S: E-1



Summary for Subcatchment 3S: E-4

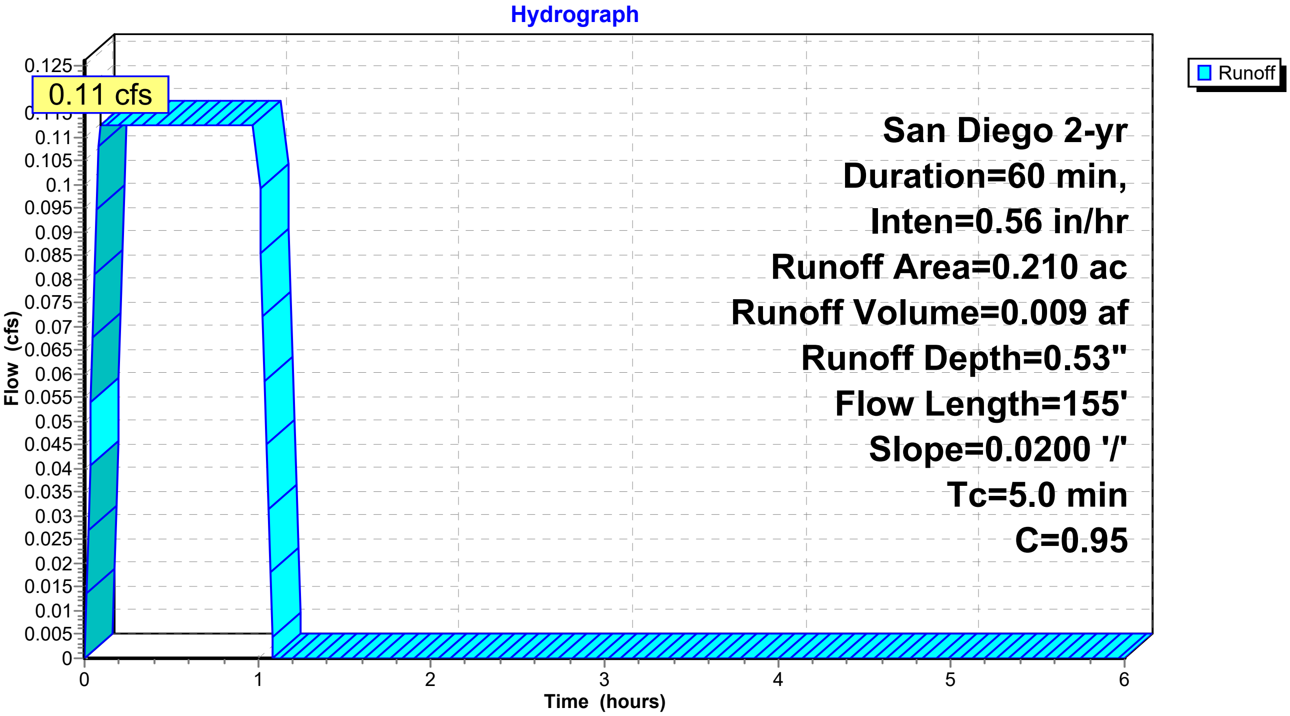
Runoff = 0.11 cfs @ 0.09 hrs, Volume= 0.009 af, Depth= 0.53"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
San Diego 2-yr Duration=60 min, Inten=0.56 in/hr

Area (ac)	C	Description
0.210	0.95	City of San Diego Table 2
0.210		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	155	0.0200	1.06		**Sheet Flow, Pavement** Smooth surfaces n= 0.011 P2= 1.60"
2.4	155	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 3S: E-4



Summary for Subcatchment 7S: E-3

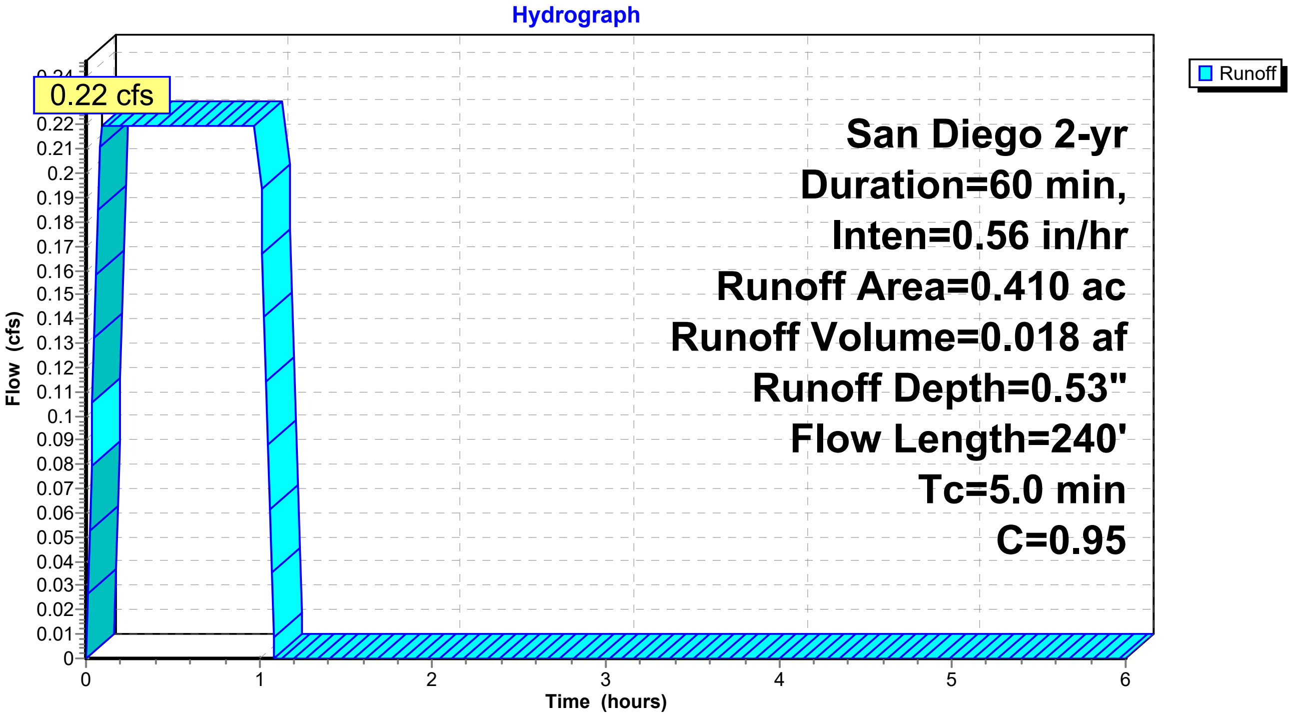
Runoff = 0.22 cfs @ 0.09 hrs, Volume= 0.018 af, Depth= 0.53"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
San Diego 2-yr Duration=60 min, Inten=0.56 in/hr

Area (ac)	C	Description
0.410	0.95	City of San Diego Table 2
0.410		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	65	0.2500	2.45		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 1.60"
1.9	120	0.0050	1.06		**Shallow Concentrated Flow, Swale along wall** Grassed Waterway Kv= 15.0 fps
1.4	55	0.0100	0.65		**Sheet Flow, Paved Surface** Smooth surfaces n= 0.011 P2= 1.60"
3.7	240	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 7S: E-3



Summary for Subcatchment 10S: E-5

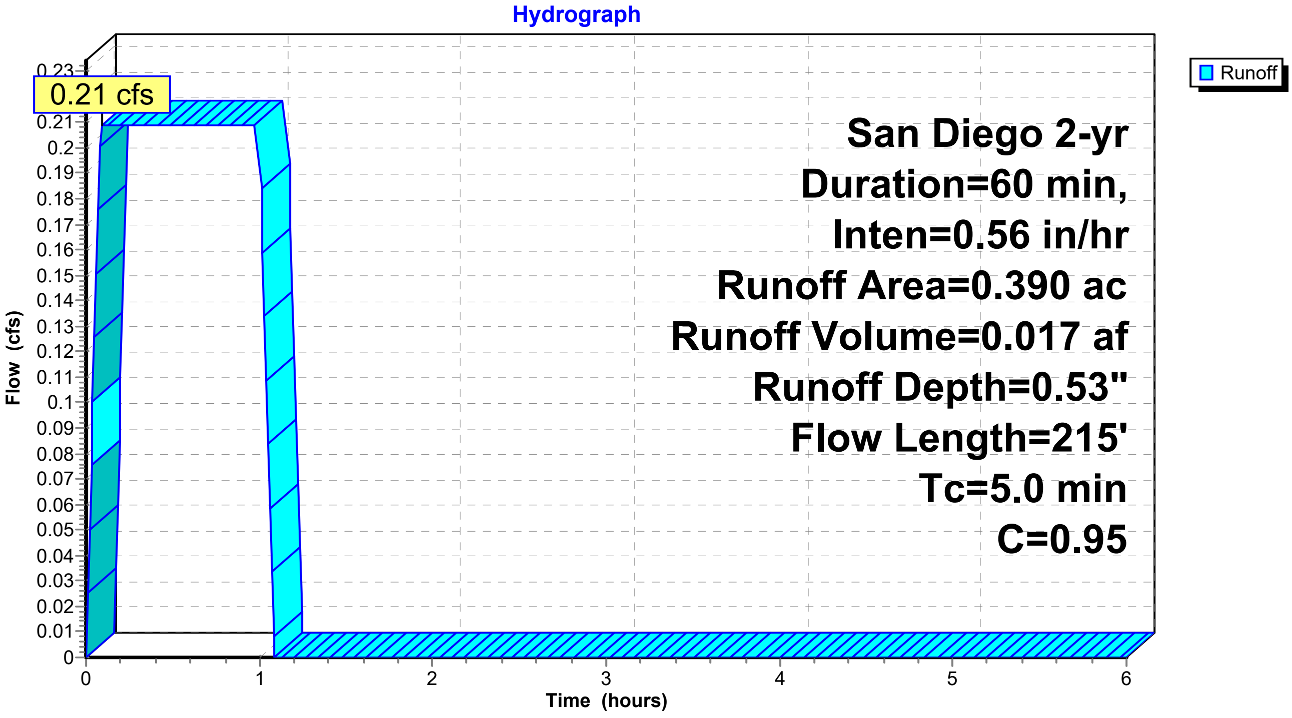
Runoff = 0.21 cfs @ 0.09 hrs, Volume= 0.017 af, Depth= 0.53"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
San Diego 2-yr Duration=60 min, Inten=0.56 in/hr

Area (ac)	C	Description
0.390	0.95	City of San Diego Table 2
0.390		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	70	0.2500	2.49		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 1.60"
1.2	145	0.0100	2.03		**Shallow Concentrated Flow, Alley** Paved Kv= 20.3 fps
1.7	215	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 10S: E-5



Summary for Subcatchment 11S: E-7

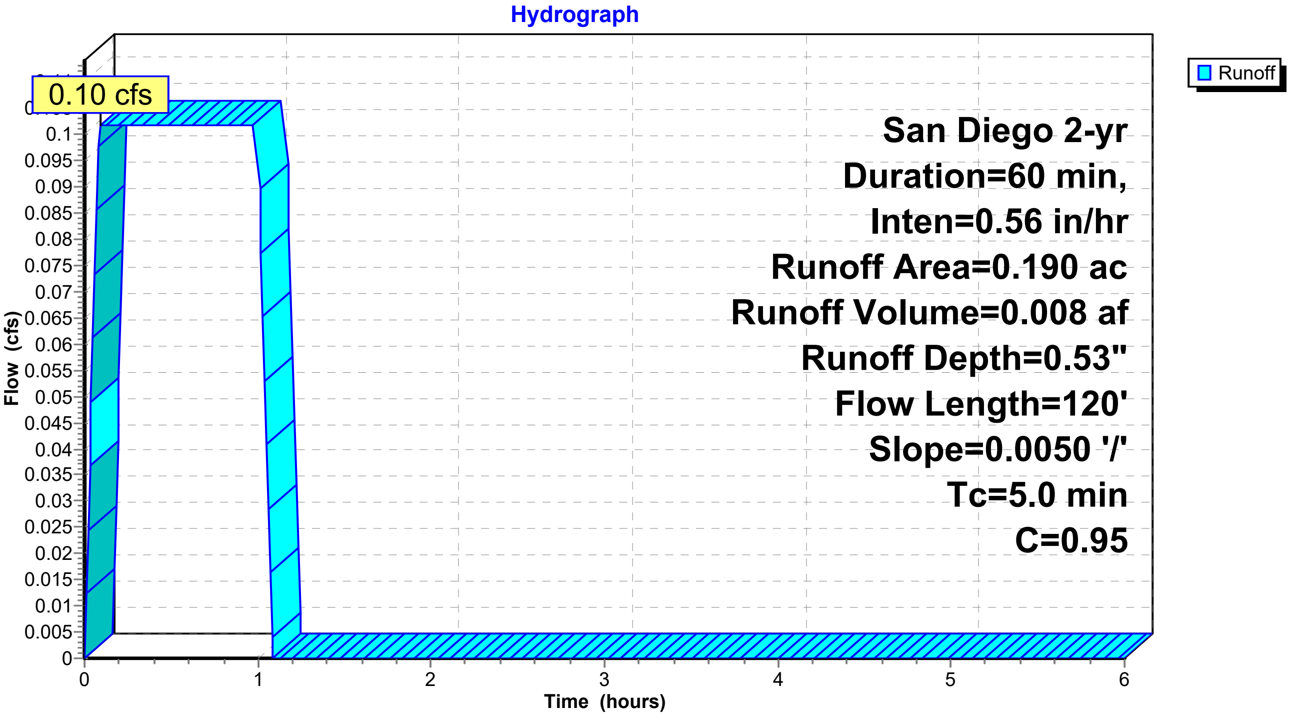
Runoff = 0.10 cfs @ 0.09 hrs, Volume= 0.008 af, Depth= 0.53"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
San Diego 2-yr Duration=60 min, Inten=0.56 in/hr

Area (ac)	C	Description
0.190	0.95	City of San Diego Table 2
0.190		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	120	0.0050	0.58		**Sheet Flow, E-7** Smooth surfaces n= 0.011 P2= 1.60"
3.5	120	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 11S: E-7



Summary for Subcatchment 12S: E-9

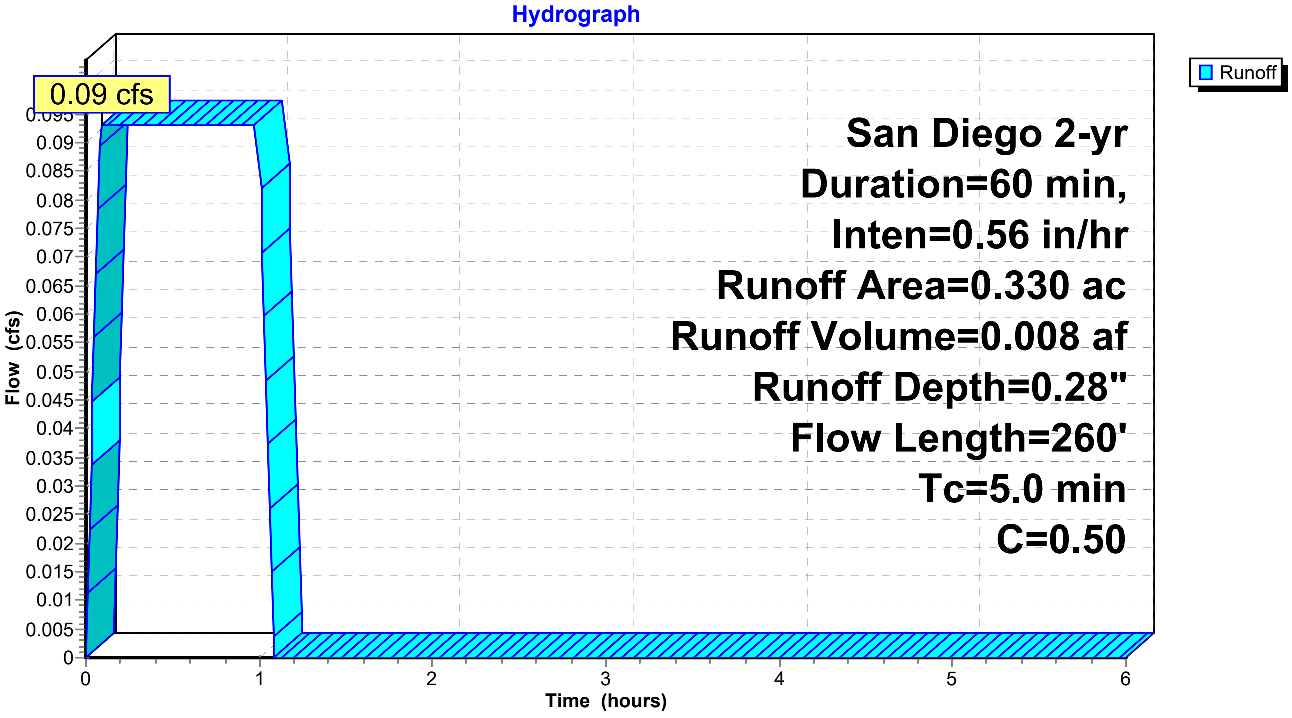
Runoff = 0.09 cfs @ 0.09 hrs, Volume= 0.008 af, Depth= 0.28"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
San Diego 2-yr Duration=60 min, Inten=0.56 in/hr

Area (ac)	C	Description
0.330	0.50	City of San Diego Table 2
0.330		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	30	0.5000	0.15		**Sheet Flow,** Grass: Bermuda n= 0.410 P2= 1.60"
1.3	230	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.6	260	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 12S: E-9



Summary for Subcatchment 13S: E-8

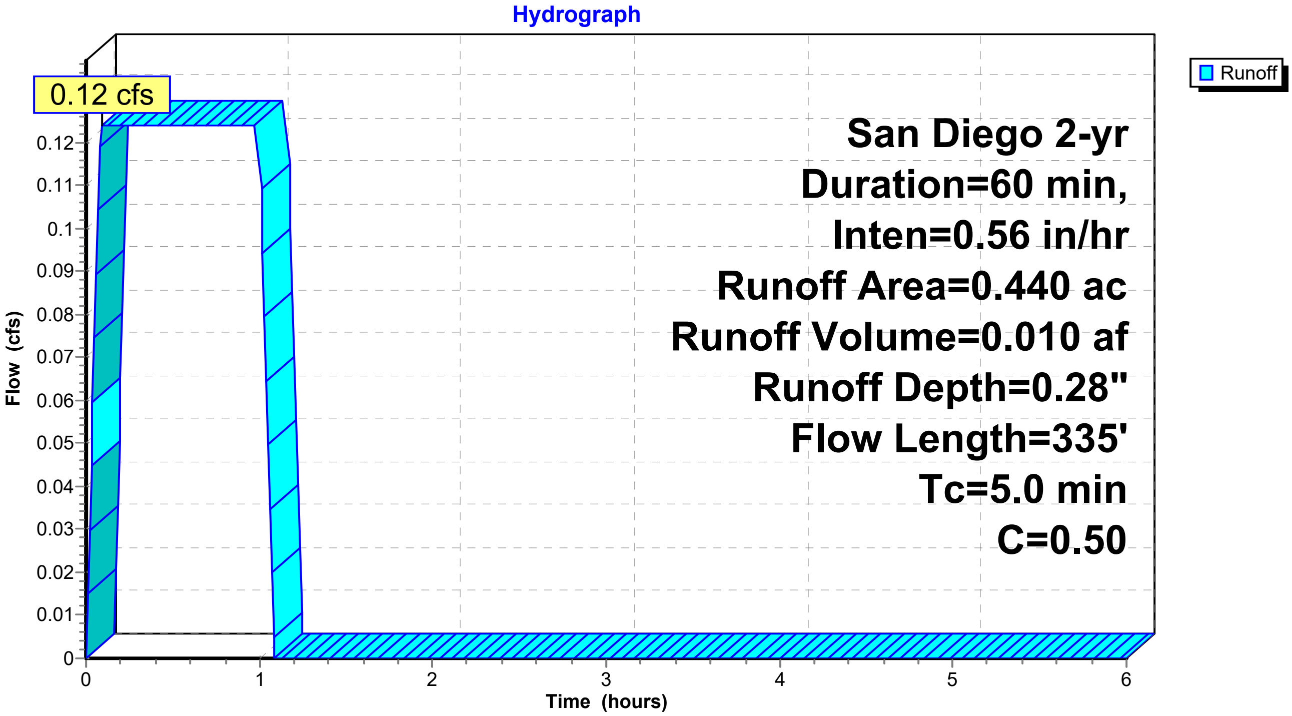
Runoff = 0.12 cfs @ 0.09 hrs, Volume= 0.010 af, Depth= 0.28"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
San Diego 2-yr Duration=60 min, Inten=0.56 in/hr

Area (ac)	C	Description
0.440	0.50	City of San Diego Table 2
0.440		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	25	0.5000	0.23		**Sheet Flow, Slope** Grass: Dense n= 0.240 P2= 1.60"
1.8	310	0.0200	2.87		**Shallow Concentrated Flow, Alley** Paved Kv= 20.3 fps
3.6	335	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 13S: E-8



Summary for Subcatchment 14S: E-2

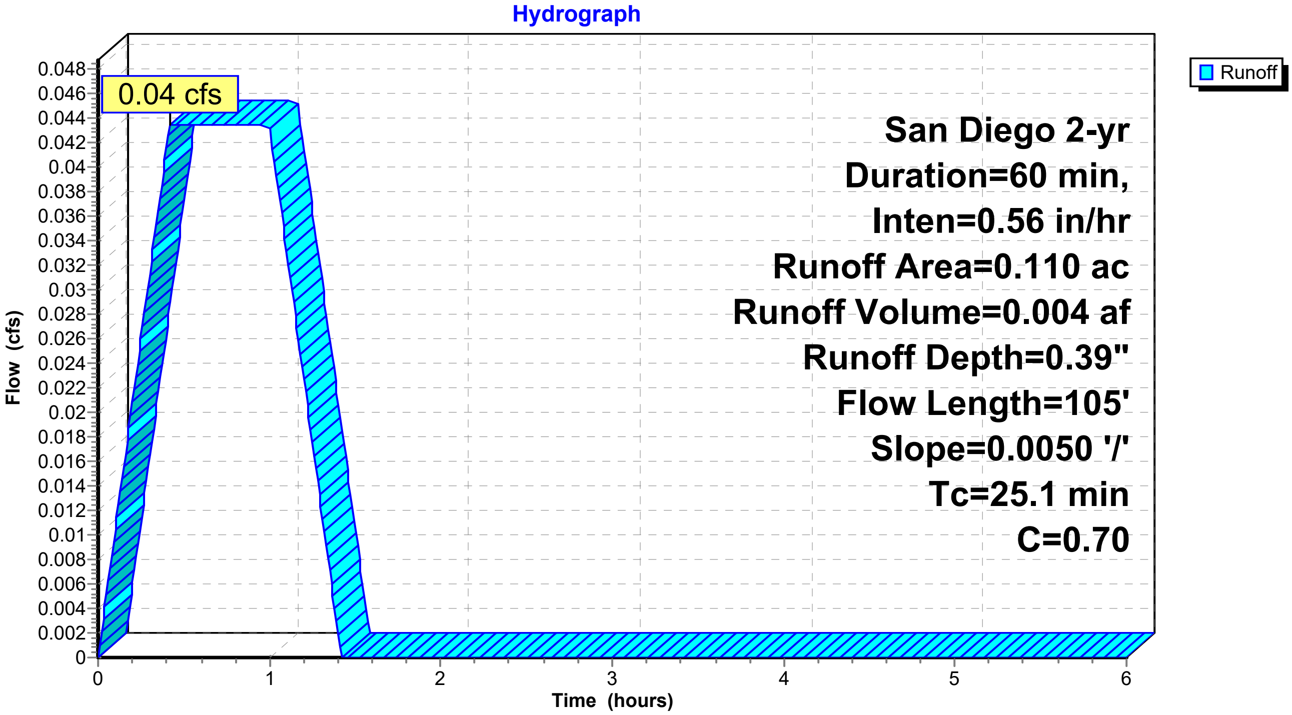
Runoff = 0.04 cfs @ 0.42 hrs, Volume= 0.004 af, Depth= 0.39"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
San Diego 2-yr Duration=60 min, Inten=0.56 in/hr

Area (ac)	C	Description
0.110	0.70	City of San Diego Table 2
0.110		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.1	105	0.0050	0.07		**Sheet Flow, Lawn** Grass: Short n= 0.150 P2= 1.60"

Subcatchment 14S: E-2



Summary for Subcatchment 15S: E-6

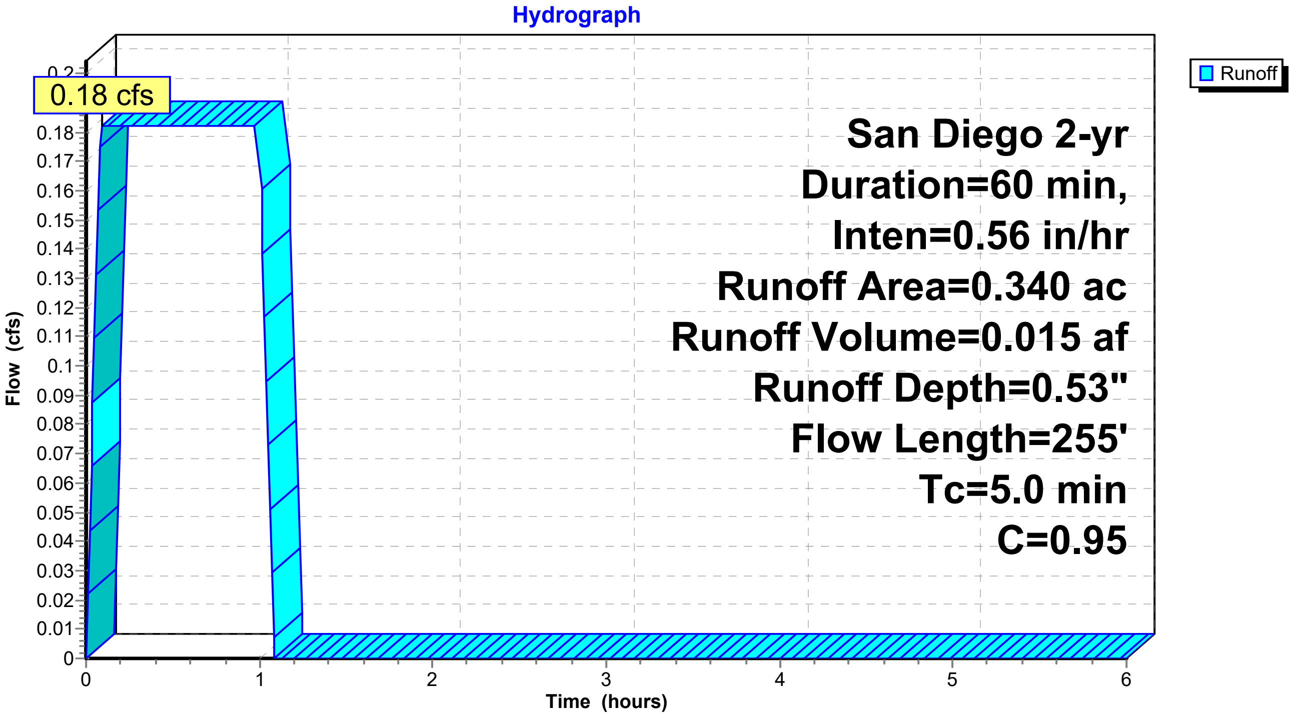
Runoff = 0.18 cfs @ 0.09 hrs, Volume= 0.015 af, Depth= 0.53"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
San Diego 2-yr Duration=60 min, Inten=0.56 in/hr

Area (ac)	C	Description
0.340	0.95	City of San Diego Table 2
0.340		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	65	0.2500	2.45		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 1.60"
1.9	120	0.0050	1.06		**Shallow Concentrated Flow, Swale along wall** Grassed Waterway Kv= 15.0 fps
2.2	70	0.0050	0.52		**Sheet Flow, Pavement** Smooth surfaces n= 0.011 P2= 1.60"
4.5	255	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 15S: E-6



Summary for Reach 10R: Existing 15-inch RCP

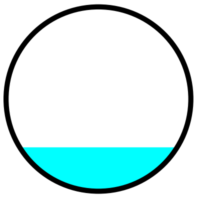
[52] Hint: Inlet/Outlet conditions not evaluated
[81] Warning: Exceeded Pond 2P by 1.62' @ 1.09 hrs

```
Inflow Area =          2.040 ac,  58.82% Impervious,  Inflow Depth =   0.43"    for  2-yr event
Inflow      =         0.89 cfs @     0.09 hrs,  Volume=            0.073 af
Outflow     =         0.89 cfs @     1.01 hrs,  Volume=            0.073 af,  Atten= 0%,  Lag= 55.2 min
```

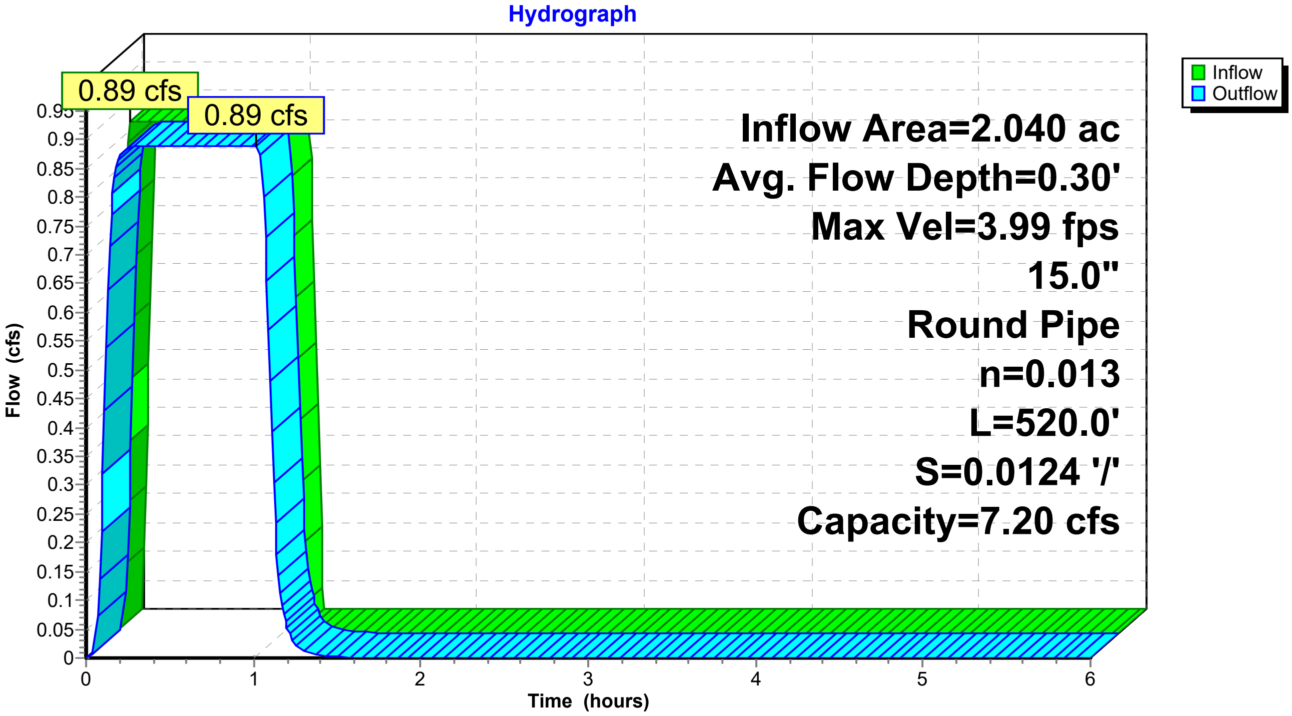
Routing by Stor-Ind+Trans method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.99 fps, Min. Travel Time= 2.2 min
Avg. Velocity = 2.12 fps, Avg. Travel Time= 4.1 min

Peak Storage= 116 cf @ 0.97 hrs
Average Depth at Peak Storage= 0.30'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 7.20 cfs

15.0" Round Pipe
n= 0.013 Concrete pipe, bends & connections
Length= 520.0'   Slope= 0.0124 '/'
Inlet Invert= 17.46', Outlet Invert= 11.00'



Reach 10R: Existing 15-inch RCP



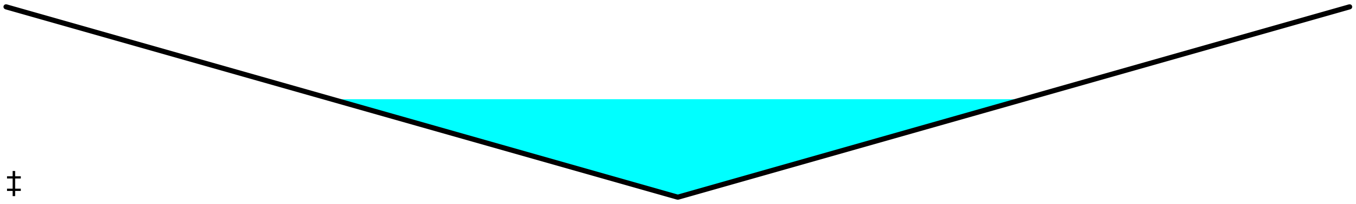
Summary for Reach 11R: Cross Gutter

Inflow Area =	0.450 ac,	75.56% Impervious,	Inflow Depth = 0.50"	for 2-yr event
Inflow =	0.23 cfs @	0.42 hrs, Volume=	0.019 af	
Outflow =	0.23 cfs @	1.02 hrs, Volume=	0.019 af,	Atten= 0%, Lag= 36.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.00 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 0.60 fps, Avg. Travel Time= 2.8 min

Peak Storage= 23 cf @ 1.00 hrs
Average Depth at Peak Storage= 0.09'
Bank-Full Depth= 0.17' Flow Area= 0.8 sf, Capacity= 1.33 cfs

0.00' x 0.17' deep channel, n= 0.013
Side Slope Z-value= 29.4 '/' Top Width= 10.00'
Length= 100.0' Slope= 0.0050 '/'
Inlet Invert= 20.60', Outlet Invert= 20.10'



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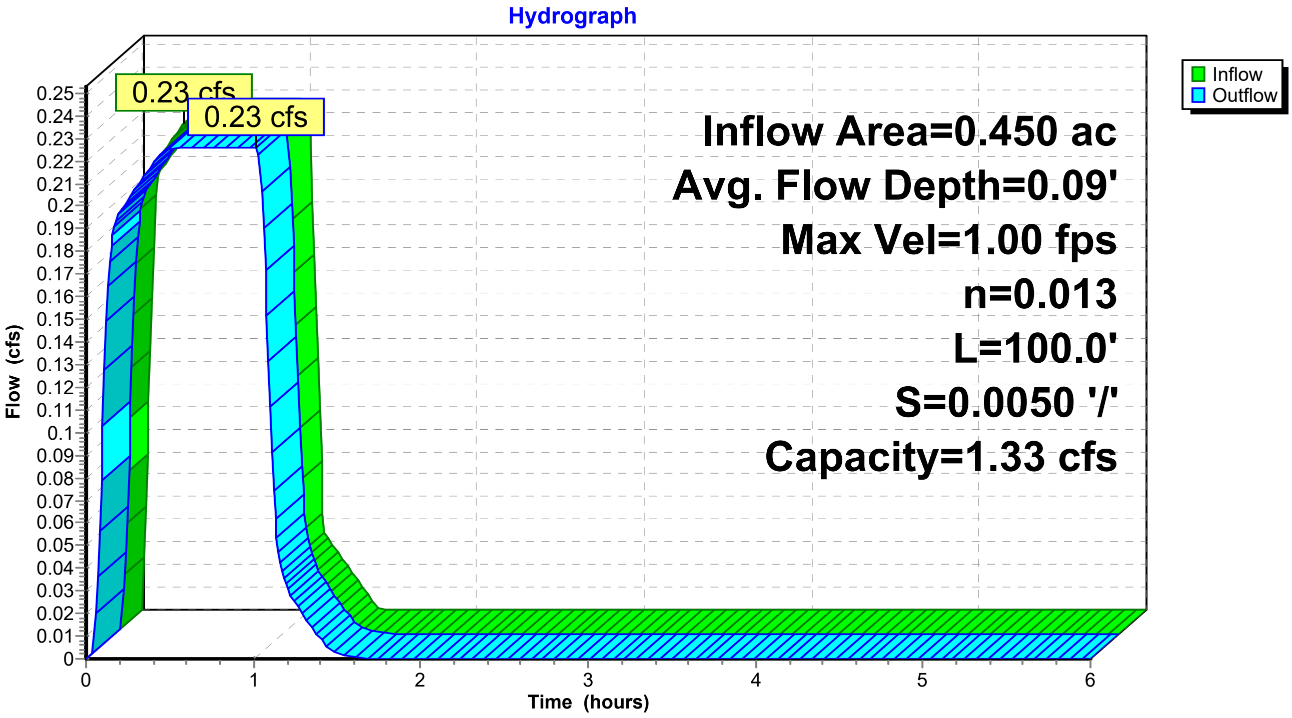
Reach 11R: Cross Gutter



Summary for Pond 2P: Existing Catch Basin

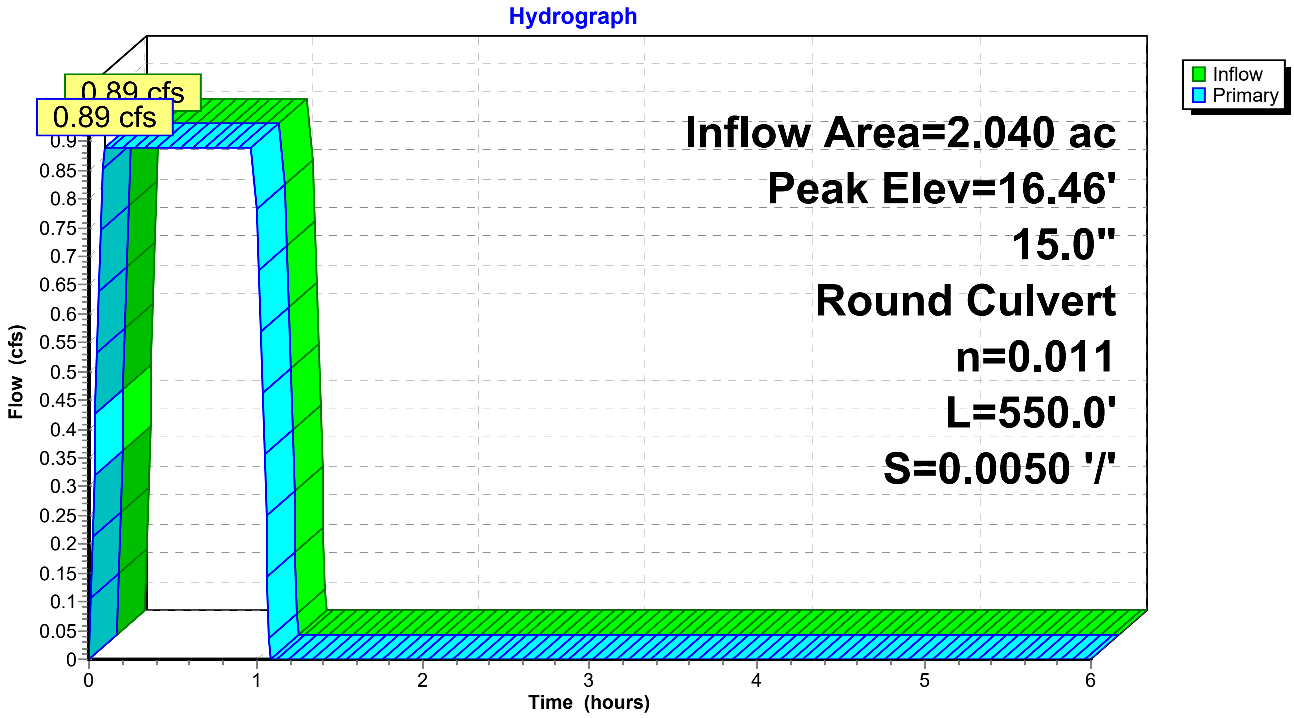
Inflow Area = 2.040 ac, 58.82% Impervious, Inflow Depth = 0.43" for 2-yr event
Inflow = 0.89 cfs @ 0.09 hrs, Volume= 0.073 af
Outflow = 0.89 cfs @ 0.09 hrs, Volume= 0.073 af, Atten= 0%, Lag= 0.0 min
Primary = 0.89 cfs @ 0.09 hrs, Volume= 0.073 af

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 16.46' @ 0.09 hrs
Flood Elev= 23.13'

Device	Routing	Invert	Outlet Devices
#1	Primary	16.00'	**15.0" Round Culvert** L= 550.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 16.00' / 13.25' S= 0.0050 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf

Primary OutFlow Max=0.88 cfs @ 0.09 hrs HW=16.46' (Free Discharge)
↑**1=Culvert** (Barrel Controls 0.88 cfs @ 3.19 fps)

Pond 2P: Existing Catch Basin



Summary for Pond 5P: Existing Catch Basin

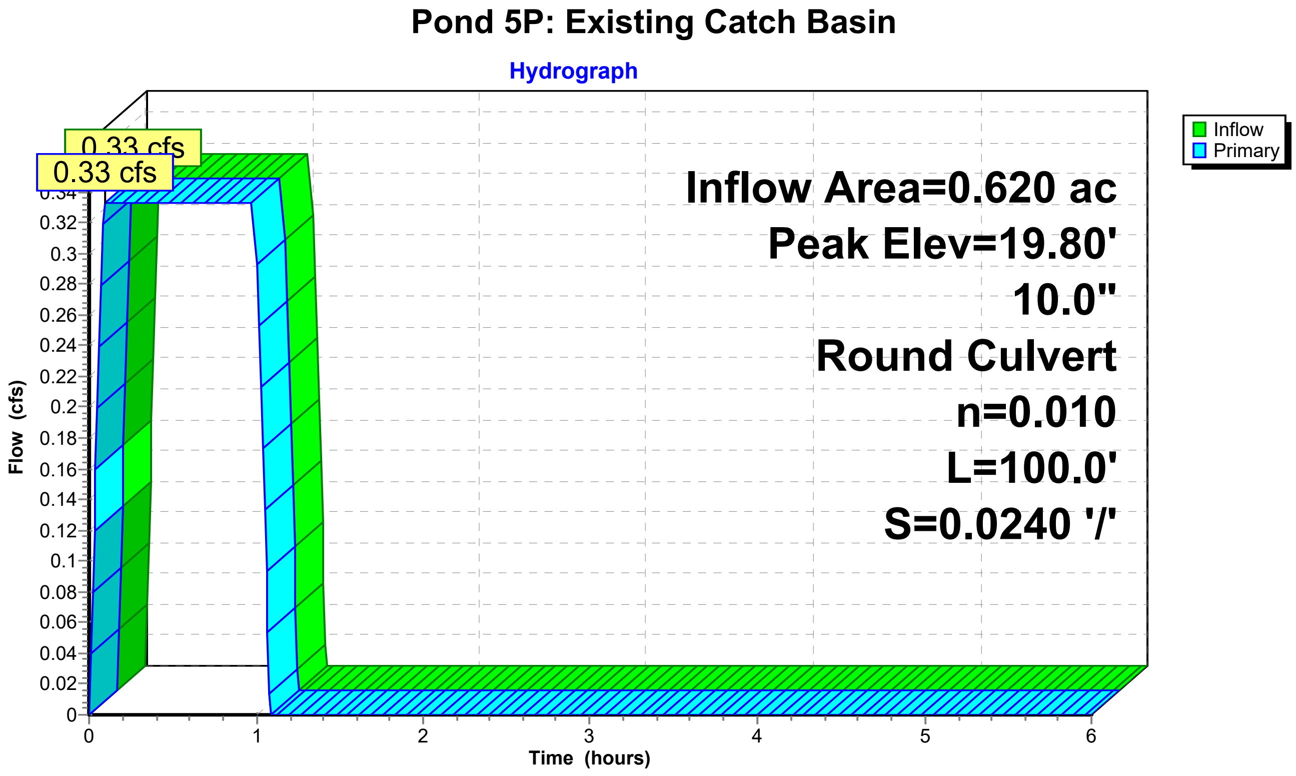
[79] Warning: Submerged Pond 9P Primary device # 1 OUTLET by 0.30'

Inflow Area = 0.620 ac,100.00% Impervious, Inflow Depth = 0.53" for 2-yr event
Inflow = 0.33 cfs @ 0.09 hrs, Volume= 0.027 af
Outflow = 0.33 cfs @ 0.09 hrs, Volume= 0.027 af, Atten= 0%, Lag= 0.0 min
Primary = 0.33 cfs @ 0.09 hrs, Volume= 0.027 af

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 19.80' @ 0.09 hrs
Flood Elev= 23.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	19.50'	**10.0" Round Culvert** L= 100.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 19.50' / 17.10' S= 0.0240 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.33 cfs @ 0.09 hrs HW=19.80' (Free Discharge)
↑**1=Culvert** (Inlet Controls 0.33 cfs @ 1.87 fps)



Summary for Pond 6P: Existing Catch Basin

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[79] Warning: Submerged Pond 5P Primary device # 1 OUTLET by 1.03'

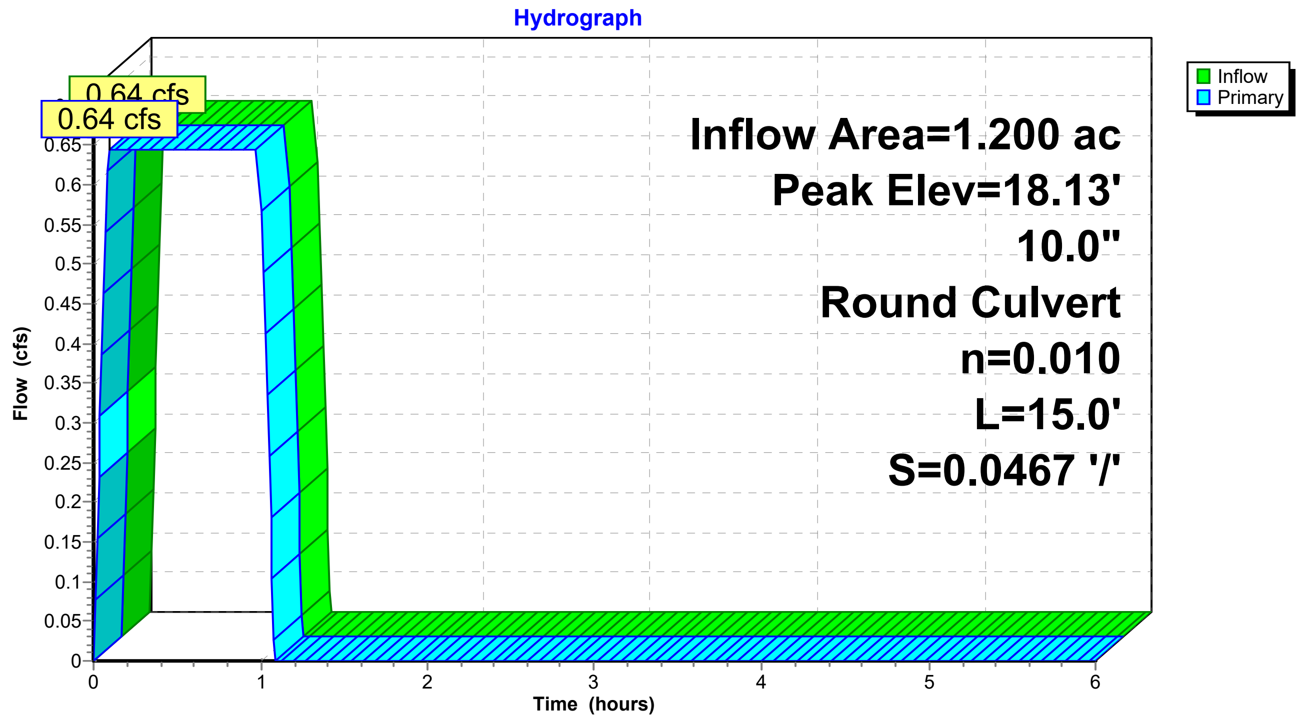
Inflow Area =      1.200 ac,100.00% Impervious,  Inflow Depth =   0.53"    for  2-yr event
Inflow      =      0.64 cfs @    0.09 hrs,  Volume=          0.053 af
Outflow     =      0.64 cfs @    0.09 hrs,  Volume=          0.053 af,  Atten= 0%,  Lag= 0.0 min
Primary     =      0.64 cfs @    0.09 hrs,  Volume=          0.053 af

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 18.13' @ 0.09 hrs
Flood Elev= 23.24'

Device   Routing          Invert   Outlet Devices
  #1     Primary          17.70'   10.0"  Round Culvert
                                   L= 15.0'   CPP, square edge headwall,  Ke= 0.500
                                   Inlet / Outlet Invert= 17.70' / 17.00'   S= 0.0467 '/'   Cc= 0.900
                                   n= 0.010  PVC, smooth interior,  Flow Area= 0.55 sf

Primary OutFlow  Max=0.64 cfs @ 0.09 hrs  HW=18.13'   (Free Discharge)
└─1=Culvert  (Inlet Controls 0.64 cfs @ 2.24 fps)
```

Pond 6P: Existing Catch Basin



Summary for Pond 9P: Existing Catch Basin

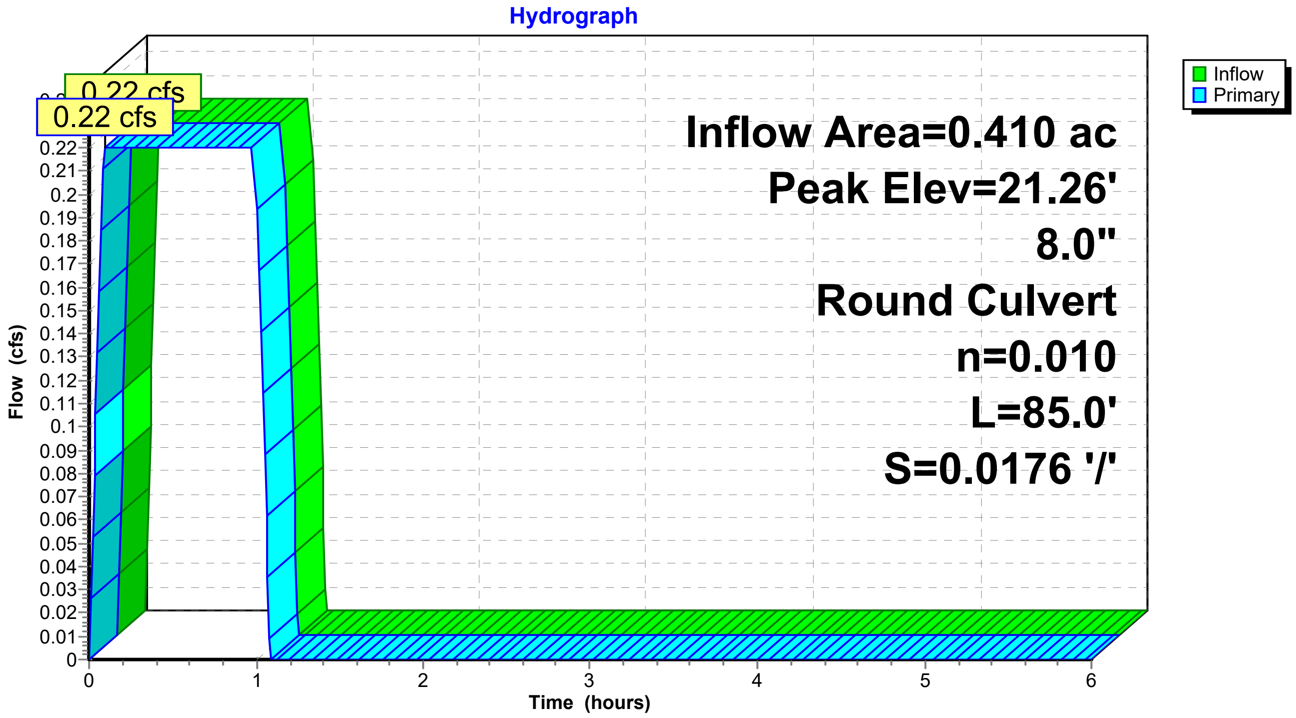
Inflow Area =	0.410 ac,100.00% Impervious, Inflow Depth = 0.53" for 2-yr event			
Inflow =	0.22 cfs @	0.09 hrs, Volume=	0.018 af	
Outflow =	0.22 cfs @	0.10 hrs, Volume=	0.018 af,	Atten= 0%, Lag= 0.6 min
Primary =	0.22 cfs @	0.10 hrs, Volume=	0.018 af	

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 21.26' @ 0.09 hrs
Flood Elev= 23.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	21.00'	**8.0" Round Culvert** L= 85.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 21.00' / 19.50' S= 0.0176 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.22 cfs @ 0.10 hrs HW=21.26' (Free Discharge)
↑**1=Culvert** (Inlet Controls 0.22 cfs @ 1.74 fps)

Pond 9P: Existing Catch Basin



Time span=0.00-6.00 hrs, dt=0.01 hrs, 601 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: E-1 Runoff Area=0.070 ac 0.00% Impervious Runoff Depth=0.65"
Flow Length=340' Tc=5.0 min C=0.70 Runoff=0.05 cfs 0.004 af

Subcatchment 3S: E-4 Runoff Area=0.210 ac 100.00% Impervious Runoff Depth=0.88"
Flow Length=155' Slope=0.0200 '/' Tc=5.0 min C=0.95 Runoff=0.19 cfs 0.015 af

Subcatchment 7S: E-3 Runoff Area=0.410 ac 100.00% Impervious Runoff Depth=0.88"
Flow Length=240' Tc=5.0 min C=0.95 Runoff=0.37 cfs 0.030 af

Subcatchment 10S: E-5 Runoff Area=0.390 ac 100.00% Impervious Runoff Depth=0.88"
Flow Length=215' Tc=5.0 min C=0.95 Runoff=0.35 cfs 0.029 af

Subcatchment 11S: E-7 Runoff Area=0.190 ac 100.00% Impervious Runoff Depth=0.88"
Flow Length=120' Slope=0.0050 '/' Tc=5.0 min C=0.95 Runoff=0.17 cfs 0.014 af

Subcatchment 12S: E-9 Runoff Area=0.330 ac 0.00% Impervious Runoff Depth=0.47"
Flow Length=260' Tc=5.0 min C=0.50 Runoff=0.15 cfs 0.013 af

Subcatchment 13S: E-8 Runoff Area=0.440 ac 0.00% Impervious Runoff Depth=0.47"
Flow Length=335' Tc=5.0 min C=0.50 Runoff=0.21 cfs 0.017 af

Subcatchment 14S: E-2 Runoff Area=0.110 ac 0.00% Impervious Runoff Depth=0.65"
Flow Length=105' Slope=0.0050 '/' Tc=25.1 min C=0.70 Runoff=0.07 cfs 0.006 af

Subcatchment 15S: E-6 Runoff Area=0.340 ac 100.00% Impervious Runoff Depth=0.88"
Flow Length=255' Tc=5.0 min C=0.95 Runoff=0.30 cfs 0.025 af

Reach 10R: Existing 15-inch RCP Avg. Flow Depth=0.38' Max Vel=4.61 fps Inflow=1.48 cfs 0.122 af
15.0" Round Pipe n=0.013 L=520.0' S=0.0124 '/' Capacity=7.20 cfs Outflow=1.48 cfs 0.122 af

Reach 11R: Cross Gutter Avg. Flow Depth=0.11' Max Vel=1.14 fps Inflow=0.38 cfs 0.031 af
n=0.013 L=100.0' S=0.0050 '/' Capacity=1.33 cfs Outflow=0.38 cfs 0.031 af

Pond 2P: Existing Catch Basin Peak Elev=16.61' Inflow=1.48 cfs 0.122 af
15.0" Round Culvert n=0.011 L=550.0' S=0.0050 '/' Outflow=1.48 cfs 0.122 af

Pond 5P: Existing Catch Basin Peak Elev=19.90' Inflow=0.55 cfs 0.046 af
10.0" Round Culvert n=0.010 L=100.0' S=0.0240 '/' Outflow=0.55 cfs 0.046 af

Pond 6P: Existing Catch Basin Peak Elev=18.29' Inflow=1.07 cfs 0.088 af
10.0" Round Culvert n=0.010 L=15.0' S=0.0467 '/' Outflow=1.07 cfs 0.088 af

Pond 9P: Existing Catch Basin Peak Elev=21.35' Inflow=0.37 cfs 0.030 af
8.0" Round Culvert n=0.010 L=85.0' S=0.0176 '/' Outflow=0.37 cfs 0.030 af

Total Runoff Area = 2.490 ac Runoff Volume = 0.153 af Average Runoff Depth = 0.74"
38.15% Pervious = 0.950 ac 61.85% Impervious = 1.540 ac

Summary for Subcatchment 1S: E-1

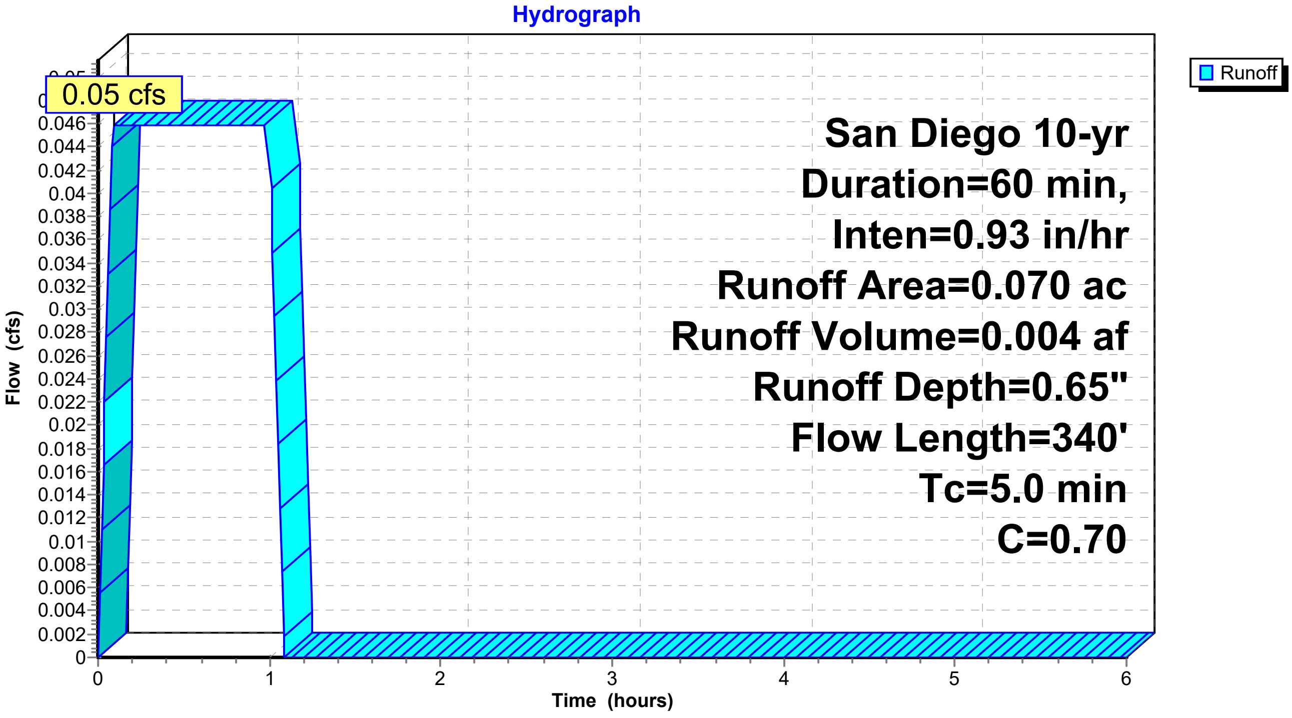
Runoff = 0.05 cfs @ 0.09 hrs, Volume= 0.004 af, Depth= 0.65"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
San Diego 10-yr Duration=60 min, Inten=0.93 in/hr

Area (ac)	C	Description
0.070	0.70	City of San Diego Table 2
0.070		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	90	0.0200	0.95		**Sheet Flow, Residential Lot** Smooth surfaces n= 0.011 P2= 1.60"
1.6	250	0.0160	2.57		**Shallow Concentrated Flow, Alley Flow** Paved Kv= 20.3 fps
3.2	340	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 1S: E-1



Summary for Subcatchment 3S: E-4

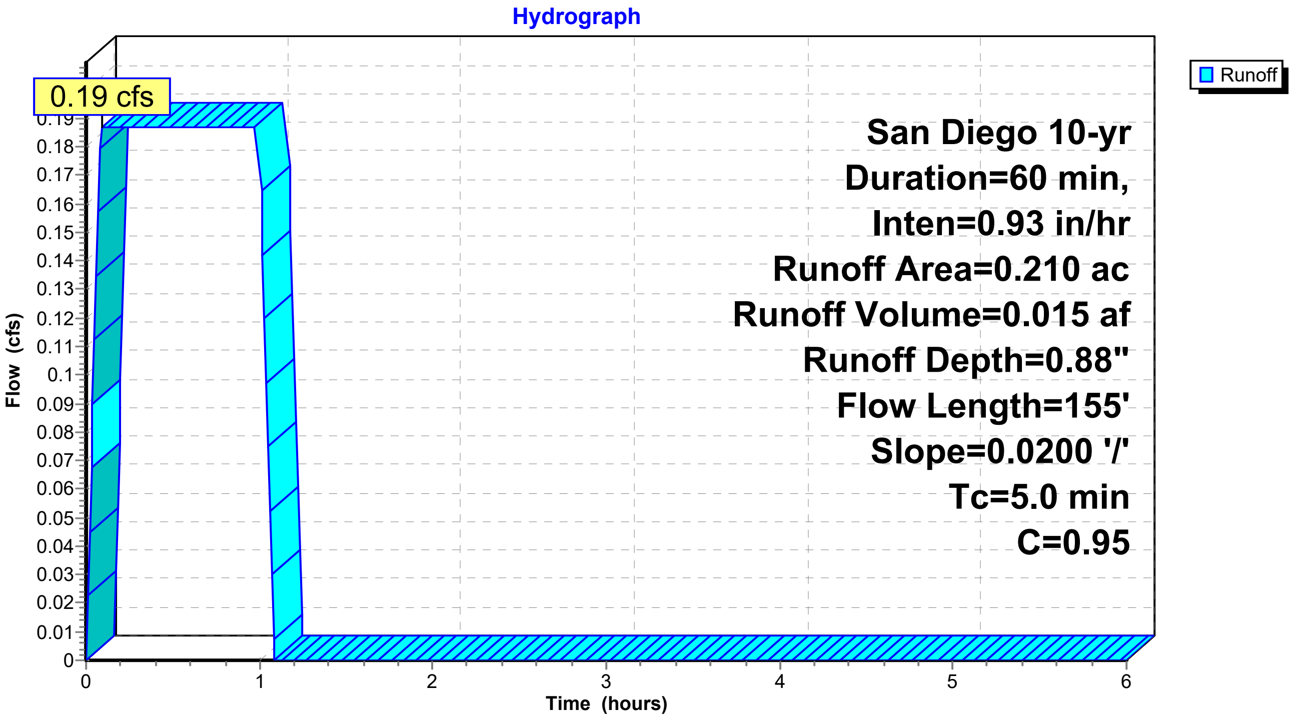
Runoff = 0.19 cfs @ 0.09 hrs, Volume= 0.015 af, Depth= 0.88"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
San Diego 10-yr Duration=60 min, Inten=0.93 in/hr

Area (ac)	C	Description
0.210	0.95	City of San Diego Table 2
0.210		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	155	0.0200	1.06		**Sheet Flow, Pavement** Smooth surfaces n= 0.011 P2= 1.60"
2.4	155	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 3S: E-4



Summary for Subcatchment 7S: E-3

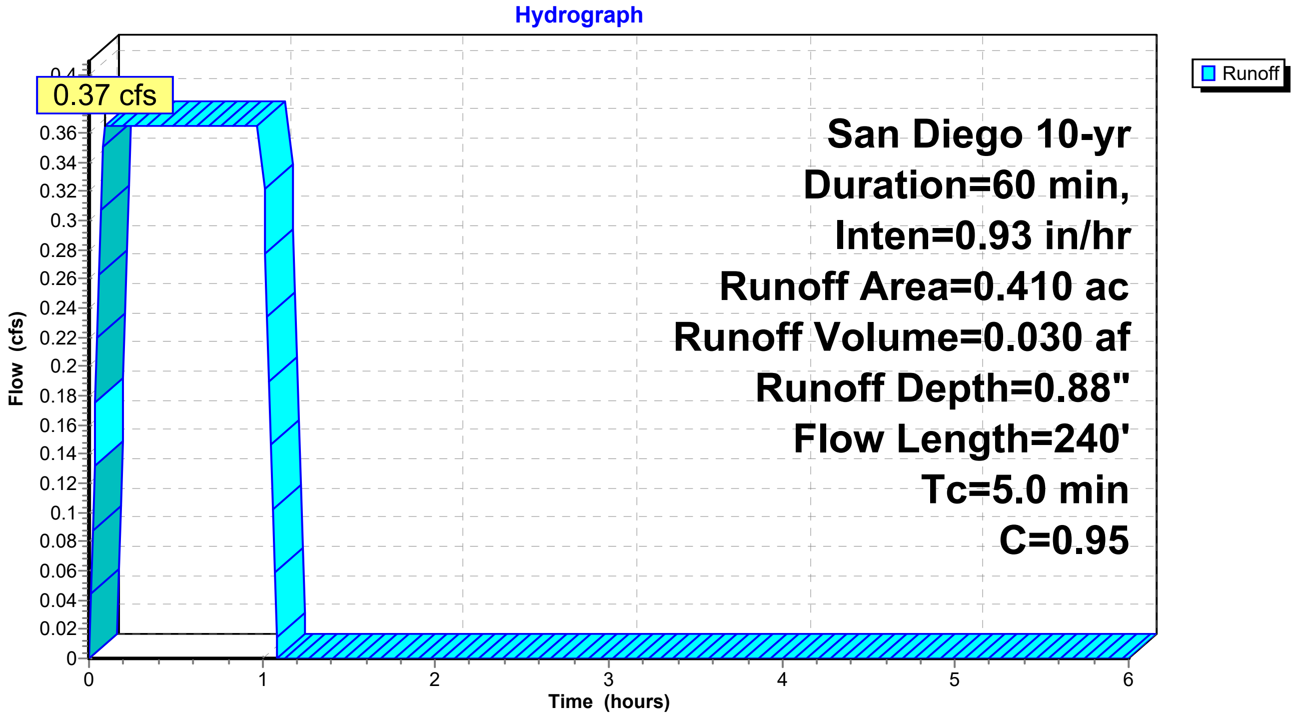
Runoff = 0.37 cfs @ 0.09 hrs, Volume= 0.030 af, Depth= 0.88"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
San Diego 10-yr Duration=60 min, Inten=0.93 in/hr

Area (ac)	C	Description
0.410	0.95	City of San Diego Table 2
0.410		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	65	0.2500	2.45		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 1.60"
1.9	120	0.0050	1.06		**Shallow Concentrated Flow, Swale along wall** Grassed Waterway Kv= 15.0 fps
1.4	55	0.0100	0.65		**Sheet Flow, Paved Surface** Smooth surfaces n= 0.011 P2= 1.60"
3.7	240	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 7S: E-3



Summary for Subcatchment 10S: E-5

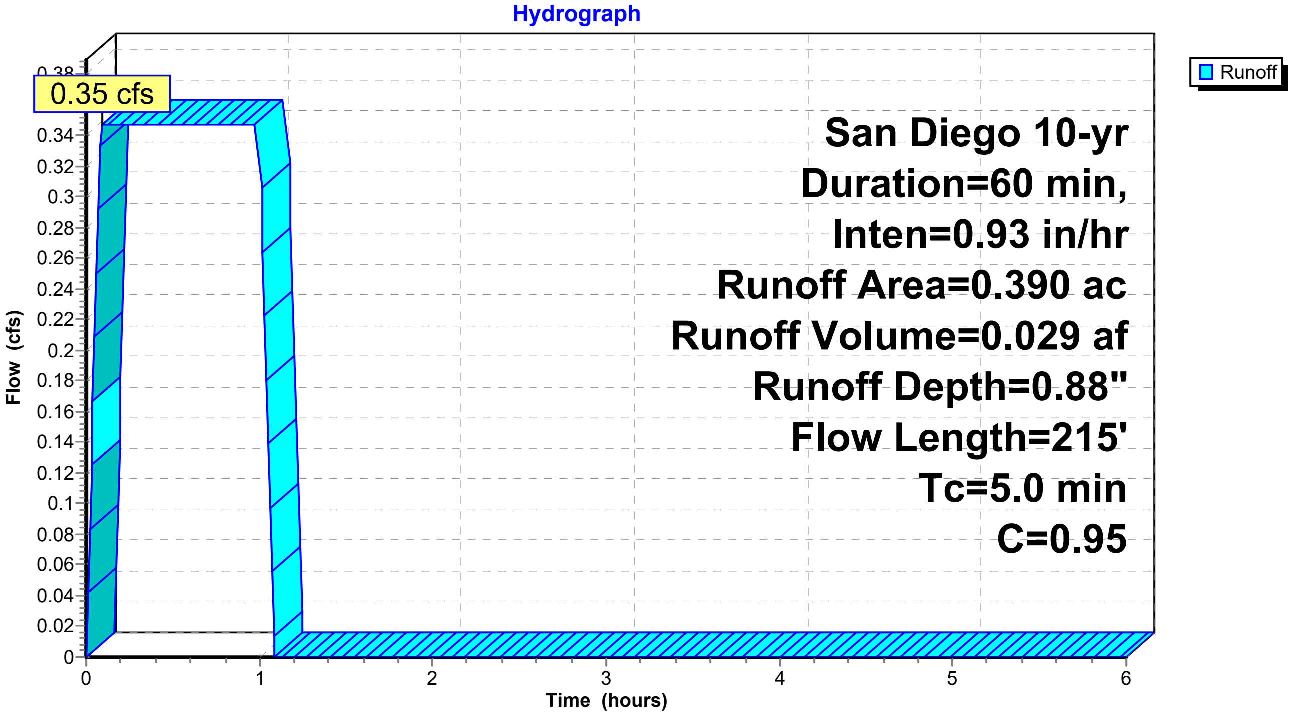
Runoff = 0.35 cfs @ 0.09 hrs, Volume= 0.029 af, Depth= 0.88"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
San Diego 10-yr Duration=60 min, Inten=0.93 in/hr

Area (ac)	C	Description
0.390	0.95	City of San Diego Table 2
0.390		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	70	0.2500	2.49		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 1.60"
1.2	145	0.0100	2.03		**Shallow Concentrated Flow, Alley** Paved Kv= 20.3 fps
1.7	215	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 10S: E-5



Summary for Subcatchment 11S: E-7

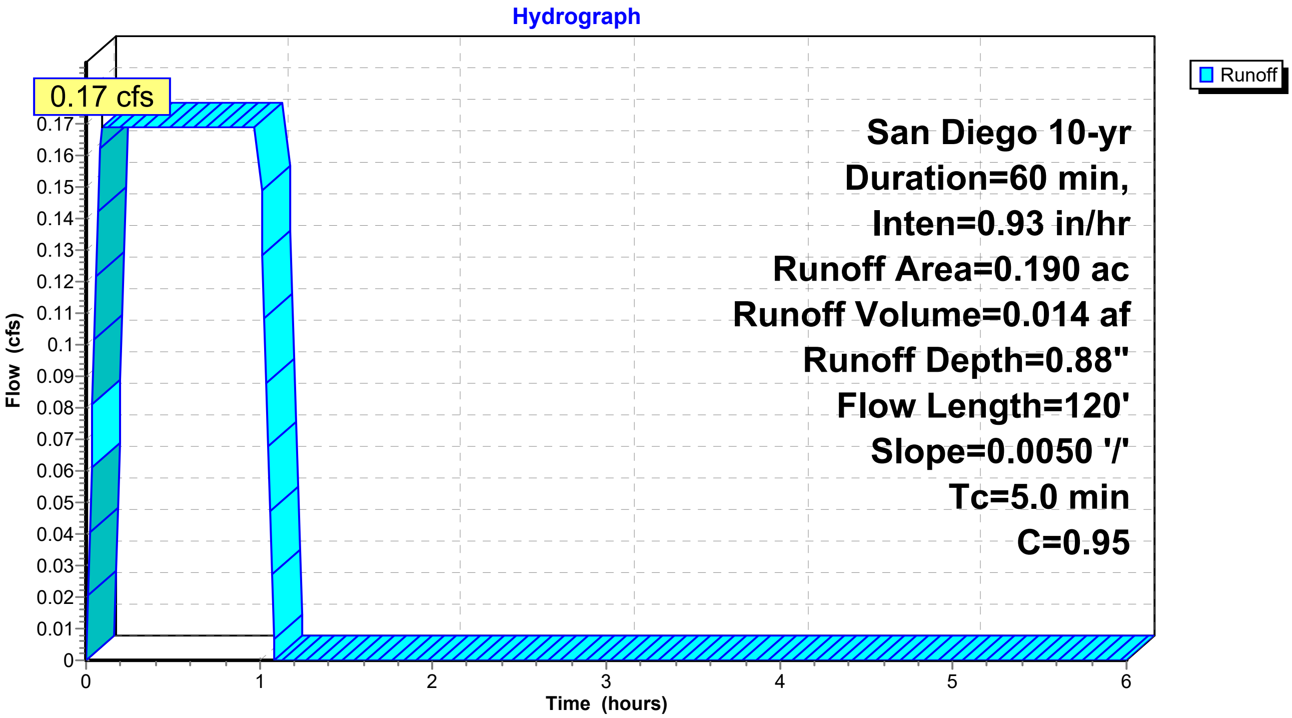
Runoff = 0.17 cfs @ 0.09 hrs, Volume= 0.014 af, Depth= 0.88"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
San Diego 10-yr Duration=60 min, Inten=0.93 in/hr

Area (ac)	C	Description
0.190	0.95	City of San Diego Table 2
0.190		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	120	0.0050	0.58		**Sheet Flow, E-7** Smooth surfaces n= 0.011 P2= 1.60"
3.5	120	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 11S: E-7



Summary for Subcatchment 12S: E-9

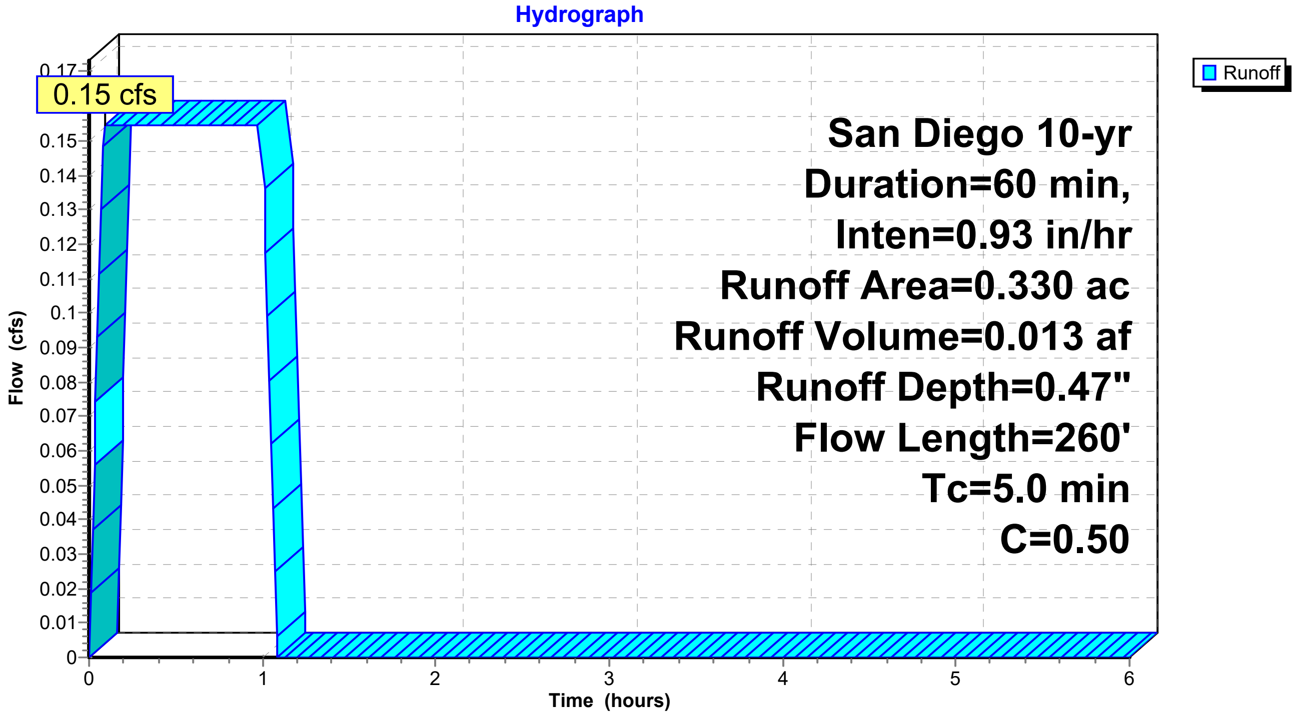
Runoff = 0.15 cfs @ 0.09 hrs, Volume= 0.013 af, Depth= 0.47"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
San Diego 10-yr Duration=60 min, Inten=0.93 in/hr

Area (ac)	C	Description
0.330	0.50	City of San Diego Table 2
0.330		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	30	0.5000	0.15		**Sheet Flow,** Grass: Bermuda n= 0.410 P2= 1.60"
1.3	230	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.6	260	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 12S: E-9



Summary for Subcatchment 13S: E-8

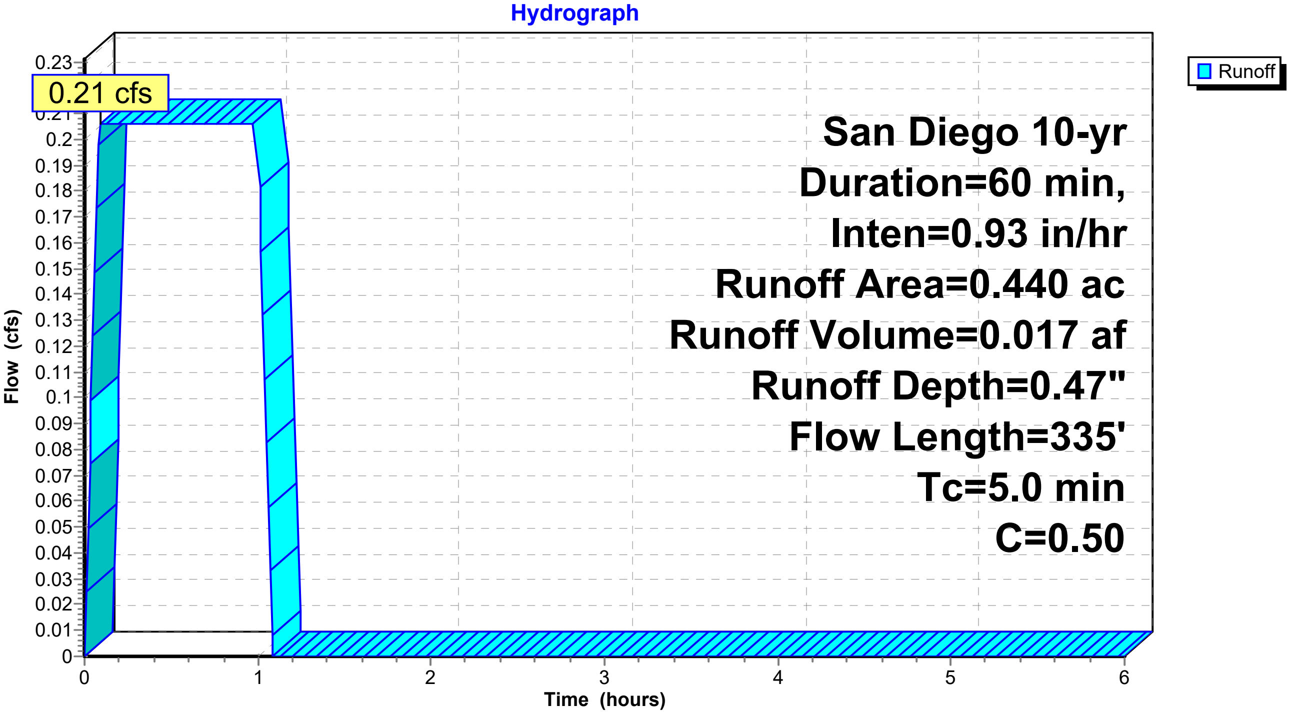
Runoff = 0.21 cfs @ 0.09 hrs, Volume= 0.017 af, Depth= 0.47"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
San Diego 10-yr Duration=60 min, Inten=0.93 in/hr

Area (ac)	C	Description
0.440	0.50	City of San Diego Table 2
0.440		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	25	0.5000	0.23		**Sheet Flow, Slope** Grass: Dense n= 0.240 P2= 1.60"
1.8	310	0.0200	2.87		**Shallow Concentrated Flow, Alley** Paved Kv= 20.3 fps
3.6	335	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 13S: E-8



Summary for Subcatchment 14S: E-2

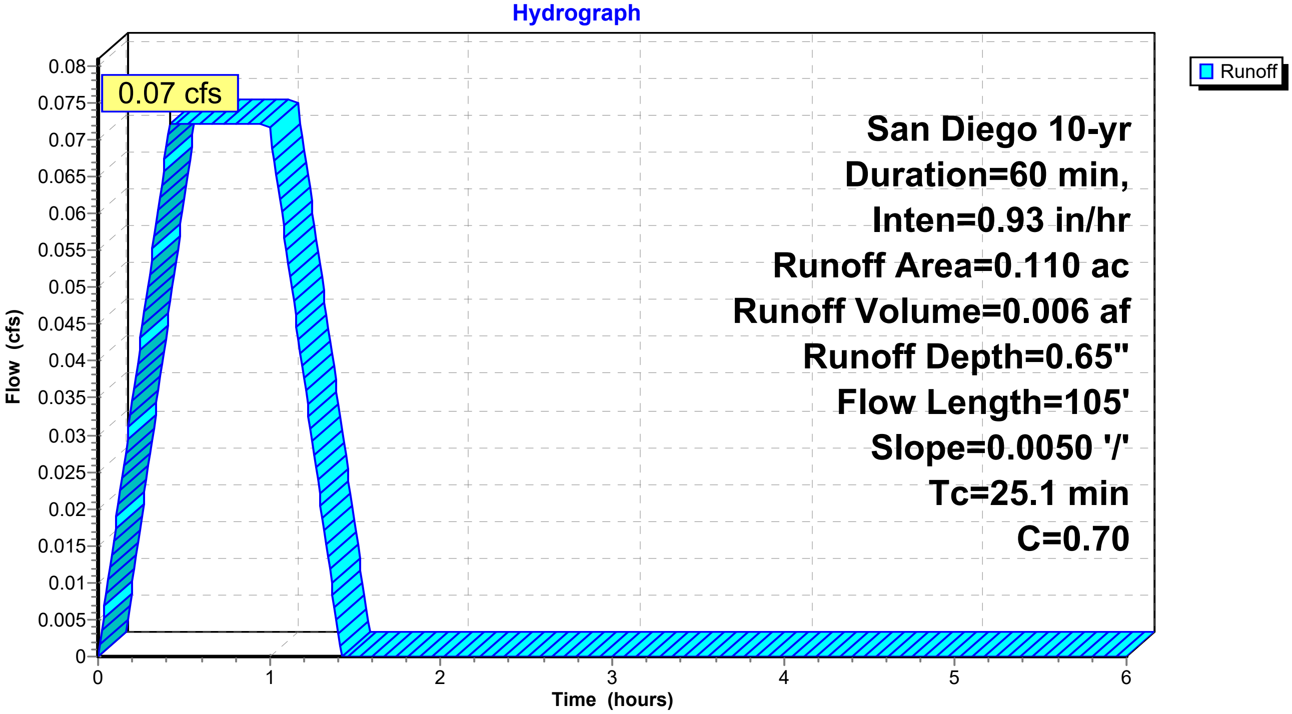
Runoff = 0.07 cfs @ 0.42 hrs, Volume= 0.006 af, Depth= 0.65"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
San Diego 10-yr Duration=60 min, Inten=0.93 in/hr

Area (ac)	C	Description
0.110	0.70	City of San Diego Table 2
0.110		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.1	105	0.0050	0.07		**Sheet Flow, Lawn** Grass: Short n= 0.150 P2= 1.60"

Subcatchment 14S: E-2



Summary for Subcatchment 15S: E-6

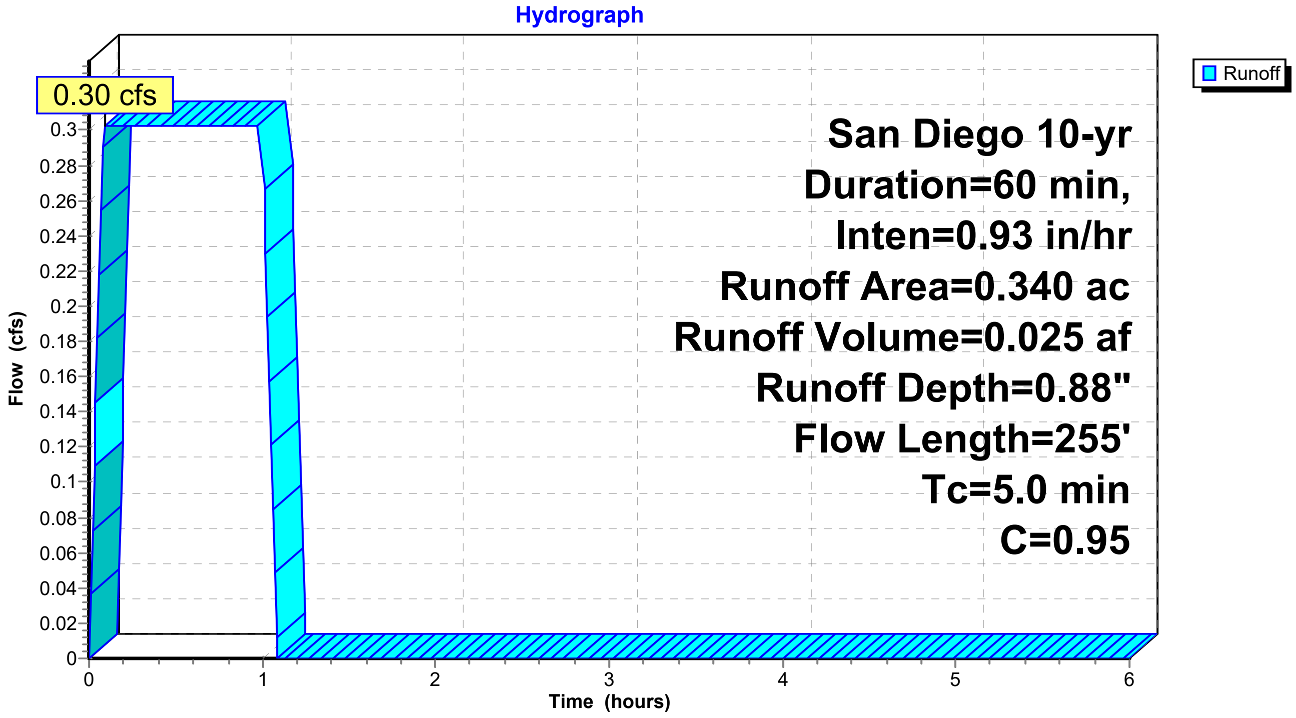
Runoff = 0.30 cfs @ 0.09 hrs, Volume= 0.025 af, Depth= 0.88"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
San Diego 10-yr Duration=60 min, Inten=0.93 in/hr

Area (ac)	C	Description
0.340	0.95	City of San Diego Table 2
0.340		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	65	0.2500	2.45		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 1.60"
1.9	120	0.0050	1.06		**Shallow Concentrated Flow, Swale along wall** Grassed Waterway Kv= 15.0 fps
2.2	70	0.0050	0.52		**Sheet Flow, Pavement** Smooth surfaces n= 0.011 P2= 1.60"
4.5	255	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 15S: E-6



Summary for Reach 10R: Existing 15-inch RCP

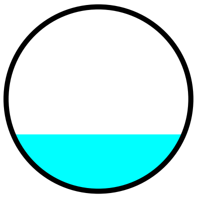
[52] Hint: Inlet/Outlet conditions not evaluated
[81] Warning: Exceeded Pond 2P by 1.65' @ 1.09 hrs

```
Inflow Area =       2.040 ac,  58.82% Impervious,  Inflow Depth =   0.72"    for  10-yr event
Inflow      =       1.48 cfs @    0.14 hrs,  Volume=          0.122 af
Outflow     =       1.48 cfs @    0.88 hrs,  Volume=          0.122 af,  Atten= 0%,  Lag= 44.4 min
```

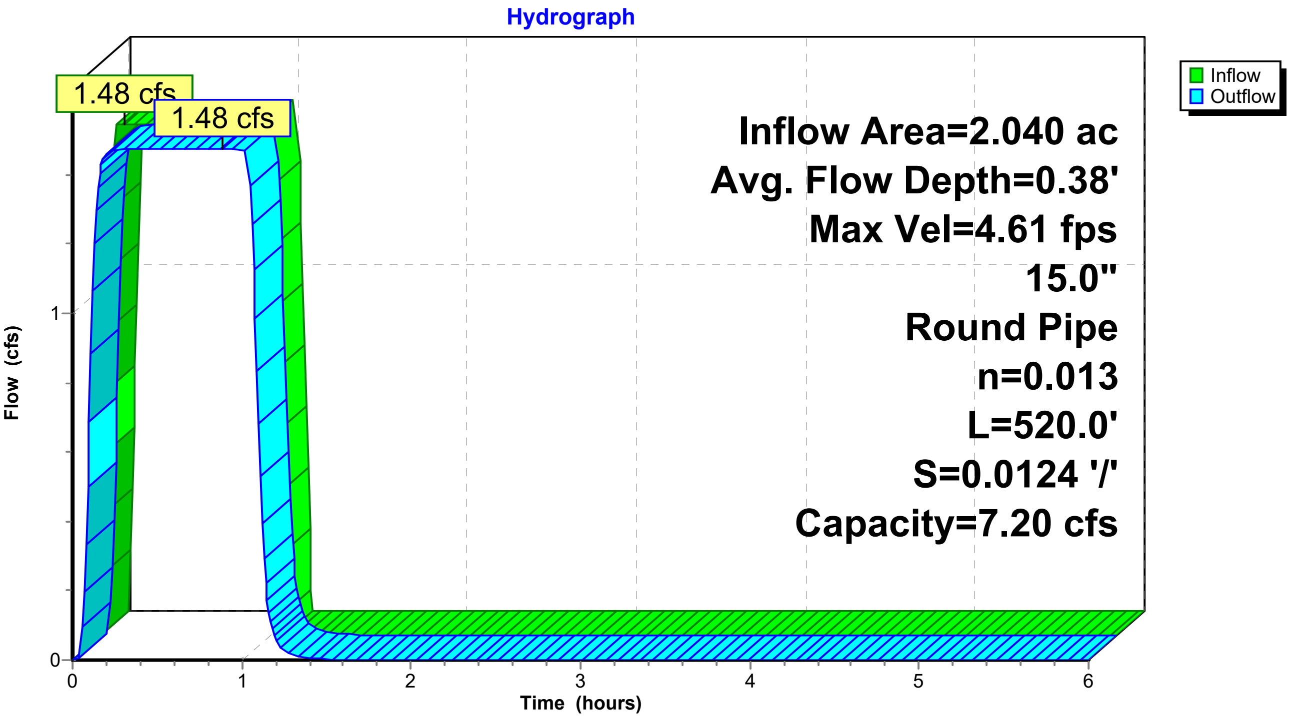
Routing by Stor-Ind+Trans method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.61 fps, Min. Travel Time= 1.9 min
Avg. Velocity = 2.39 fps, Avg. Travel Time= 3.6 min

Peak Storage= 166 cf @ 0.85 hrs
Average Depth at Peak Storage= 0.38'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 7.20 cfs

15.0" Round Pipe
n= 0.013 Concrete pipe, bends & connections
Length= 520.0'   Slope= 0.0124 '/'
Inlet Invert= 17.46', Outlet Invert= 11.00'



Reach 10R: Existing 15-inch RCP



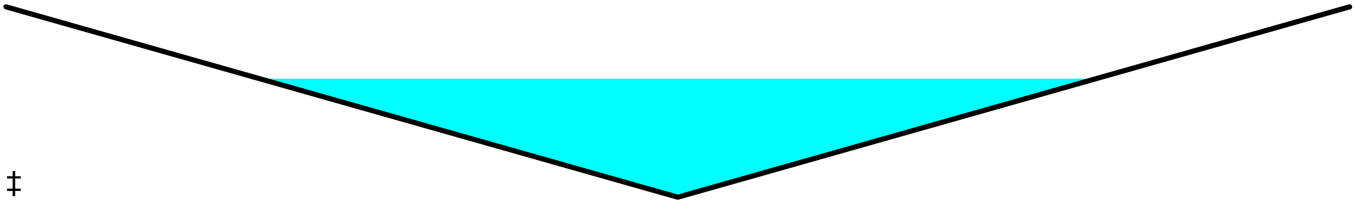
Summary for Reach 11R: Cross Gutter

Inflow Area = 0.450 ac, 75.56% Impervious, Inflow Depth = 0.83" for 10-yr event
Inflow = 0.38 cfs @ 0.42 hrs, Volume= 0.031 af
Outflow = 0.38 cfs @ 1.01 hrs, Volume= 0.031 af, Atten= 0%, Lag= 35.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.14 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 0.67 fps, Avg. Travel Time= 2.5 min

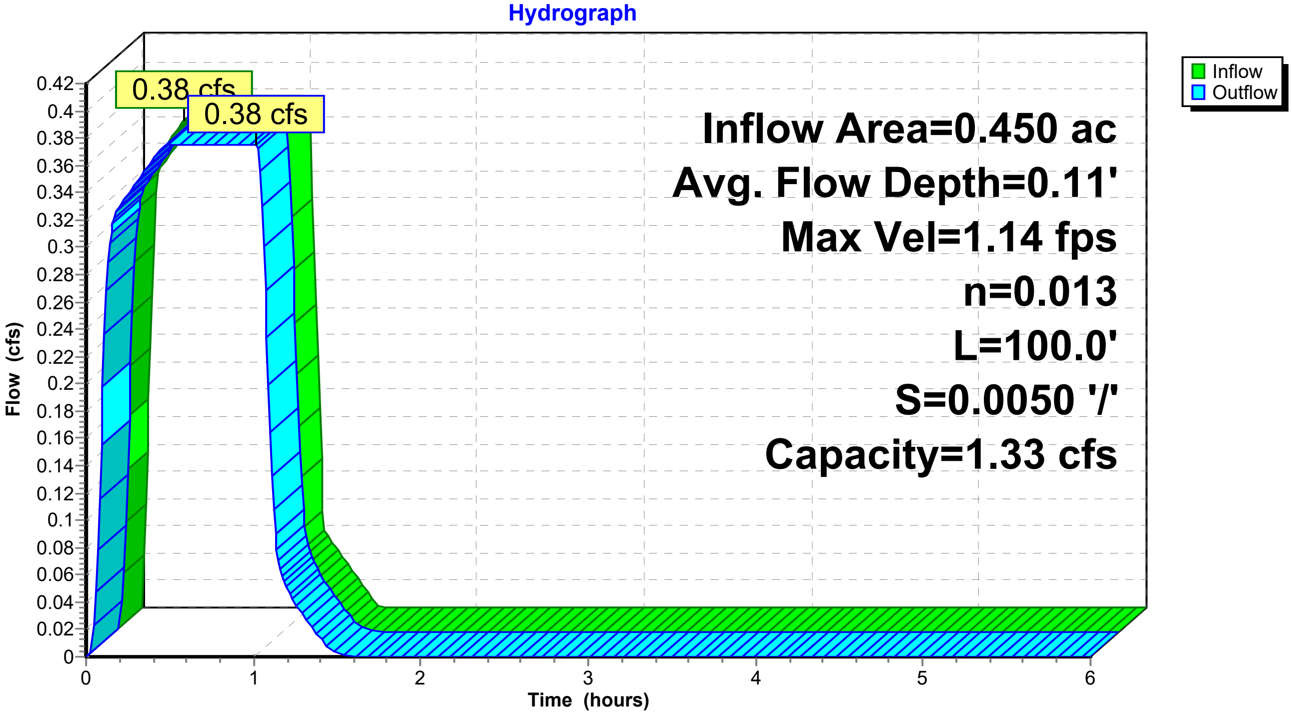
Peak Storage= 33 cf @ 0.97 hrs
Average Depth at Peak Storage= 0.11'
Bank-Full Depth= 0.17' Flow Area= 0.8 sf, Capacity= 1.33 cfs

0.00' x 0.17' deep channel, n= 0.013
Side Slope Z-value= 29.4 '/' Top Width= 10.00'
Length= 100.0' Slope= 0.0050 '/'
Inlet Invert= 20.60', Outlet Invert= 20.10'



‡

Reach 11R: Cross Gutter



Summary for Pond 2P: Existing Catch Basin

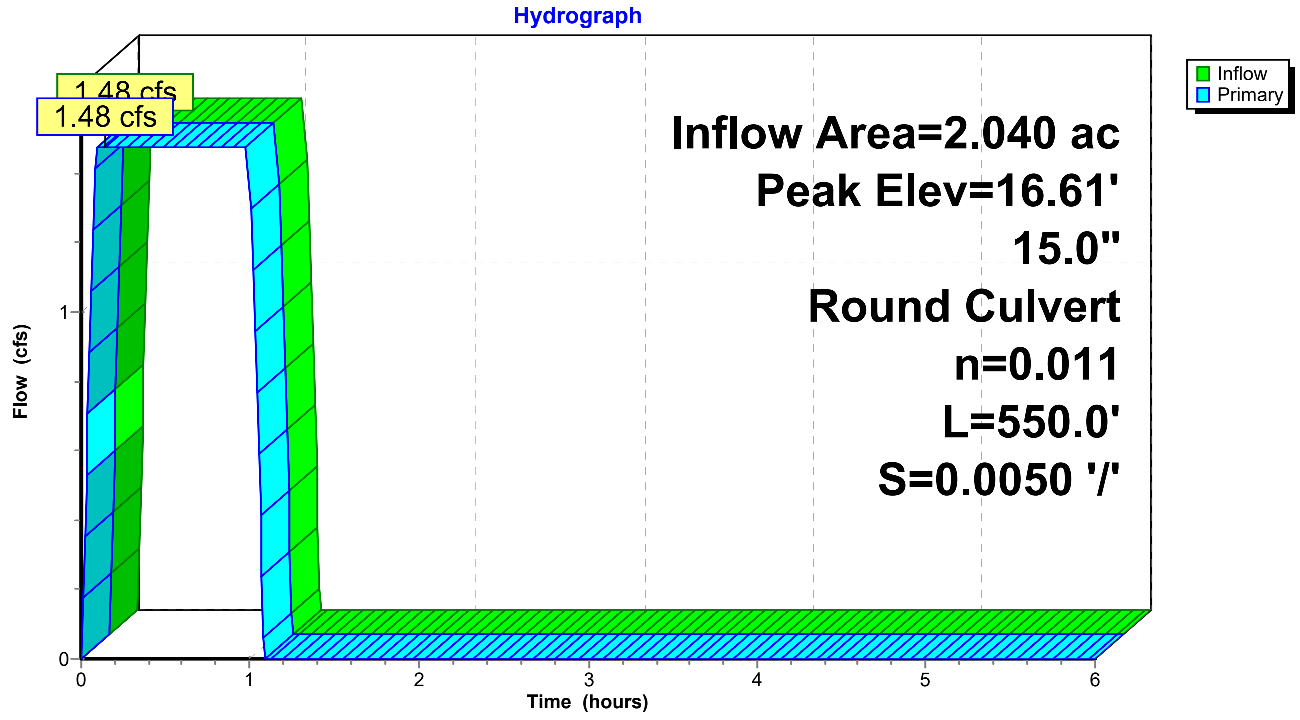
Inflow Area = 2.040 ac, 58.82% Impervious, Inflow Depth = 0.72" for 10-yr event
Inflow = 1.48 cfs @ 0.10 hrs, Volume= 0.122 af
Outflow = 1.48 cfs @ 0.14 hrs, Volume= 0.122 af, Atten= 0%, Lag= 2.4 min
Primary = 1.48 cfs @ 0.14 hrs, Volume= 0.122 af

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 16.61' @ 0.10 hrs
Flood Elev= 23.13'

Device	Routing	Invert	Outlet Devices
#1	Primary	16.00'	**15.0" Round Culvert** L= 550.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 16.00' / 13.25' S= 0.0050 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf

Primary OutFlow Max=1.47 cfs @ 0.14 hrs HW=16.61' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 1.47 cfs @ 3.66 fps)

Pond 2P: Existing Catch Basin



Summary for Pond 5P: Existing Catch Basin

[79] Warning: Submerged Pond 9P Primary device # 1 OUTLET by 0.40'

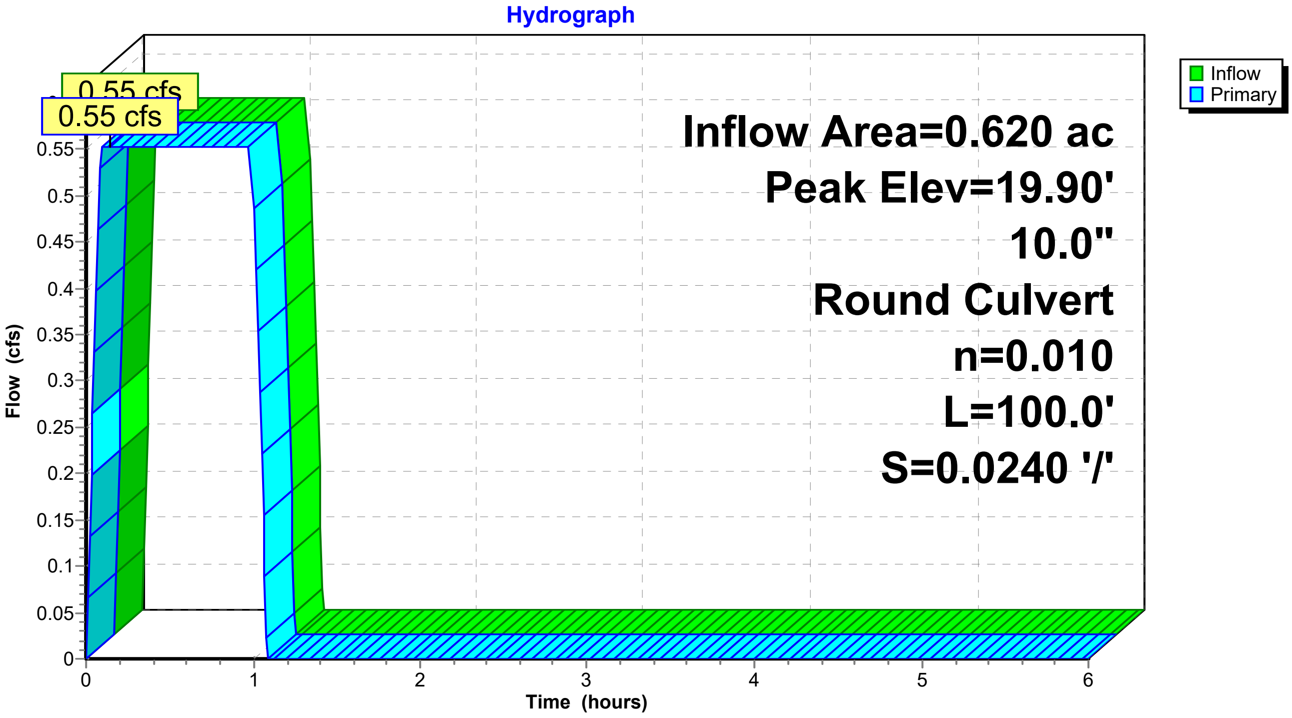
```
Inflow Area =      0.620 ac,100.00% Impervious,  Inflow Depth =   0.88"    for  10-yr event
Inflow      =     0.55 cfs @    0.10 hrs,  Volume=          0.046 af
Outflow     =     0.55 cfs @    0.14 hrs,  Volume=          0.046 af,  Atten= 0%,  Lag= 2.4 min
Primary     =     0.55 cfs @    0.14 hrs,  Volume=          0.046 af
```

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 19.90' @ 0.09 hrs
Flood Elev= 23.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	19.50'	**10.0" Round Culvert** L= 100.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 19.50' / 17.10' S= 0.0240 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.55 cfs @ 0.14 hrs HW=19.90' (Free Discharge)
└─**1=Culvert** (Inlet Controls 0.55 cfs @ 2.15 fps)

Pond 5P: Existing Catch Basin



Summary for Pond 6P: Existing Catch Basin

[79] Warning: Submerged Pond 5P Primary device # 1 OUTLET by 1.19'

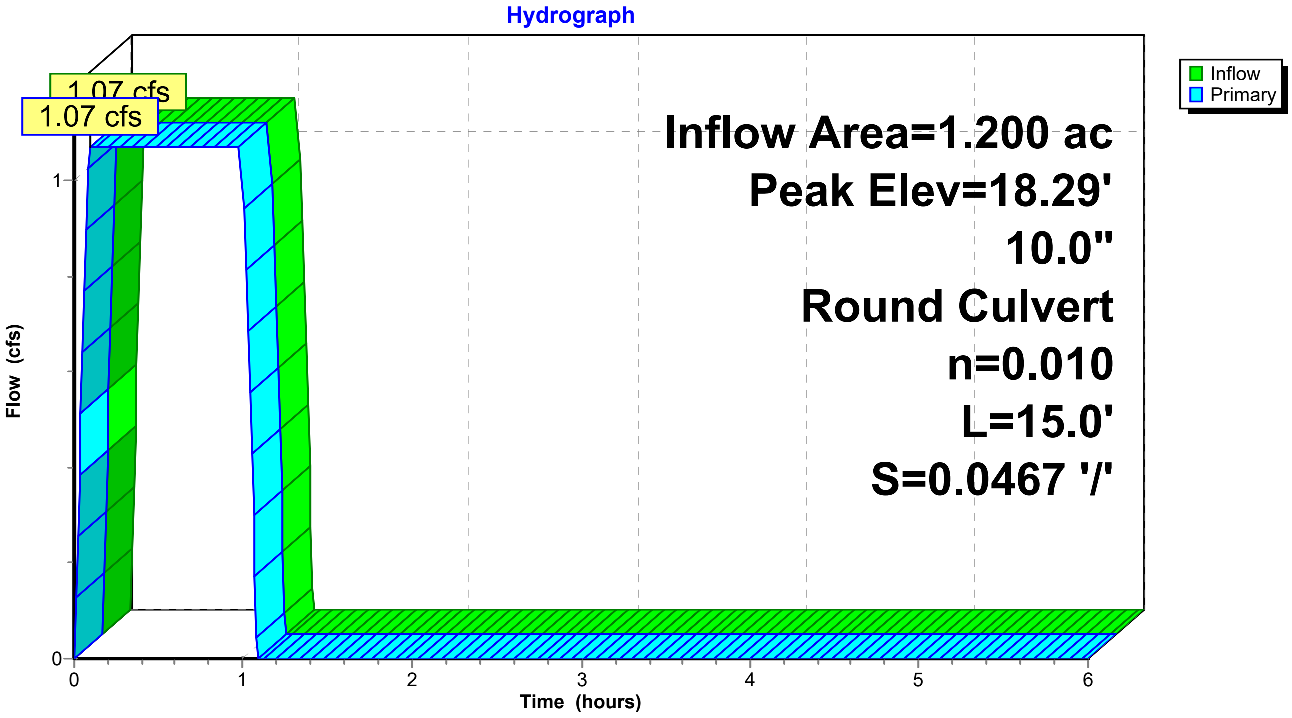
```
Inflow Area =        1.200 ac,100.00% Impervious,  Inflow Depth =   0.88"    for  10-yr event
Inflow      =        1.07 cfs @     0.10 hrs,  Volume=            0.088 af
Outflow     =        1.07 cfs @     0.10 hrs,  Volume=            0.088 af,  Atten= 0%,  Lag= 0.0 min
Primary     =        1.07 cfs @     0.10 hrs,  Volume=            0.088 af
```

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 18.29' @ 0.09 hrs
Flood Elev= 23.24'

Device	Routing	Invert	Outlet Devices
#1	Primary	17.70'	**10.0" Round Culvert** L= 15.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 17.70' / 17.00' S= 0.0467 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=1.07 cfs @ 0.10 hrs HW=18.29' (Free Discharge)
↑**1=Culvert** (Inlet Controls 1.07 cfs @ 2.61 fps)

Pond 6P: Existing Catch Basin



Summary for Pond 9P: Existing Catch Basin

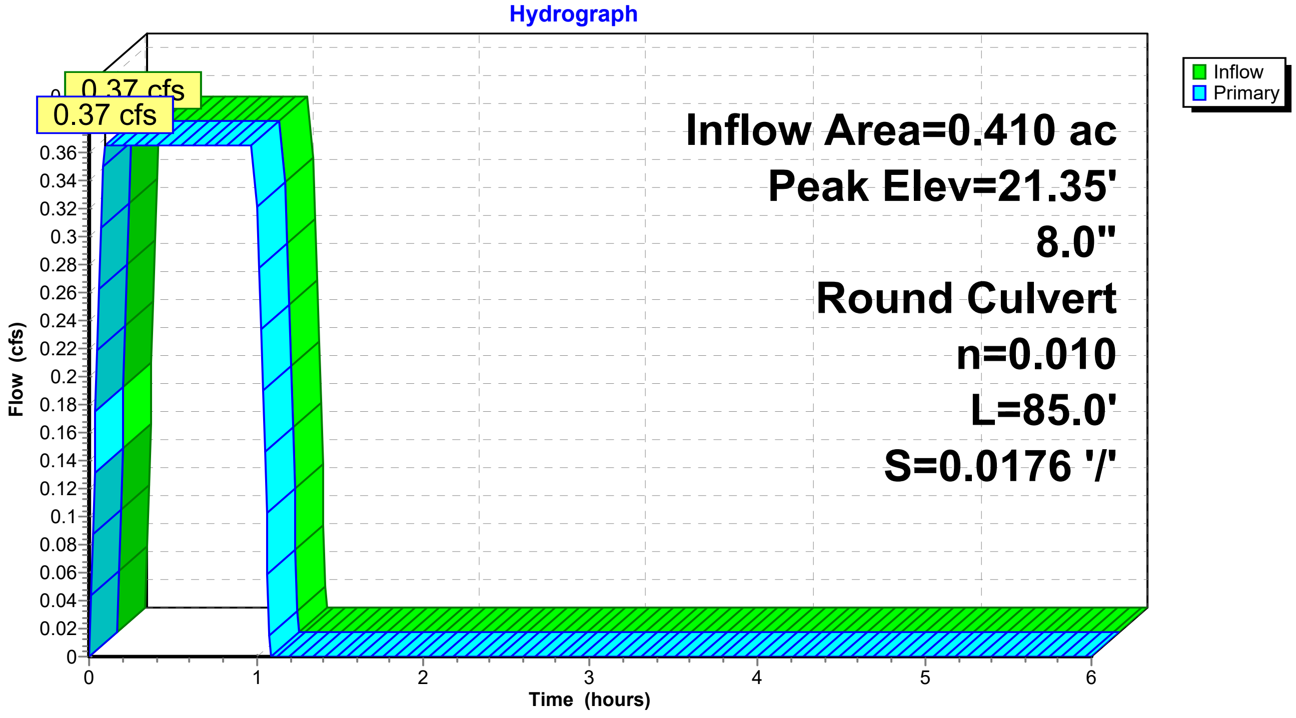
Inflow Area = 0.410 ac,100.00% Impervious, Inflow Depth = 0.88" for 10-yr event
Inflow = 0.37 cfs @ 0.09 hrs, Volume= 0.030 af
Outflow = 0.37 cfs @ 0.10 hrs, Volume= 0.030 af, Atten= 0%, Lag= 0.6 min
Primary = 0.37 cfs @ 0.10 hrs, Volume= 0.030 af

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 21.35' @ 0.09 hrs
Flood Elev= 23.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	21.00'	**8.0" Round Culvert** L= 85.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 21.00' / 19.50' S= 0.0176 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.37 cfs @ 0.10 hrs HW=21.35' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 0.37 cfs @ 2.00 fps)

Pond 9P: Existing Catch Basin



Time span=0.00-6.00 hrs, dt=0.01 hrs, 601 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: E-1 Runoff Area=0.070 ac 0.00% Impervious Runoff Depth=0.99"
Flow Length=340' Tc=5.0 min C=0.70 Runoff=0.07 cfs 0.006 af

Subcatchment 3S: E-4 Runoff Area=0.210 ac 100.00% Impervious Runoff Depth=1.35"
Flow Length=155' Slope=0.0200 '/' Tc=5.0 min C=0.95 Runoff=0.29 cfs 0.024 af

Subcatchment 7S: E-3 Runoff Area=0.410 ac 100.00% Impervious Runoff Depth=1.35"
Flow Length=240' Tc=5.0 min C=0.95 Runoff=0.56 cfs 0.046 af

Subcatchment 10S: E-5 Runoff Area=0.390 ac 100.00% Impervious Runoff Depth=1.35"
Flow Length=215' Tc=5.0 min C=0.95 Runoff=0.53 cfs 0.044 af

Subcatchment 11S: E-7 Runoff Area=0.190 ac 100.00% Impervious Runoff Depth=1.35"
Flow Length=120' Slope=0.0050 '/' Tc=5.0 min C=0.95 Runoff=0.26 cfs 0.021 af

Subcatchment 12S: E-9 Runoff Area=0.330 ac 0.00% Impervious Runoff Depth=0.71"
Flow Length=260' Tc=5.0 min C=0.50 Runoff=0.24 cfs 0.020 af

Subcatchment 13S: E-8 Runoff Area=0.440 ac 0.00% Impervious Runoff Depth=0.71"
Flow Length=335' Tc=5.0 min C=0.50 Runoff=0.32 cfs 0.026 af

Subcatchment 14S: E-2 Runoff Area=0.110 ac 0.00% Impervious Runoff Depth=0.99"
Flow Length=105' Slope=0.0050 '/' Tc=25.1 min C=0.70 Runoff=0.11 cfs 0.009 af

Subcatchment 15S: E-6 Runoff Area=0.340 ac 100.00% Impervious Runoff Depth=1.35"
Flow Length=255' Tc=5.0 min C=0.95 Runoff=0.46 cfs 0.038 af

Reach 10R: Existing 15-inch RCP Avg. Flow Depth=0.48' Max Vel=5.19 fps Inflow=2.25 cfs 0.186 af
15.0" Round Pipe n=0.013 L=520.0' S=0.0124 '/' Capacity=7.20 cfs Outflow=2.25 cfs 0.186 af

Reach 11R: Cross Gutter Avg. Flow Depth=0.12' Max Vel=1.27 fps Inflow=0.57 cfs 0.047 af
n=0.013 L=100.0' S=0.0050 '/' Capacity=1.33 cfs Outflow=0.57 cfs 0.047 af

Pond 2P: Existing Catch Basin Peak Elev=16.77' Inflow=2.25 cfs 0.186 af
15.0" Round Culvert n=0.011 L=550.0' S=0.0050 '/' Outflow=2.25 cfs 0.186 af

Pond 5P: Existing Catch Basin Peak Elev=20.01' Inflow=0.84 cfs 0.070 af
10.0" Round Culvert n=0.010 L=100.0' S=0.0240 '/' Outflow=0.84 cfs 0.070 af

Pond 6P: Existing Catch Basin Peak Elev=18.50' Inflow=1.63 cfs 0.135 af
10.0" Round Culvert n=0.010 L=15.0' S=0.0467 '/' Outflow=1.63 cfs 0.135 af

Pond 9P: Existing Catch Basin Peak Elev=21.44' Inflow=0.56 cfs 0.046 af
8.0" Round Culvert n=0.010 L=85.0' S=0.0176 '/' Outflow=0.56 cfs 0.046 af

Total Runoff Area = 2.490 ac Runoff Volume = 0.234 af Average Runoff Depth = 1.13"
38.15% Pervious = 0.950 ac 61.85% Impervious = 1.540 ac

Summary for Subcatchment 1S: E-1

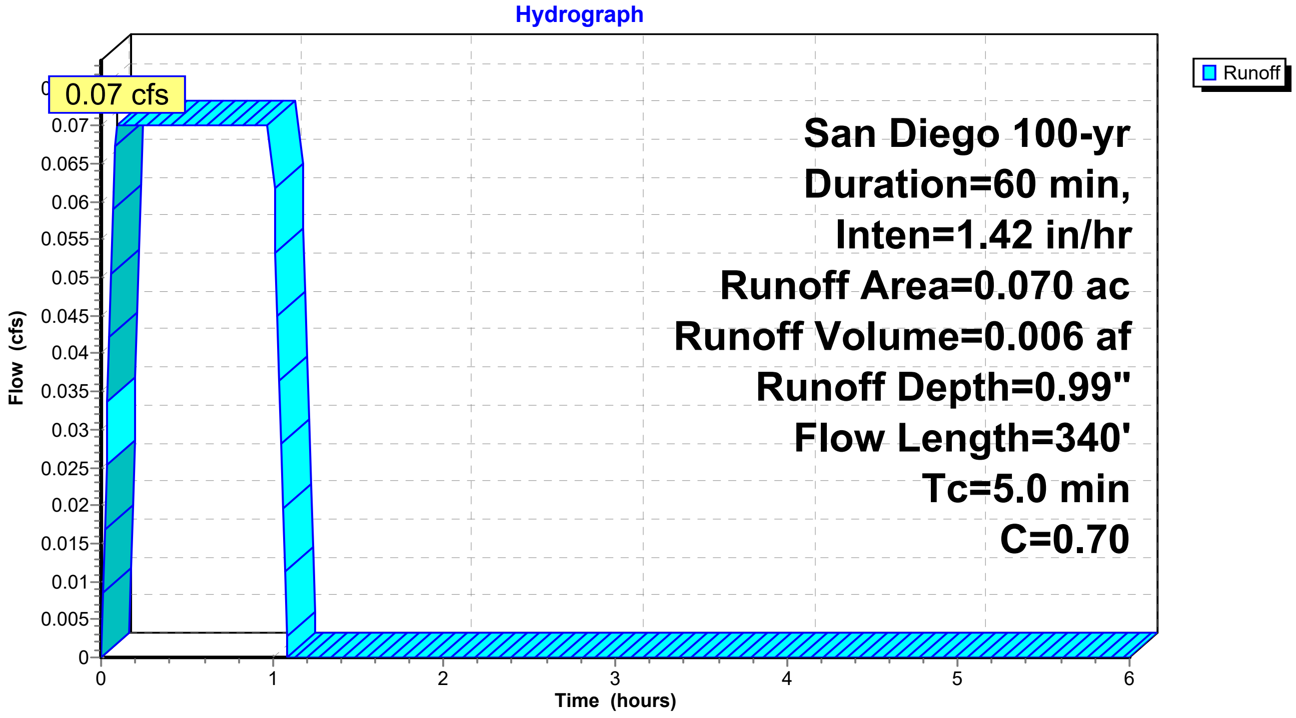
Runoff = 0.07 cfs @ 0.09 hrs, Volume= 0.006 af, Depth= 0.99"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
San Diego 100-yr Duration=60 min, Inten=1.42 in/hr

Area (ac)	C	Description
0.070	0.70	City of San Diego Table 2
0.070		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	90	0.0200	0.95		**Sheet Flow, Residential Lot** Smooth surfaces n= 0.011 P2= 1.60"
1.6	250	0.0160	2.57		**Shallow Concentrated Flow, Alley Flow** Paved Kv= 20.3 fps
3.2	340	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 1S: E-1



Summary for Subcatchment 3S: E-4

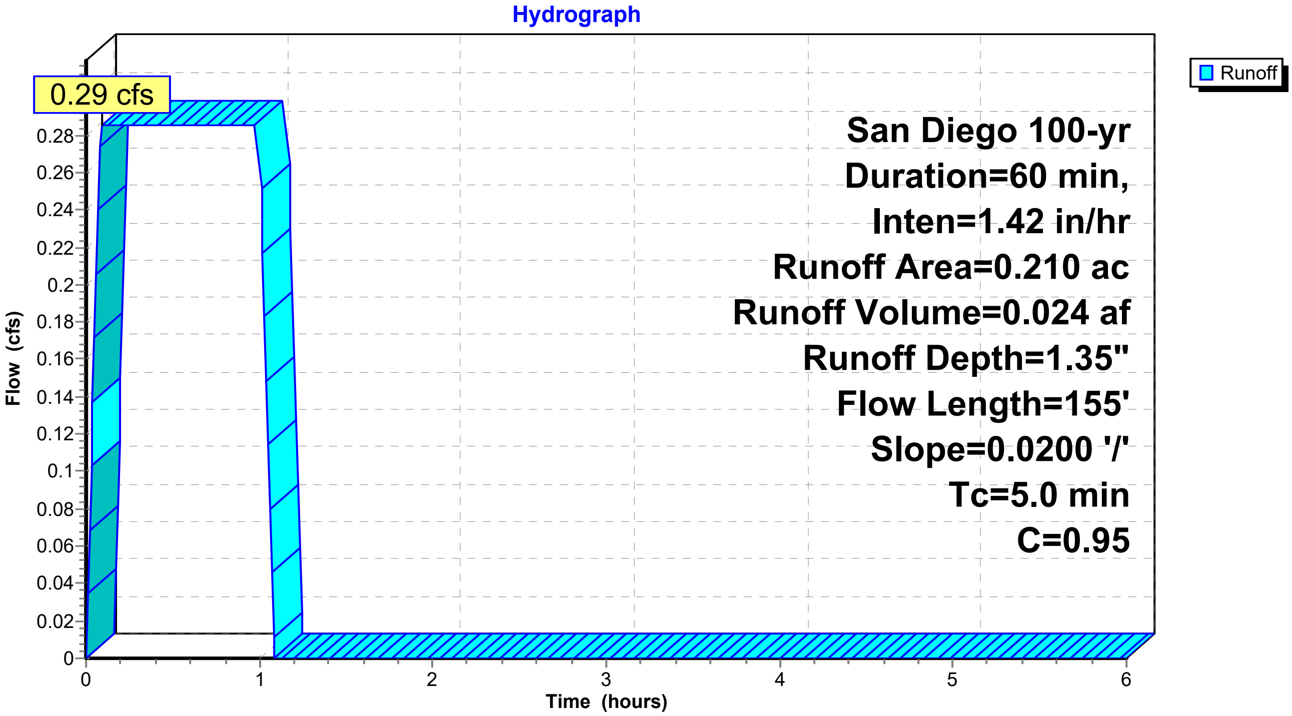
Runoff = 0.29 cfs @ 0.09 hrs, Volume= 0.024 af, Depth= 1.35"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
San Diego 100-yr Duration=60 min, Inten=1.42 in/hr

Area (ac)	C	Description
0.210	0.95	City of San Diego Table 2
0.210		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	155	0.0200	1.06		**Sheet Flow, Pavement** Smooth surfaces n= 0.011 P2= 1.60"
2.4	155	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 3S: E-4



Summary for Subcatchment 7S: E-3

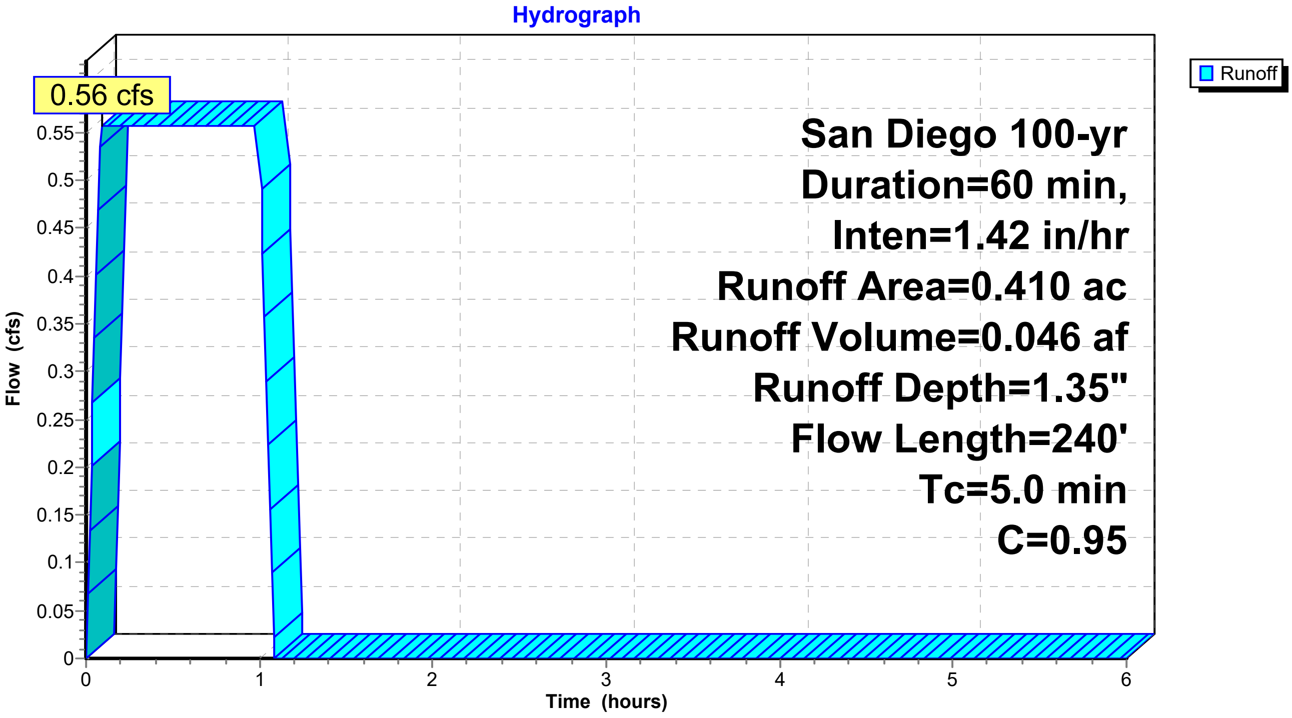
Runoff = 0.56 cfs @ 0.09 hrs, Volume= 0.046 af, Depth= 1.35"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
San Diego 100-yr Duration=60 min, Inten=1.42 in/hr

Area (ac)	C	Description
0.410	0.95	City of San Diego Table 2
0.410		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	65	0.2500	2.45		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 1.60"
1.9	120	0.0050	1.06		**Shallow Concentrated Flow, Swale along wall** Grassed Waterway Kv= 15.0 fps
1.4	55	0.0100	0.65		**Sheet Flow, Paved Surface** Smooth surfaces n= 0.011 P2= 1.60"
3.7	240	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 7S: E-3



Summary for Subcatchment 10S: E-5

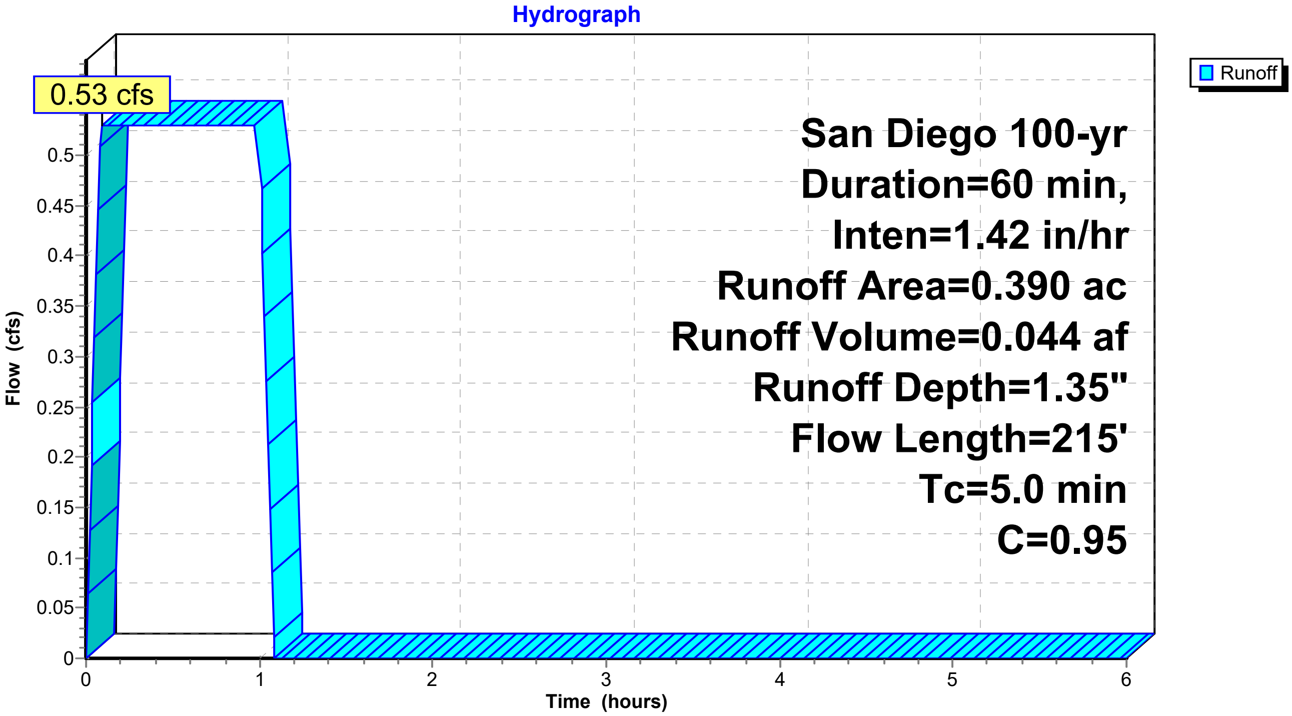
Runoff = 0.53 cfs @ 0.09 hrs, Volume= 0.044 af, Depth= 1.35"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
San Diego 100-yr Duration=60 min, Inten=1.42 in/hr

Area (ac)	C	Description
0.390	0.95	City of San Diego Table 2
0.390		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	70	0.2500	2.49		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 1.60"
1.2	145	0.0100	2.03		**Shallow Concentrated Flow, Alley** Paved Kv= 20.3 fps
1.7	215	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 10S: E-5



Summary for Subcatchment 11S: E-7

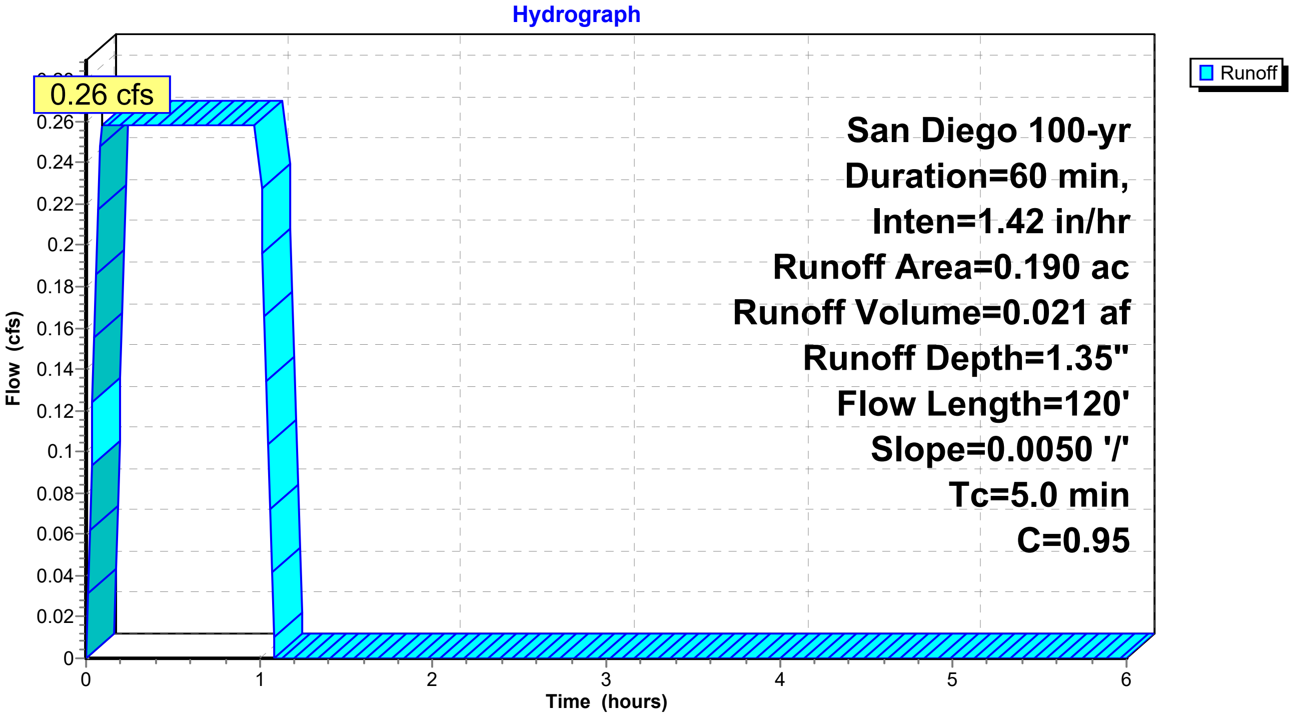
Runoff = 0.26 cfs @ 0.09 hrs, Volume= 0.021 af, Depth= 1.35"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
San Diego 100-yr Duration=60 min, Inten=1.42 in/hr

Area (ac)	C	Description
0.190	0.95	City of San Diego Table 2
0.190		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	120	0.0050	0.58		**Sheet Flow, E-7** Smooth surfaces n= 0.011 P2= 1.60"
3.5	120	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 11S: E-7



Summary for Subcatchment 12S: E-9

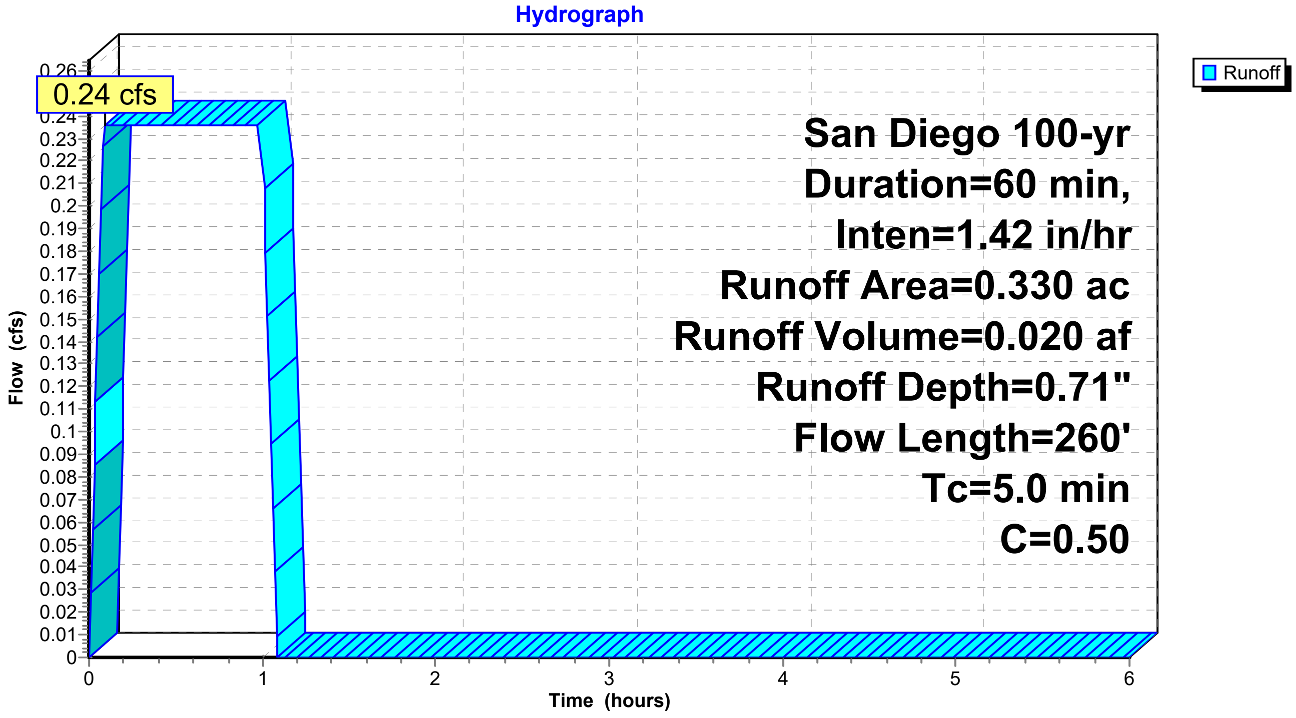
Runoff = 0.24 cfs @ 0.09 hrs, Volume= 0.020 af, Depth= 0.71"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
San Diego 100-yr Duration=60 min, Inten=1.42 in/hr

Area (ac)	C	Description
0.330	0.50	City of San Diego Table 2
0.330		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	30	0.5000	0.15		**Sheet Flow,** Grass: Bermuda n= 0.410 P2= 1.60"
1.3	230	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.6	260	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 12S: E-9



Summary for Subcatchment 13S: E-8

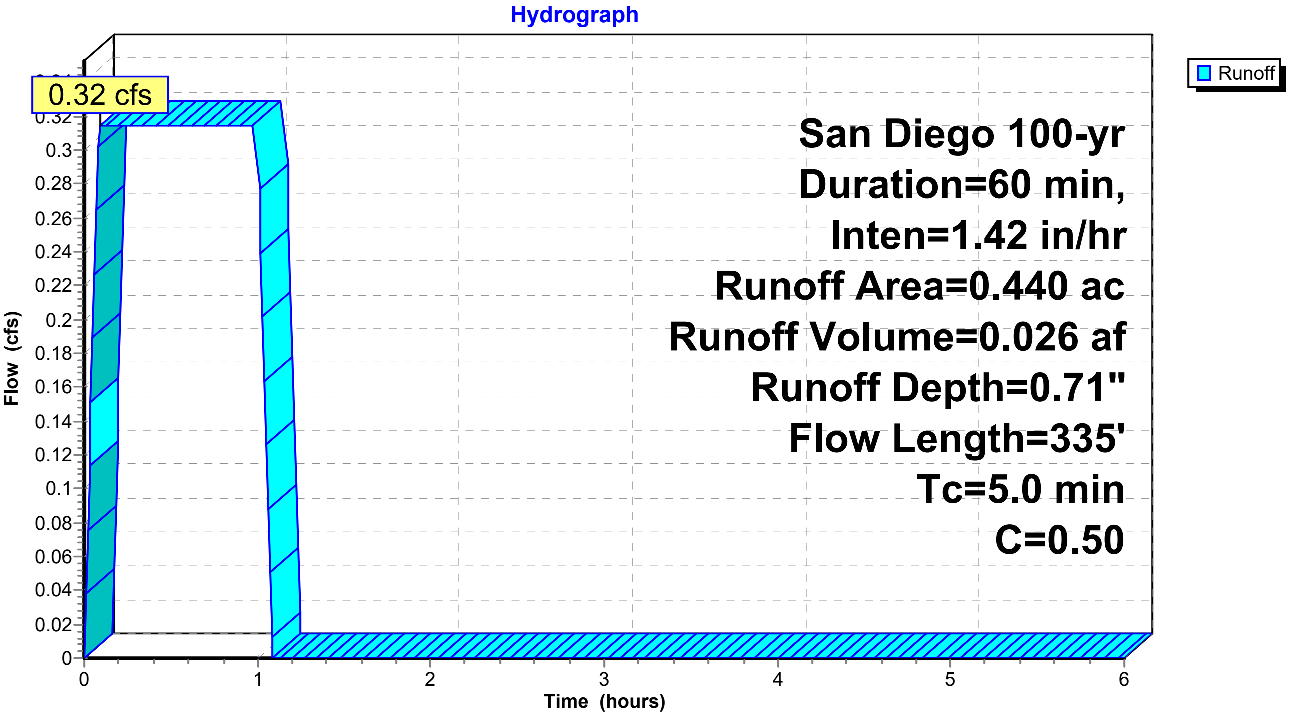
Runoff = 0.32 cfs @ 0.09 hrs, Volume= 0.026 af, Depth= 0.71"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
San Diego 100-yr Duration=60 min, Inten=1.42 in/hr

Area (ac)	C	Description
0.440	0.50	City of San Diego Table 2
0.440		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	25	0.5000	0.23		**Sheet Flow, Slope** Grass: Dense n= 0.240 P2= 1.60"
1.8	310	0.0200	2.87		**Shallow Concentrated Flow, Alley** Paved Kv= 20.3 fps
3.6	335	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 13S: E-8



Summary for Subcatchment 14S: E-2

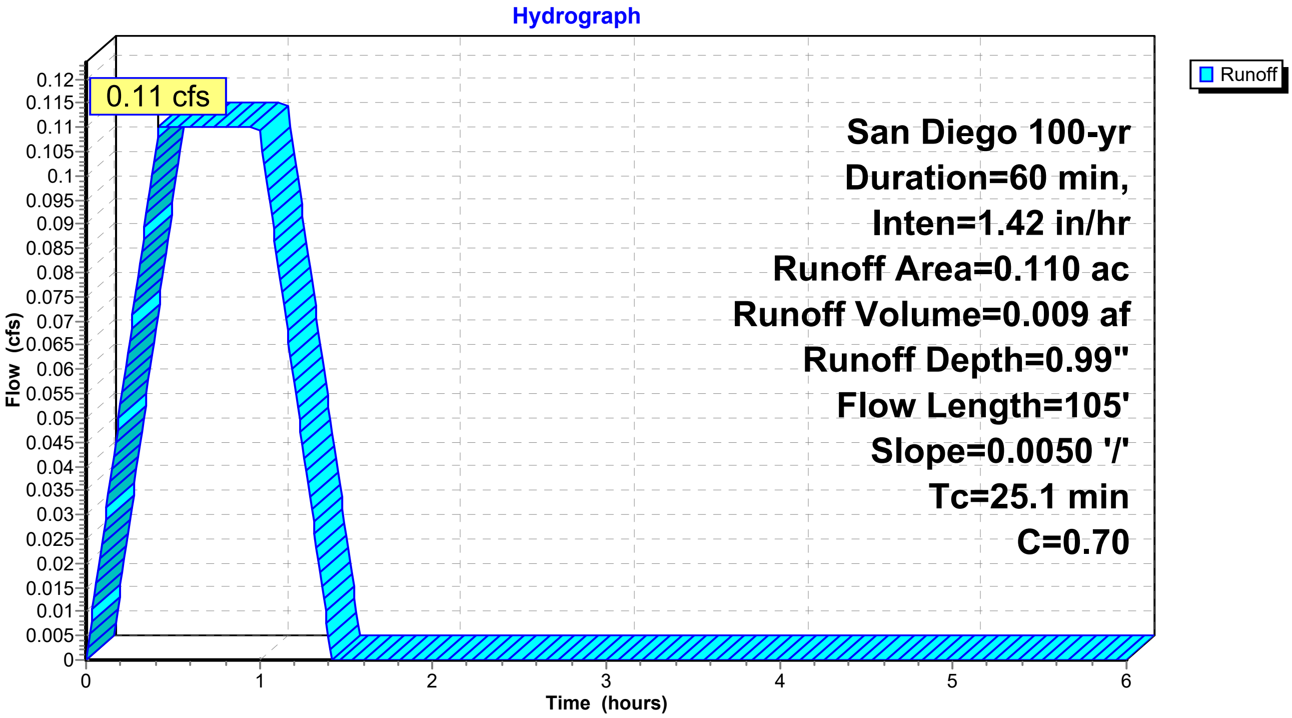
Runoff = 0.11 cfs @ 0.42 hrs, Volume= 0.009 af, Depth= 0.99"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
San Diego 100-yr Duration=60 min, Inten=1.42 in/hr

Area (ac)	C	Description
0.110	0.70	City of San Diego Table 2
0.110		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.1	105	0.0050	0.07		**Sheet Flow, Lawn** Grass: Short n= 0.150 P2= 1.60"

Subcatchment 14S: E-2



Summary for Subcatchment 15S: E-6

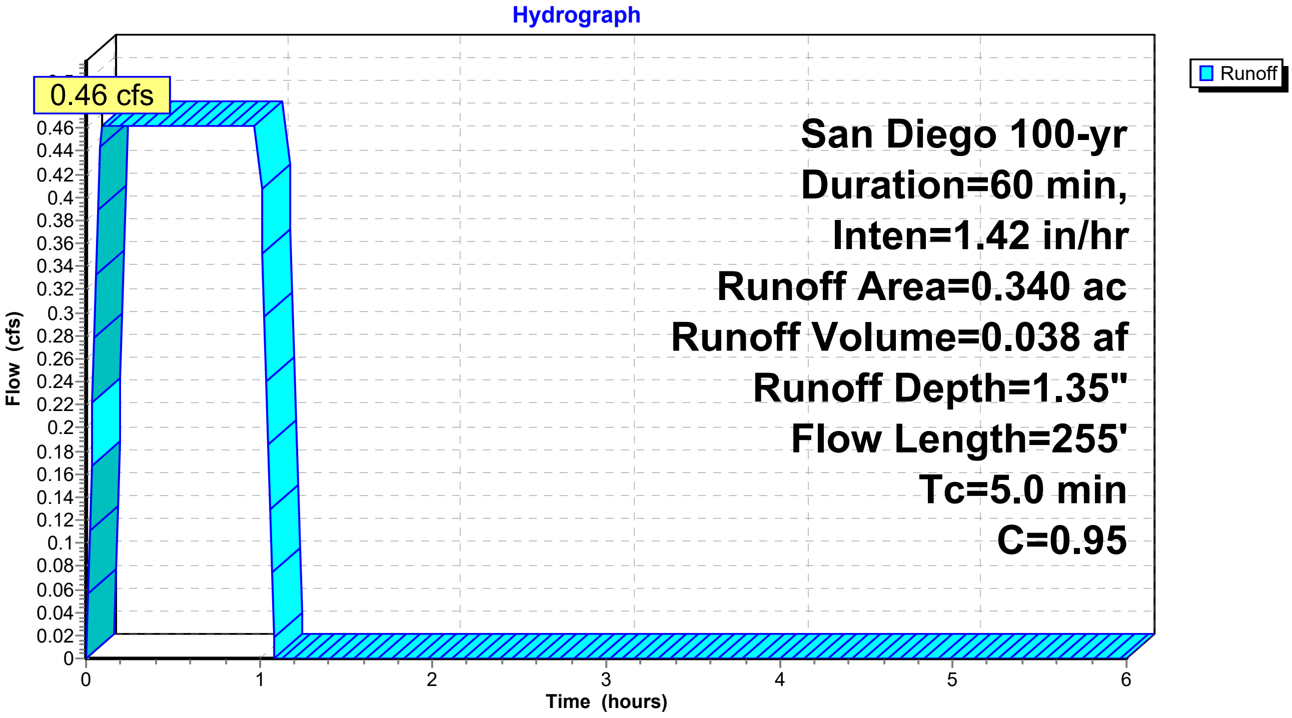
Runoff = 0.46 cfs @ 0.09 hrs, Volume= 0.038 af, Depth= 1.35"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
San Diego 100-yr Duration=60 min, Inten=1.42 in/hr

Area (ac)	C	Description
0.340	0.95	City of San Diego Table 2
0.340		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	65	0.2500	2.45		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 1.60"
1.9	120	0.0050	1.06		**Shallow Concentrated Flow, Swale along wall** Grassed Waterway Kv= 15.0 fps
2.2	70	0.0050	0.52		**Sheet Flow, Pavement** Smooth surfaces n= 0.011 P2= 1.60"
4.5	255	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 15S: E-6



Summary for Reach 10R: Existing 15-inch RCP

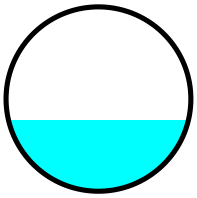
[52] Hint: Inlet/Outlet conditions not evaluated
[81] Warning: Exceeded Pond 2P by 1.69' @ 1.09 hrs

```
Inflow Area =         2.040 ac,  58.82% Impervious,  Inflow Depth =   1.10"    for  100-yr event
Inflow      =         2.25 cfs @     0.09 hrs,  Volume=            0.186 af
Outflow     =         2.25 cfs @     0.81 hrs,  Volume=            0.186 af,  Atten= 0%,  Lag= 43.2 min
```

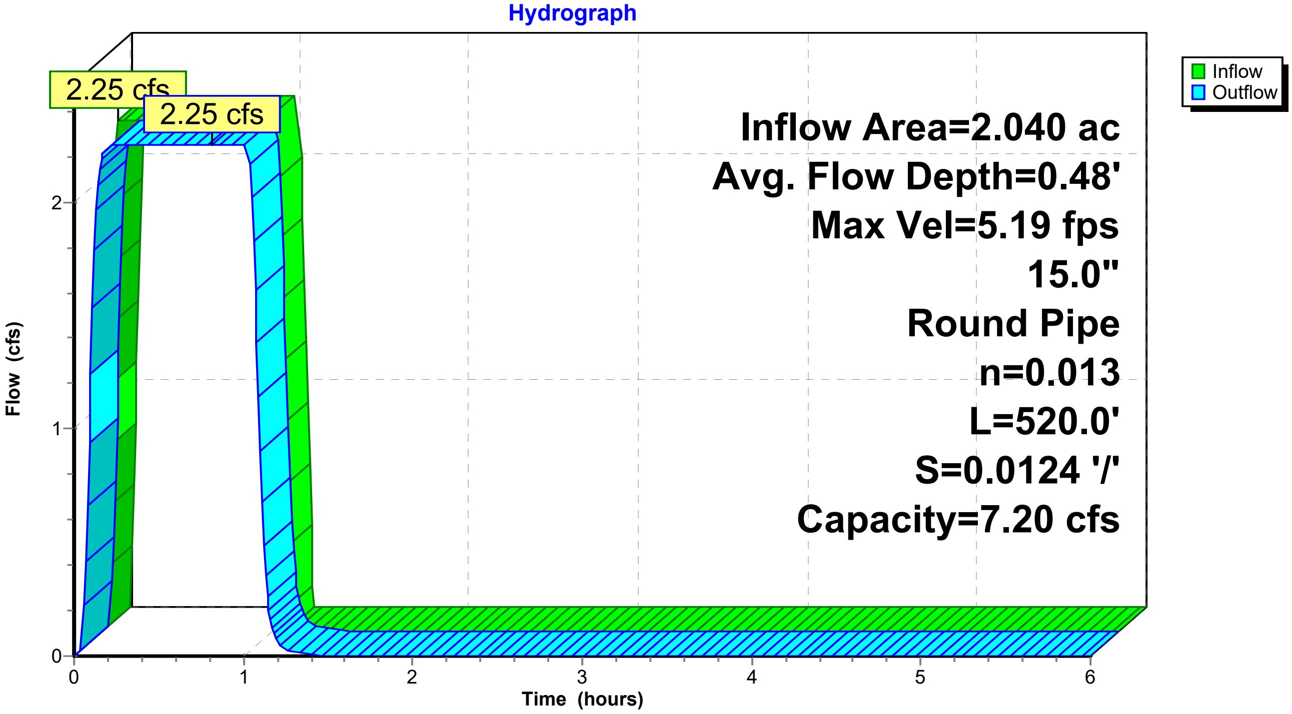
Routing by Stor-Ind+Trans method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.19 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 2.65 fps, Avg. Travel Time= 3.3 min

Peak Storage= 226 cf @ 0.78 hrs
Average Depth at Peak Storage= 0.48'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 7.20 cfs

15.0" Round Pipe
n= 0.013 Concrete pipe, bends & connections
Length= 520.0'   Slope= 0.0124 '/'
Inlet Invert= 17.46', Outlet Invert= 11.00'



Reach 10R: Existing 15-inch RCP



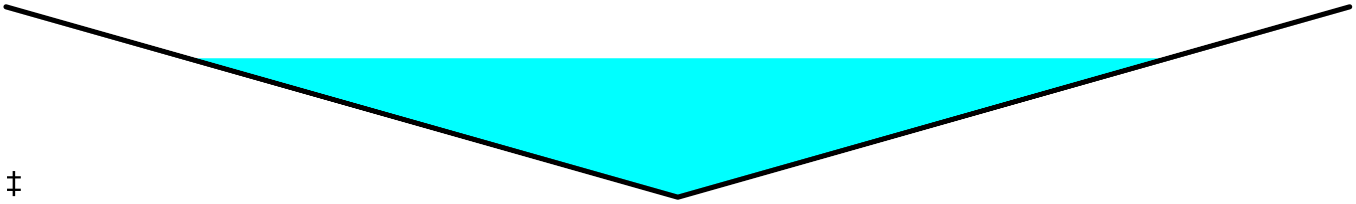
Summary for Reach 11R: Cross Gutter

Inflow Area =	0.450 ac, 75.56% Impervious, Inflow Depth = 1.26" for 100-yr event		
Inflow =	0.57 cfs @ 0.42 hrs, Volume=	0.047 af	
Outflow =	0.57 cfs @ 0.94 hrs, Volume=	0.047 af, Atten= 0%, Lag= 31.2 min	

Routing by Stor-Ind+Trans method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.27 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 0.74 fps, Avg. Travel Time= 2.3 min

Peak Storage= 45 cf @ 0.92 hrs
Average Depth at Peak Storage= 0.12'
Bank-Full Depth= 0.17' Flow Area= 0.8 sf, Capacity= 1.33 cfs

0.00' x 0.17' deep channel, n= 0.013
Side Slope Z-value= 29.4 '/' Top Width= 10.00'
Length= 100.0' Slope= 0.0050 '/'
Inlet Invert= 20.60', Outlet Invert= 20.10'



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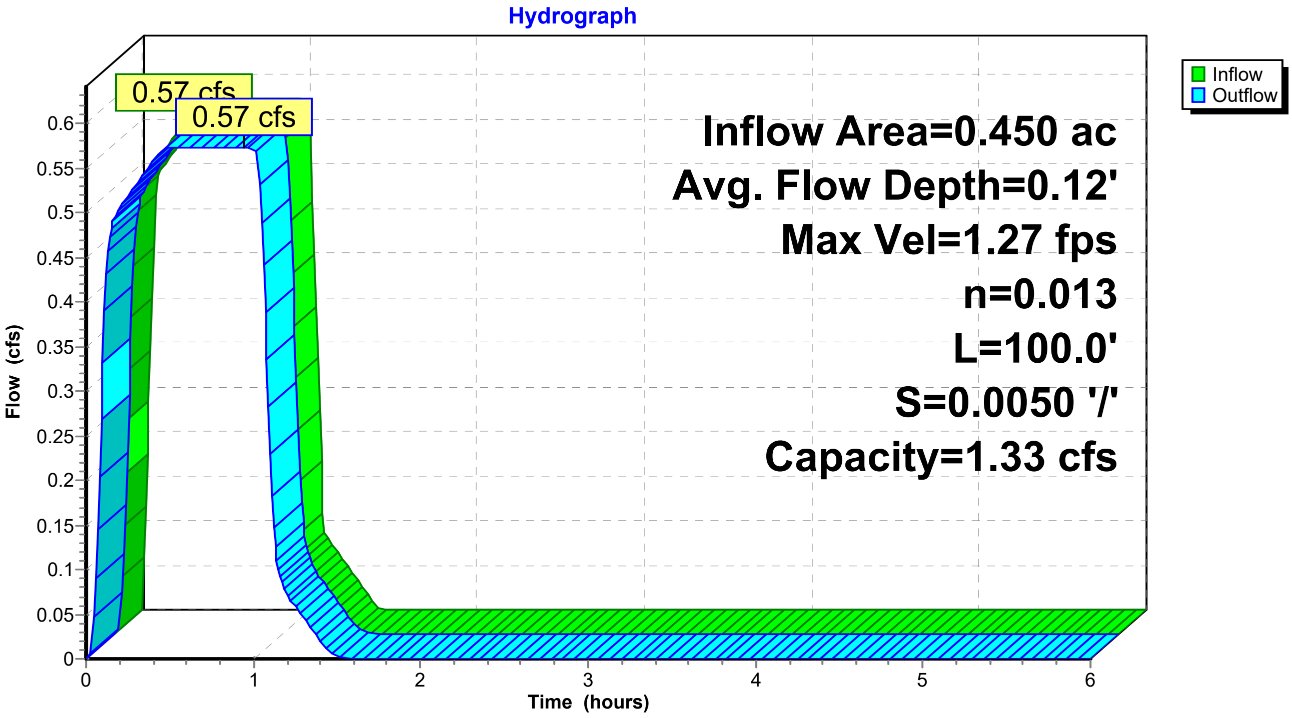
Reach 11R: Cross Gutter



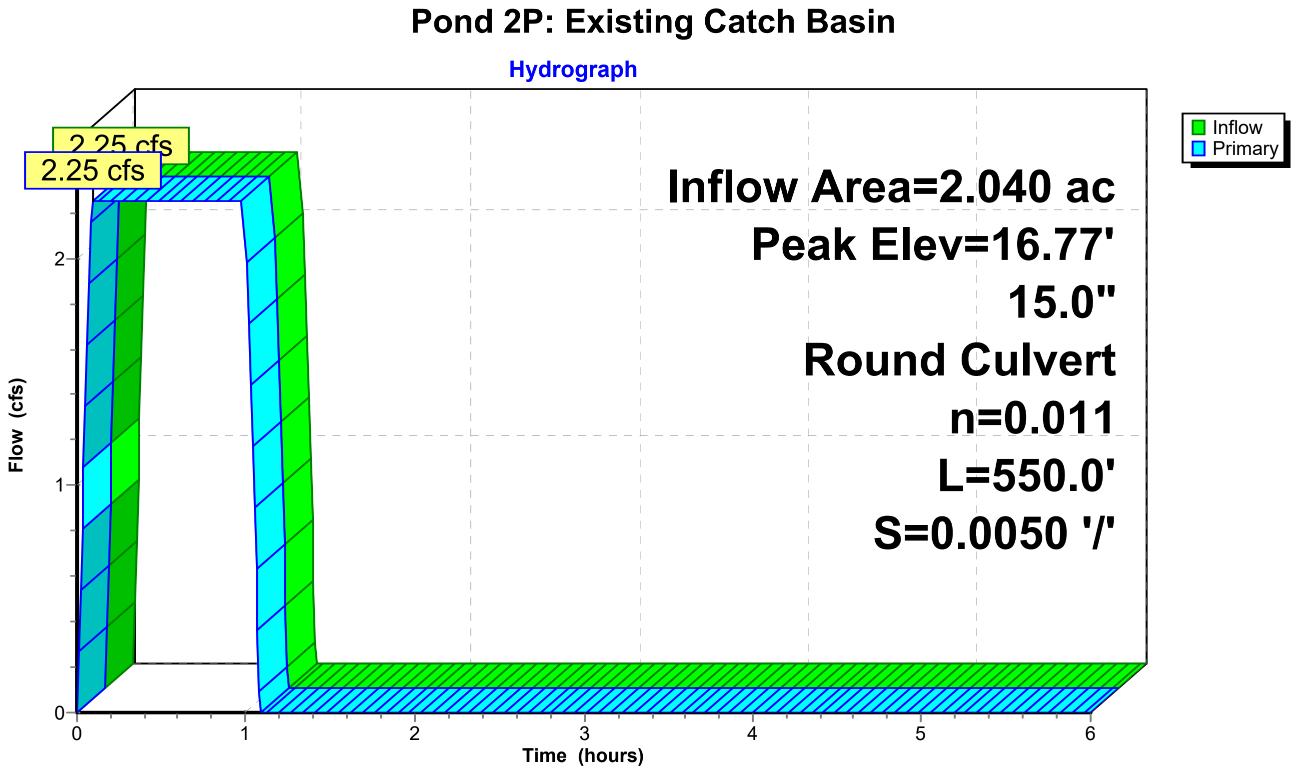
Summary for Pond 2P: Existing Catch Basin

```
Inflow Area =      2.040 ac, 58.82% Impervious, Inflow Depth = 1.10"   for 100-yr event
Inflow      =     2.25 cfs @   0.10 hrs, Volume=        0.186 af
Outflow     =     2.25 cfs @   0.09 hrs, Volume=        0.186 af, Atten= 0%, Lag= 0.0 min
Primary     =     2.25 cfs @   0.09 hrs, Volume=        0.186 af
```

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 16.77' @ 0.09 hrs
Flood Elev= 23.13'

Device	Routing	Invert	Outlet Devices
#1	Primary	16.00'	**15.0" Round Culvert** L= 550.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 16.00' / 13.25' S= 0.0050 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf

Primary OutFlow Max=2.25 cfs @ 0.09 hrs HW=16.77' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 2.25 cfs @ 4.08 fps)



Summary for Pond 5P: Existing Catch Basin

[79] Warning: Submerged Pond 9P Primary device # 1 OUTLET by 0.51'

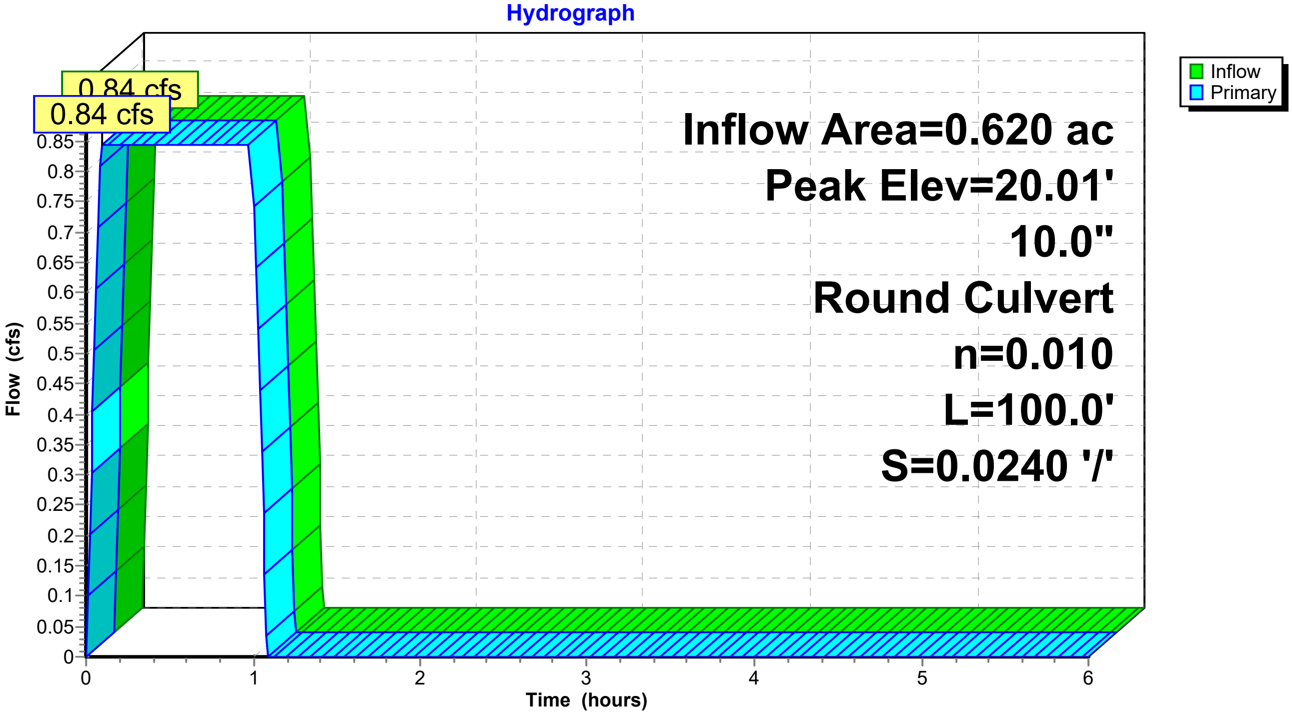
Inflow Area =	0.620 ac,100.00% Impervious,	Inflow Depth = 1.35" for 100-yr event		
Inflow =	0.84 cfs @	0.09 hrs, Volume=	0.070 af	
Outflow =	0.84 cfs @	0.10 hrs, Volume=	0.070 af,	Atten= 0%, Lag= 0.6 min
Primary =	0.84 cfs @	0.10 hrs, Volume=	0.070 af	

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 20.01' @ 0.09 hrs
Flood Elev= 23.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	19.50'	**10.0" Round Culvert** L= 100.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 19.50' / 17.10' S= 0.0240 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.84 cfs @ 0.10 hrs HW=20.01' (Free Discharge)
└─**1=Culvert** (Inlet Controls 0.84 cfs @ 2.43 fps)

Pond 5P: Existing Catch Basin



Summary for Pond 6P: Existing Catch Basin

[79] Warning: Submerged Pond 5P Primary device # 1 OUTLET by 1.40'

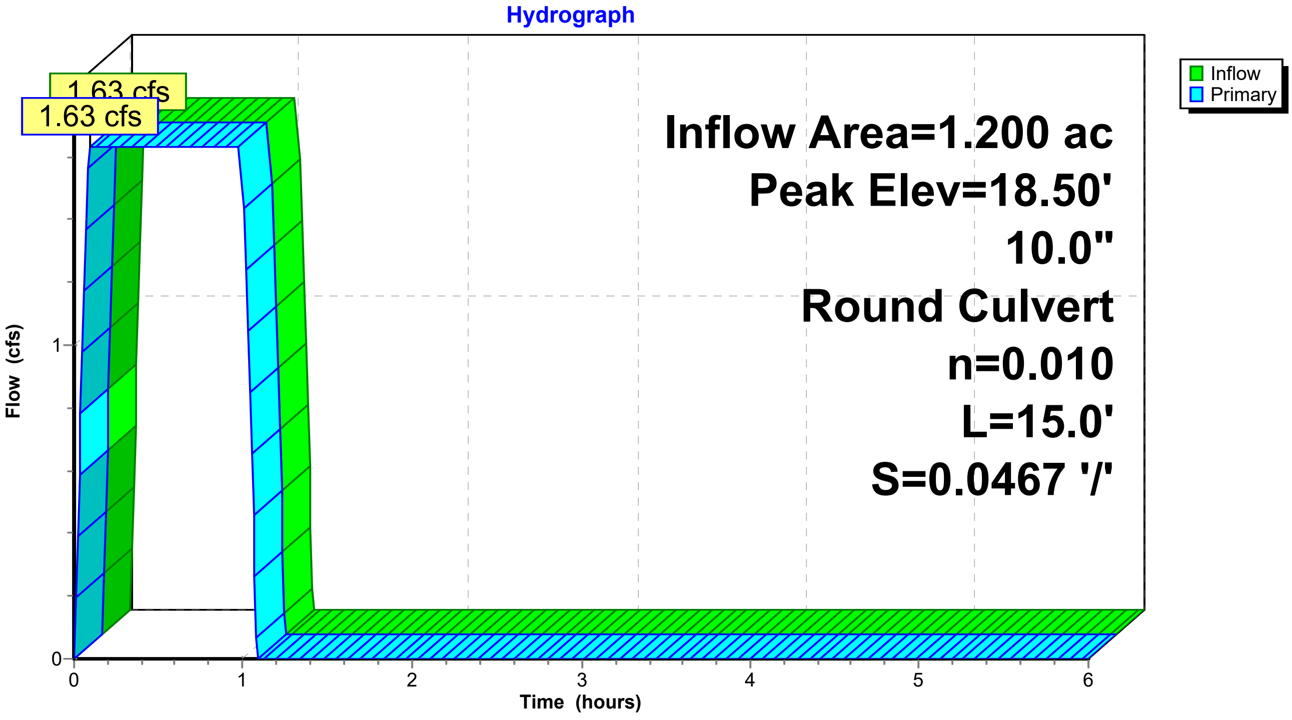
```
Inflow Area =      1.200 ac,100.00% Impervious,  Inflow Depth =   1.35"   for  100-yr event
Inflow      =      1.63 cfs @    0.10 hrs,  Volume=         0.135 af
Outflow     =      1.63 cfs @    0.10 hrs,  Volume=         0.135 af,  Atten= 0%,  Lag= 0.0 min
Primary     =      1.63 cfs @    0.10 hrs,  Volume=         0.135 af
```

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 18.50' @ 0.09 hrs
Flood Elev= 23.24'

Device	Routing	Invert	Outlet Devices
#1	Primary	17.70'	**10.0" Round Culvert** L= 15.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 17.70' / 17.00' S= 0.0467 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=1.64 cfs @ 0.10 hrs HW=18.50' (Free Discharge)
└─**1=Culvert** (Inlet Controls 1.64 cfs @ 3.04 fps)

Pond 6P: Existing Catch Basin



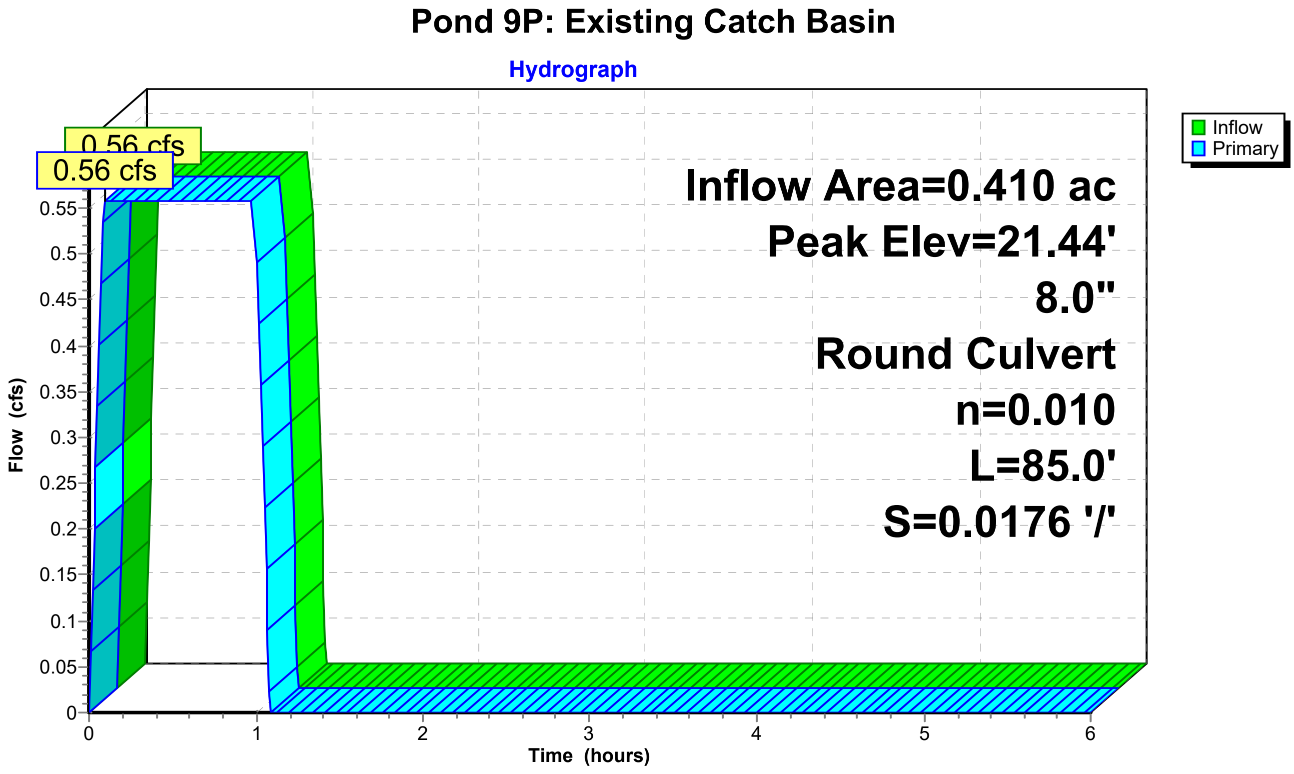
Summary for Pond 9P: Existing Catch Basin

```
Inflow Area =      0.410 ac,100.00% Impervious,  Inflow Depth =   1.35"    for  100-yr event
Inflow     =      0.56 cfs @    0.09 hrs,  Volume=         0.046 af
Outflow    =      0.56 cfs @    0.09 hrs,  Volume=         0.046 af,  Atten= 0%,  Lag= 0.0 min
Primary    =      0.56 cfs @    0.09 hrs,  Volume=         0.046 af
```

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 21.44' @ 0.09 hrs
Flood Elev= 23.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	21.00'	**8.0" Round Culvert** L= 85.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 21.00' / 19.50' S= 0.0176 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.56 cfs @ 0.09 hrs HW=21.44' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 0.56 cfs @ 2.27 fps)

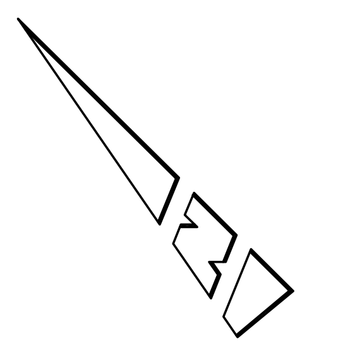


Appendix C
Proposed Hydrology Map

NOTE: X2 GOES INTO P3 & X1 GOES INTO O2.

LEGEND

— - — - →	FLOW PATH OF TRAVEL
———	PROPOSED CONTOUR
P.O.C.	POINT OF COMPLIANCE
*	TO RAINWATER HARVEST SYSTEM



SCALE: 1"=20'
0 10' 20' 40' 60'

BASIN NAME	C-FACTOR	AREA (AC)	Q100 (CFS)	V100 (FPS)
P1	0.95	0.21	0.29	0.33
P2	0.95	0.19	0.26	0.12
P3	0.95	0.28	0.33	0.12
P4	0.95	0.10	0.14	0.37
P5	0.95	0.65	0.88	0.41.
P6	0.95	0.34	0.46	0.38
P7	0.95	0.10	0.14	0.38
P8	0.95	0.10	0.14	0.31
O1	0.35	0.05	0.03	1.24
O2	0.35	0.48	0.24	2.12

TABLE OF PERVIOUS/IMPERVIOUS

	PERVIOUS	IMPERVIOUS
P-1 TO P-8	0%	100%
O1 AND O2	100%	0%

PAUL J. HACUNDA, PE
16 LAKERIDGE TRABUCO CANYON, CA 92679
CA PE LIC No 41627

PREPARED BY:
R.C.E. NO.
DATE Jul. 31, 16

BENCHMARK:

SCALE: AS SHOWN

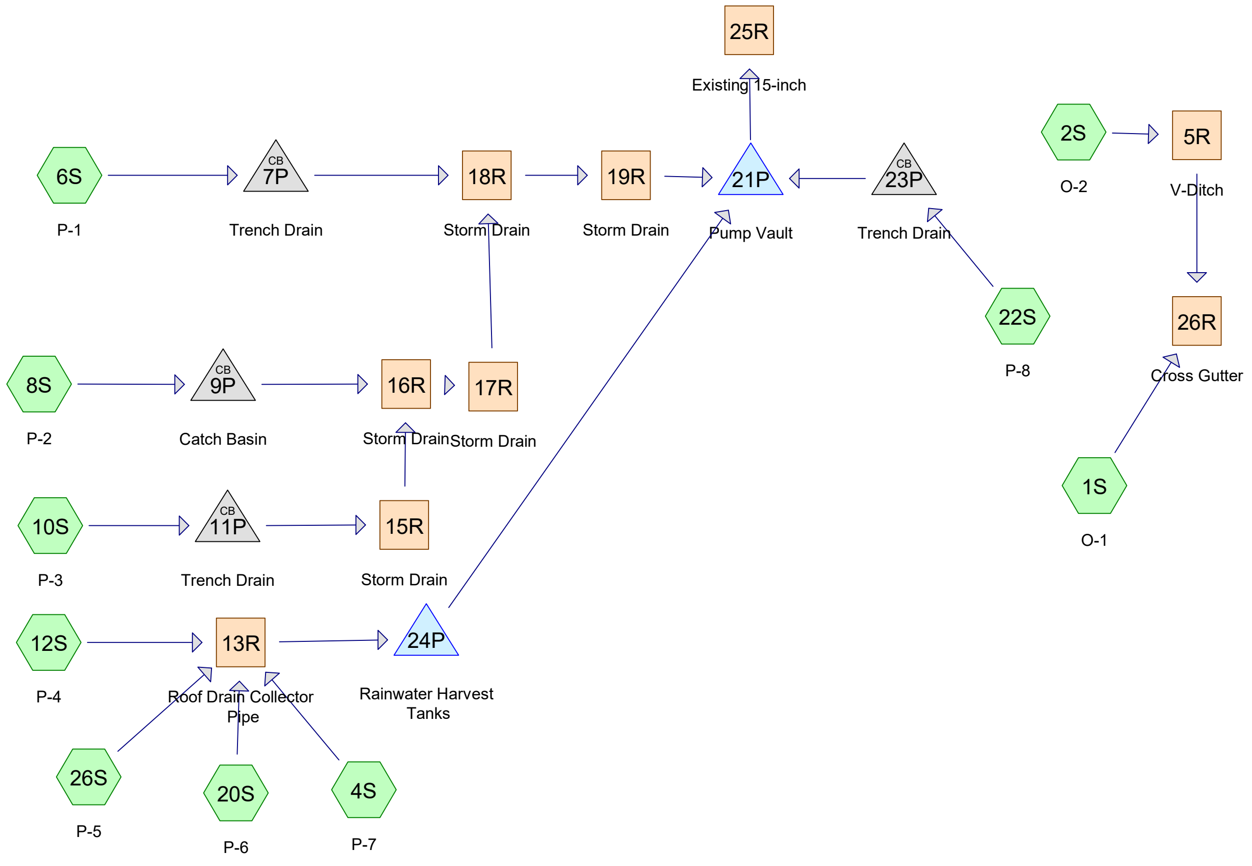
PROPOSED DRAINAGE CONDITIONS
3608-3688 DALBERGIA STREET
SAN DIEGO, CA 92113

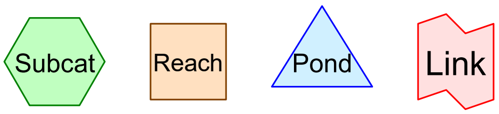
FOR:
W.O.

SHEET NO. 1
OF 1 SHTS

Drawing: E:\My Work\Dalbergia Street\Proposed Drainage Conditions.dwg Layout: Layout1 Last Saved: Mon Mar 12, 2018 - 6:34am Last Plotted: Mon Mar 12, 2018 - 6:36am By: raymondh

Appendix D
Proposed Conditions
HydroCAD® Results
2-year, 1-hour
10-year, 1-hour
100-year, 1-hour





Routing Diagram for Dalbergia Street Proposed Conditions Rev4
Prepared by Paul J. Hacunda, PE, Printed 1/3/2018
HydroCAD® 10.00-20 s/n 04689 © 2017 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	C	Description (subcatchment-numbers)
0.530	0.35	(1S, 2S)
1.970	0.95	(4S, 6S, 8S, 10S, 12S, 20S, 22S, 26S)
2.500	**0.82**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
2.500	Other	1S, 2S, 4S, 6S, 8S, 10S, 12S, 20S, 22S, 26S
2.500		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	2.500	2.500		1S, 2S, 4S, 6S, 8S, 10S, 12S, 20S, 22S, 26S
0.000	**0.000**	**0.000**	**0.000**	**2.500**	**2.500**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	13R	53.33	36.33	195.0	0.0872	0.010	6.0	0.0	0.0
2	15R	18.13	18.00	25.0	0.0052	0.010	8.0	0.0	0.0
3	16R	18.00	17.00	98.0	0.0102	0.010	8.0	0.0	0.0
4	17R	17.00	4.00	1.0	13.0000	0.010	8.0	0.0	0.0
5	18R	4.00	3.90	12.0	0.0083	0.010	8.0	0.0	0.0
6	19R	4.40	3.75	125.0	0.0052	0.010	8.0	0.0	0.0
7	25R	17.46	11.00	520.0	0.0124	0.013	15.0	0.0	0.0
8	7P	4.50	3.85	125.0	0.0052	0.010	8.0	0.0	0.0
9	9P	18.00	16.00	100.0	0.0200	0.010	6.0	0.0	0.0
10	11P	22.00	18.13	25.0	0.1548	0.010	8.0	0.0	0.0
11	23P	14.00	13.22	155.0	0.0050	0.010	8.0	0.0	0.0

Time span=0.00-1.00 hrs, dt=0.01 hrs, 101 points x 3
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: O-1 Runoff Area=0.050 ac 0.00% Impervious Runoff Depth>0.17"
Flow Length=107' Tc=13.5 min C=0.35 Runoff=0.01 cfs 0.001 af

Subcatchment 2S: O-2 Runoff Area=0.480 ac 0.00% Impervious Runoff Depth>0.17"
Flow Length=583' Tc=17.1 min C=0.35 Runoff=0.09 cfs 0.007 af

Subcatchment 4S: P-7 Runoff Area=0.100 ac 100.00% Impervious Runoff Depth>0.51"
Flow Length=60' Slope=0.2500 '/' Tc=5.0 min C=0.95 Runoff=0.05 cfs 0.004 af

Subcatchment 6S: P-1 Runoff Area=0.210 ac 100.00% Impervious Runoff Depth>0.48"
Flow Length=240' Slope=0.0900 '/' Tc=12.0 min C=0.95 Runoff=0.11 cfs 0.008 af

Subcatchment 8S: P-2 Runoff Area=0.190 ac 100.00% Impervious Runoff Depth>0.46"
Flow Length=125' Slope=0.0100 '/' Tc=17.1 min C=0.95 Runoff=0.10 cfs 0.007 af

Subcatchment 10S: P-3 Runoff Area=0.280 ac 100.00% Impervious Runoff Depth>0.44"
Flow Length=300' Tc=22.1 min C=0.95 Runoff=0.15 cfs 0.010 af

Subcatchment 12S: P-4 Runoff Area=0.100 ac 100.00% Impervious Runoff Depth>0.51"
Flow Length=55' Slope=0.2500 '/' Tc=5.0 min C=0.95 Runoff=0.05 cfs 0.004 af

Subcatchment 20S: P-6 Runoff Area=0.340 ac 100.00% Impervious Runoff Depth>0.51"
Flow Length=60' Slope=0.2500 '/' Tc=5.0 min C=0.95 Runoff=0.18 cfs 0.015 af

Subcatchment 22S: P-8 Runoff Area=0.100 ac 100.00% Impervious Runoff Depth>0.51"
Flow Length=150' Tc=5.1 min C=0.95 Runoff=0.05 cfs 0.004 af

Subcatchment 26S: P-5 Runoff Area=0.650 ac 100.00% Impervious Runoff Depth>0.51"
Flow Length=90' Slope=0.2500 '/' Tc=5.0 min C=0.95 Runoff=0.35 cfs 0.028 af

Reach 5R: V-Ditch Avg. Flow Depth=0.04' Max Vel=0.76 fps Inflow=0.09 cfs 0.007 af
n=0.017 L=555.0' S=0.0054 '/' Capacity=5.03 cfs Outflow=0.09 cfs 0.005 af

Reach 13R: Roof Drain Collector Pipe Avg. Flow Depth=0.19' Max Vel=9.56 fps Inflow=0.64 cfs 0.051 af
6.0" Round Pipe n=0.010 L=195.0' S=0.0872 '/' Capacity=2.15 cfs Outflow=0.64 cfs 0.051 af

Reach 15R: Storm Drain Avg. Flow Depth=0.16' Max Vel=2.25 fps Inflow=0.15 cfs 0.010 af
8.0" Round Pipe n=0.010 L=25.0' S=0.0052 '/' Capacity=1.13 cfs Outflow=0.15 cfs 0.010 af

Reach 16R: Storm Drain Avg. Flow Depth=0.18' Max Vel=3.32 fps Inflow=0.25 cfs 0.017 af
8.0" Round Pipe n=0.010 L=98.0' S=0.0102 '/' Capacity=1.59 cfs Outflow=0.25 cfs 0.017 af

Reach 17R: Storm Drain Avg. Flow Depth=0.03' Max Vel=40.86 fps Inflow=0.25 cfs 0.017 af
8.0" Round Pipe n=0.010 L=1.0' S=13.0000 '/' Capacity=56.64 cfs Outflow=0.25 cfs 0.017 af

Reach 18R: Storm Drain Avg. Flow Depth=0.23' Max Vel=3.43 fps Inflow=0.36 cfs 0.026 af
8.0" Round Pipe n=0.010 L=12.0' S=0.0083 '/' Capacity=1.43 cfs Outflow=0.36 cfs 0.026 af

Reach 19R: Storm Drain Avg. Flow Depth=0.26' Max Vel=2.89 fps Inflow=0.36 cfs 0.026 af
8.0" Round Pipe n=0.010 L=125.0' S=0.0052 '/' Capacity=1.13 cfs Outflow=0.36 cfs 0.025 af

Reach 25R: Existing 15-inch Avg. Flow Depth=0.24' Max Vel=3.56 fps Inflow=0.61 cfs 0.035 af
15.0" Round Pipe n=0.013 L=520.0' S=0.0124 '/' Capacity=7.20 cfs Outflow=0.60 cfs 0.033 af

Reach 26R: Cross Gutter Avg. Flow Depth=0.07' Max Vel=0.83 fps Inflow=0.10 cfs 0.006 af
n=0.013 L=100.0' S=0.0050 '/' Capacity=2.05 cfs Outflow=0.10 cfs 0.006 af

Pond 7P: Trench Drain Peak Elev=4.71' Inflow=0.11 cfs 0.008 af
8.0" Round Culvert n=0.010 L=125.0' S=0.0052 '/' Outflow=0.11 cfs 0.008 af

Pond 9P: Catch Basin Peak Elev=18.31' Inflow=0.10 cfs 0.007 af
6.0" Round Culvert n=0.010 L=100.0' S=0.0200 '/' Outflow=0.10 cfs 0.007 af

Pond 11P: Trench Drain Peak Elev=22.21' Inflow=0.15 cfs 0.010 af
8.0" Round Culvert n=0.010 L=25.0' S=0.1548 '/' Outflow=0.15 cfs 0.010 af

Pond 21P: Pump Vault Peak Elev=0.17' Storage=0.002 af Inflow=0.42 cfs 0.030 af
Outflow=0.61 cfs 0.028 af

Pond 23P: Trench Drain Peak Elev=14.13' Inflow=0.05 cfs 0.004 af
8.0" Round Culvert n=0.010 L=155.0' S=0.0050 '/' Outflow=0.05 cfs 0.004 af

Pond 24P: Rainwater Harvest Tanks Peak Elev=33.01' Storage=0.050 af Inflow=0.64 cfs 0.051 af
Outflow=0.00 cfs 0.000 af

Total Runoff Area = 2.500 ac Runoff Volume = 0.088 af Average Runoff Depth = 0.42"
21.20% Pervious = 0.530 ac 78.80% Impervious = 1.970 ac

Summary for Subcatchment 1S: O-1

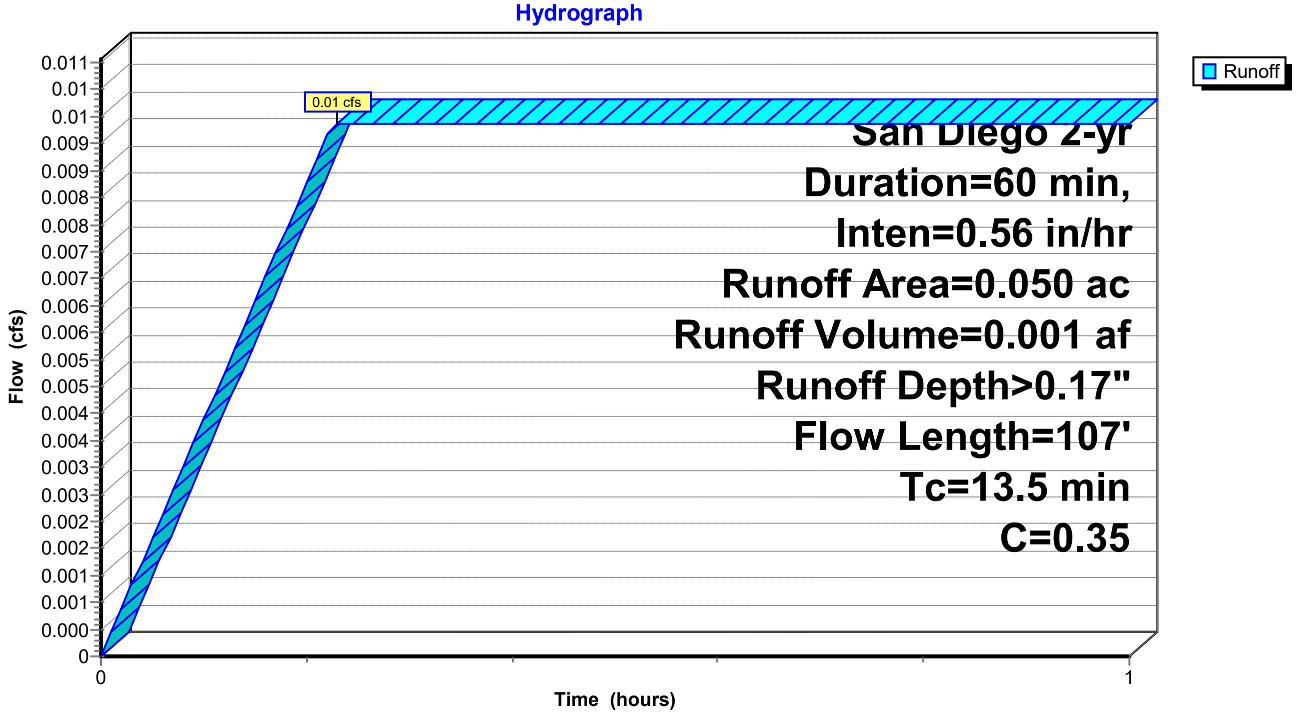
Runoff = 0.01 cfs @ 0.23 hrs, Volume= 0.001 af, Depth> 0.17"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs
San Diego 2-yr Duration=60 min, Inten=0.56 in/hr

Area (ac)	C	Description
0.050	0.35	
0.050		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	27	0.5000	0.04		**Sheet Flow, Caltrans Slope** Grass: Dense n= 0.240 P2= 0.04"
1.1	80	0.0050	1.24	0.10	**Trap/Vee/Rect Channel Flow, V-Ditch** Bot.W=0.00' D=0.20' Z= 2.0 '/' Top.W=0.80' n= 0.017 Concrete, unfinished
13.5	107	Total			

Subcatchment 1S: O-1



Summary for Subcatchment 2S: O-2

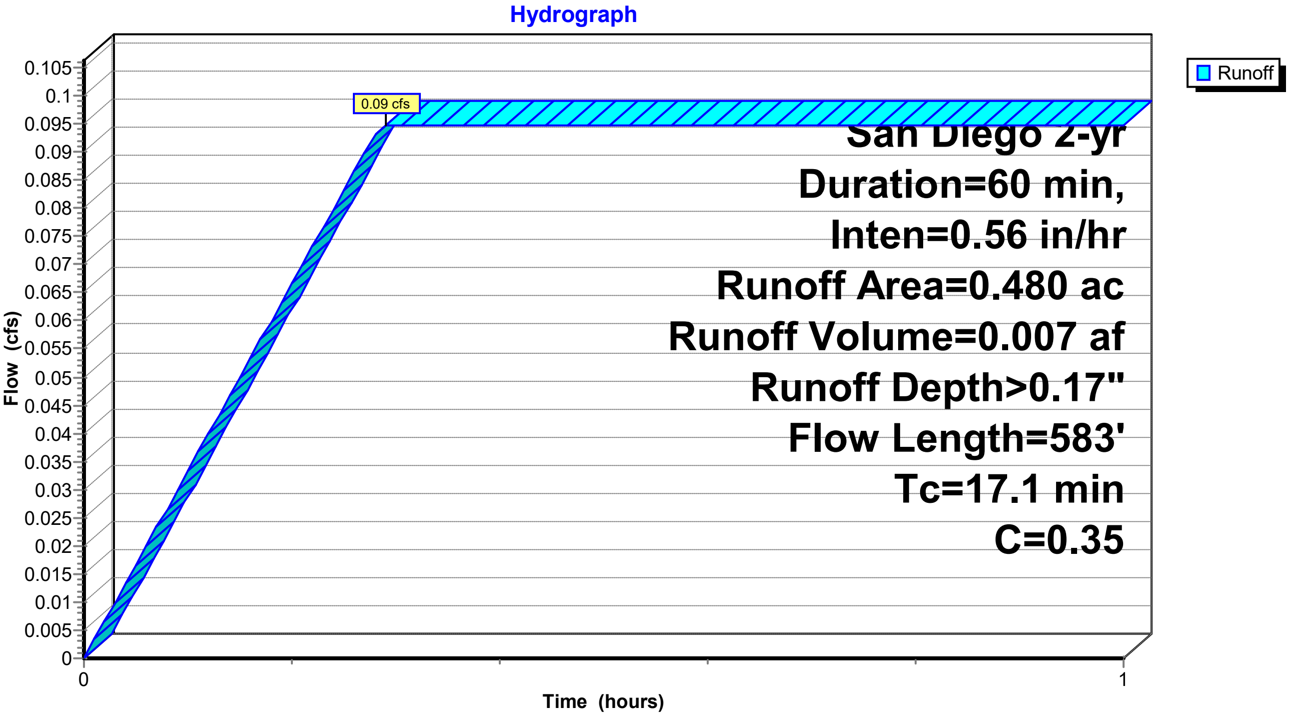
Runoff = 0.09 cfs @ 0.29 hrs, Volume= 0.007 af, Depth> 0.17"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs
San Diego 2-yr Duration=60 min, Inten=0.56 in/hr

Area (ac)	C	Description
0.480	0.35	
0.480		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	28	0.5000	0.04		**Sheet Flow, Caltrans R/W** Grass: Dense n= 0.240 P2= 0.04"
4.4	555	0.0050	2.12	0.38	**Trap/Vee/Rect Channel Flow, V-Ditch** Bot.W=0.00' D=0.30' Z= 2.0 '/' Top.W=1.20' n= 0.013 Concrete, trowel finish
17.1	583	Total			

Subcatchment 2S: O-2



Summary for Subcatchment 4S: P-7

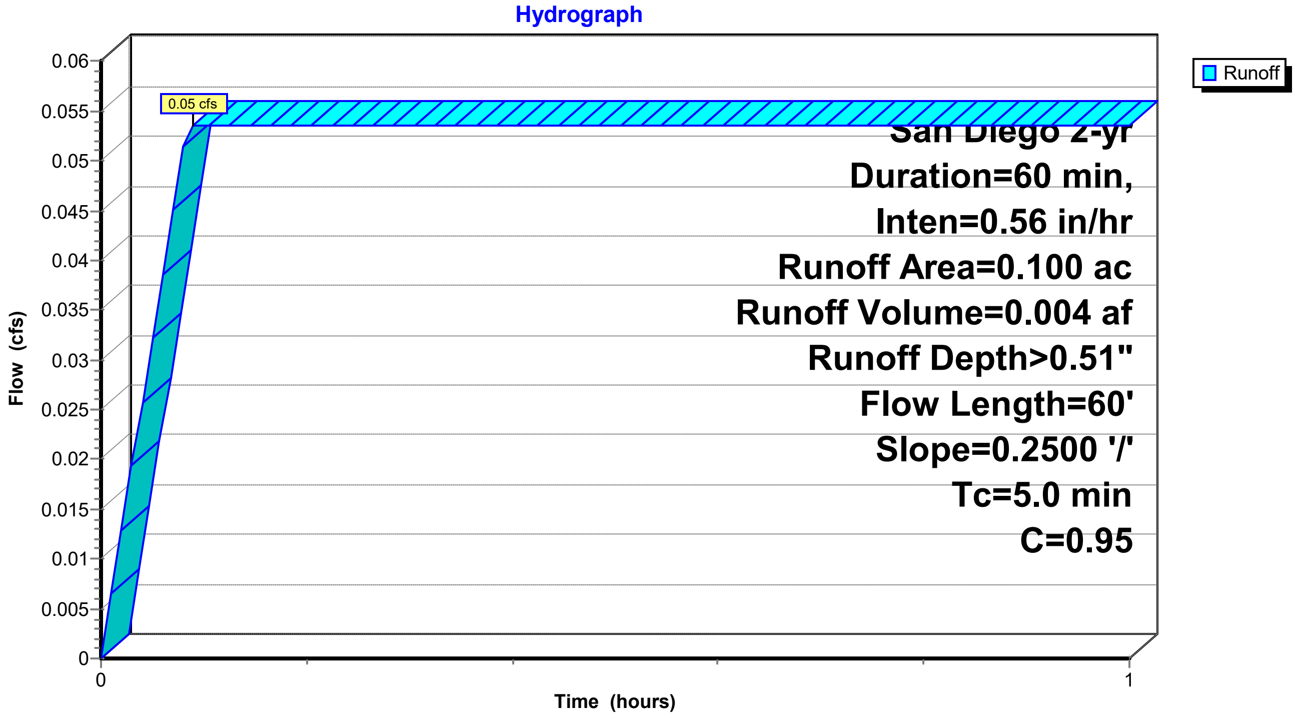
Runoff = 0.05 cfs @ 0.09 hrs, Volume= 0.004 af, Depth> 0.51"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs
San Diego 2-yr Duration=60 min, Inten=0.56 in/hr

Area (ac)	C	Description
0.100	0.95	
0.100		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.6	60	0.2500	0.38		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 0.04"
2.6	60	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 4S: P-7



Summary for Subcatchment 6S: P-1

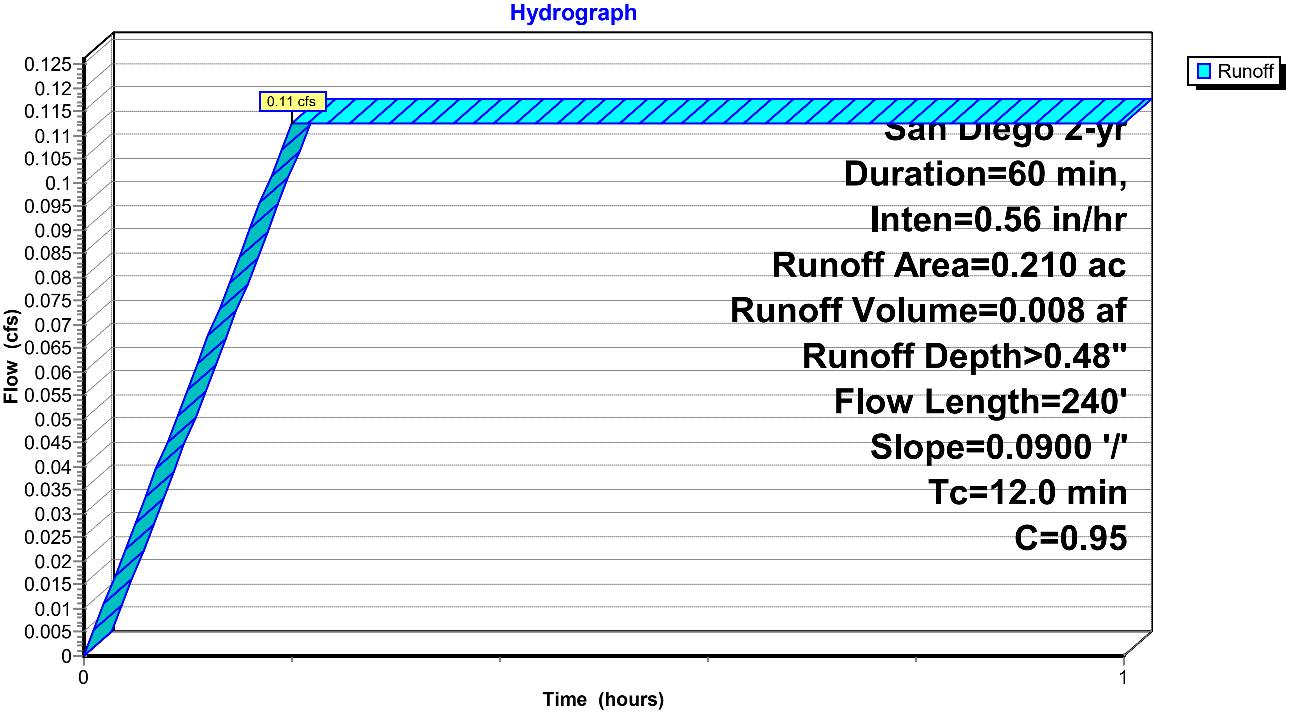
Runoff = 0.11 cfs @ 0.20 hrs, Volume= 0.008 af, Depth> 0.48"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs
San Diego 2-yr Duration=60 min, Inten=0.56 in/hr

Area (ac)	C	Description
0.210	0.95	
0.210		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0	240	0.0900	0.33		**Sheet Flow, Exit Ramp** Smooth surfaces n= 0.011 P2= 0.04"

Subcatchment 6S: P-1



Summary for Subcatchment 8S: P-2

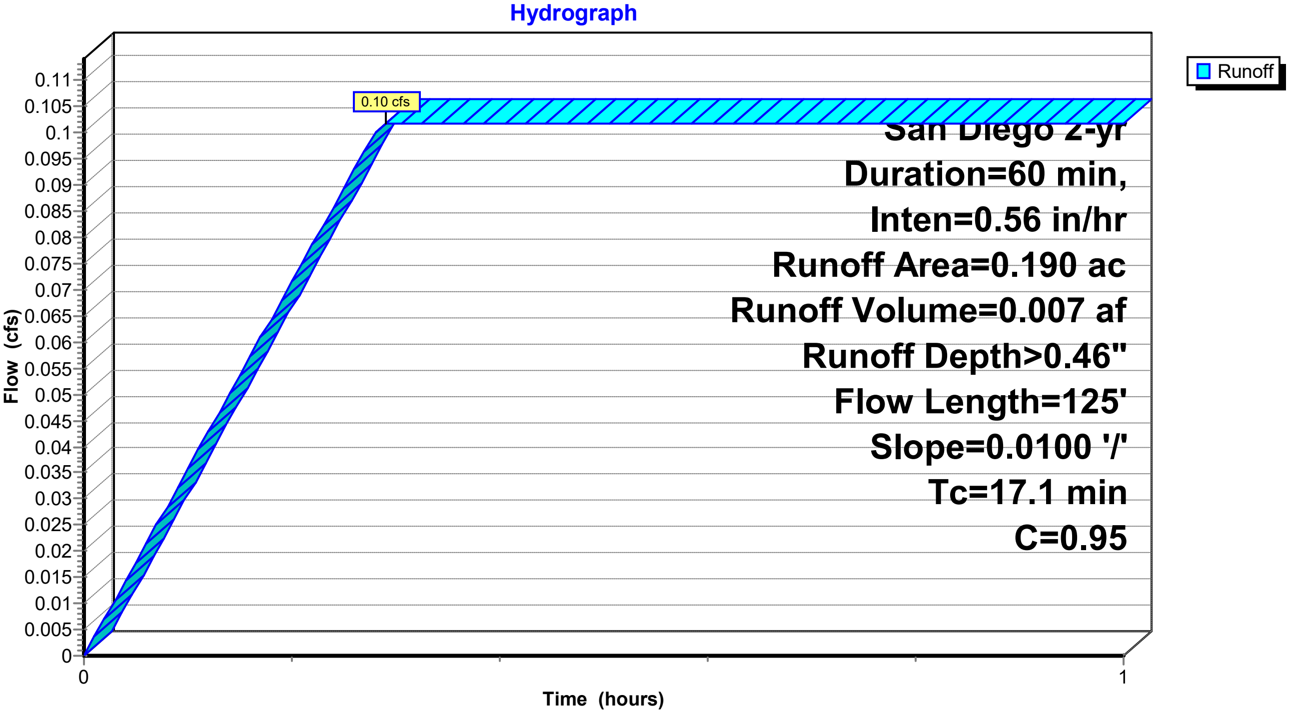
Runoff = 0.10 cfs @ 0.29 hrs, Volume= 0.007 af, Depth> 0.46"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs
San Diego 2-yr Duration=60 min, Inten=0.56 in/hr

Area (ac)	C	Description
0.190	0.95	
0.190		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.1	125	0.0100	0.12		**Sheet Flow, Exit Area** Smooth surfaces n= 0.011 P2= 0.04"

Subcatchment 8S: P-2



Summary for Subcatchment 10S: P-3

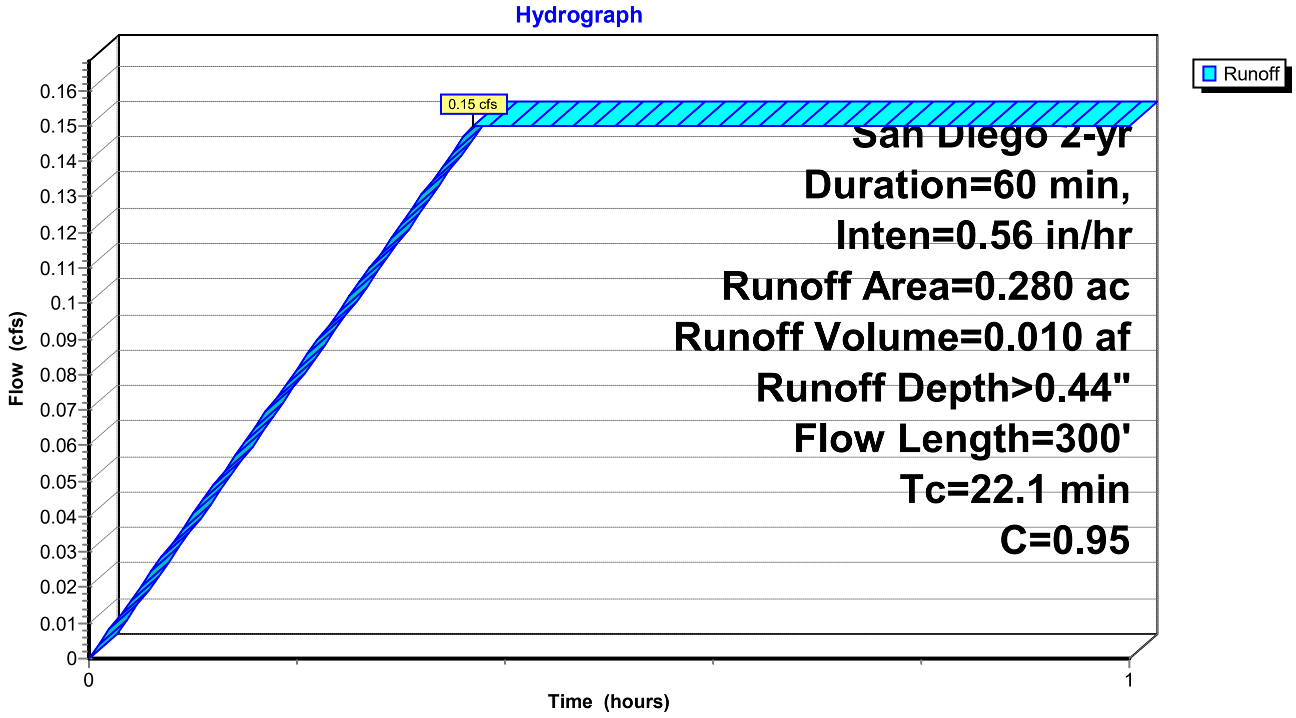
Runoff = 0.15 cfs @ 0.37 hrs, Volume= 0.010 af, Depth> 0.44"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs
San Diego 2-yr Duration=60 min, Inten=0.56 in/hr

Area (ac)	C	Description
0.280	0.95	
0.280		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.7	140	0.0100	0.12		**Sheet Flow, Pavement** Smooth surfaces n= 0.011 P2= 0.04"
3.4	160	0.0060	0.77		**Shallow Concentrated Flow, Landscape Area** Nearly Bare & Untilled Kv= 10.0 fps
22.1	300	Total			

Subcatchment 10S: P-3



Summary for Subcatchment 12S: P-4

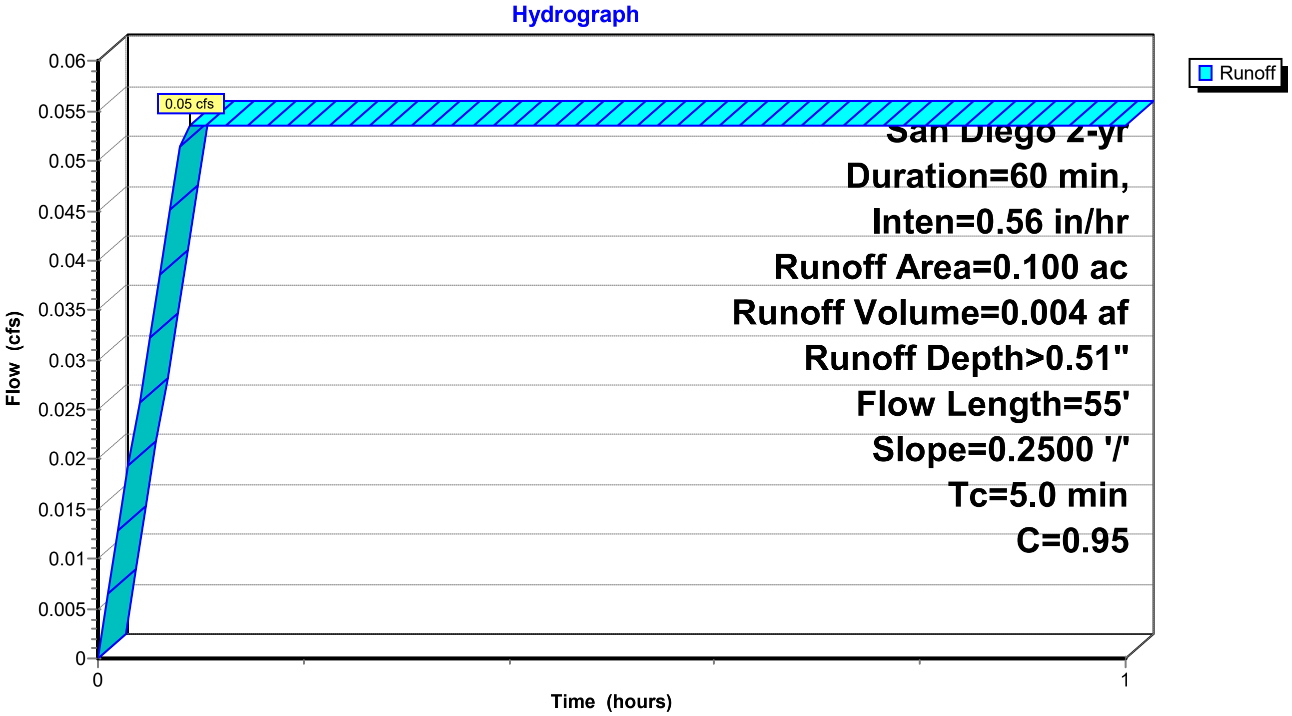
Runoff = 0.05 cfs @ 0.09 hrs, Volume= 0.004 af, Depth> 0.51"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs
San Diego 2-yr Duration=60 min, Inten=0.56 in/hr

Area (ac)	C	Description
0.100	0.95	
0.100		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	55	0.2500	0.37		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 0.04"
2.4	55	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 12S: P-4



Summary for Subcatchment 20S: P-6

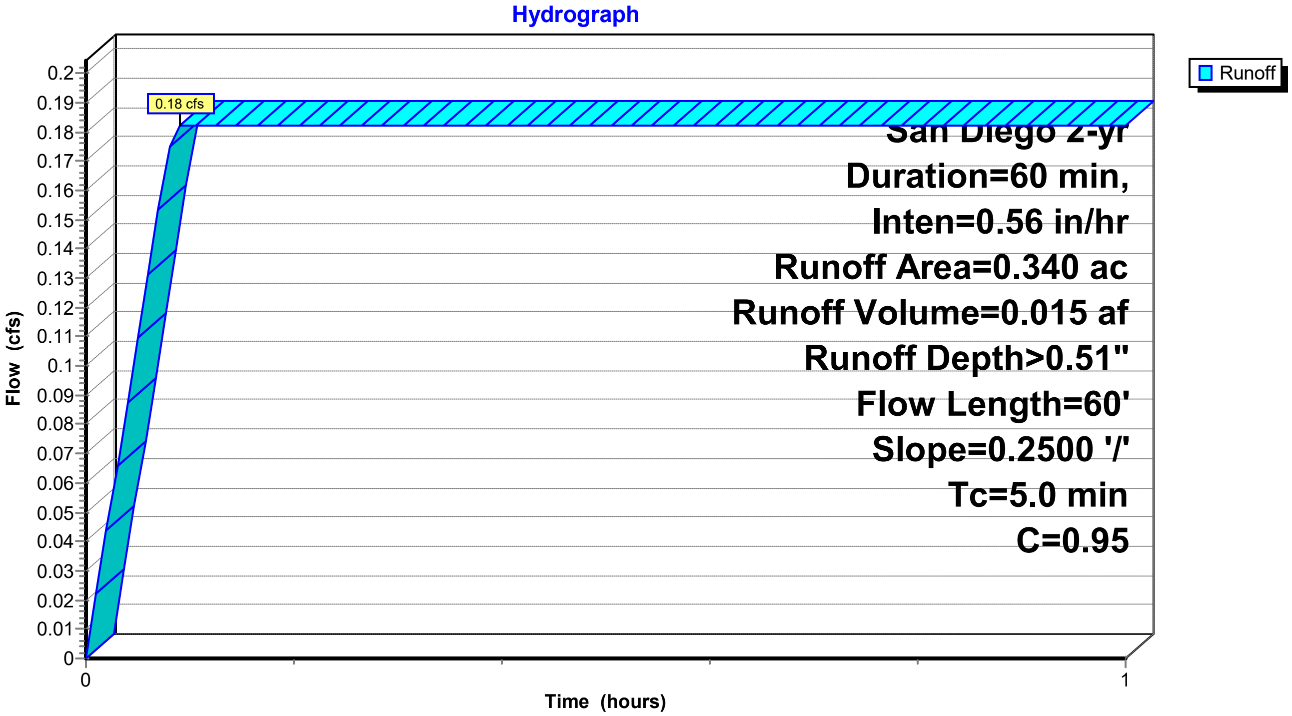
Runoff = 0.18 cfs @ 0.09 hrs, Volume= 0.015 af, Depth> 0.51"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs
San Diego 2-yr Duration=60 min, Inten=0.56 in/hr

Area (ac)	C	Description
0.340	0.95	
0.340		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.6	60	0.2500	0.38		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 0.04"
2.6	60	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 20S: P-6



Summary for Subcatchment 22S: P-8

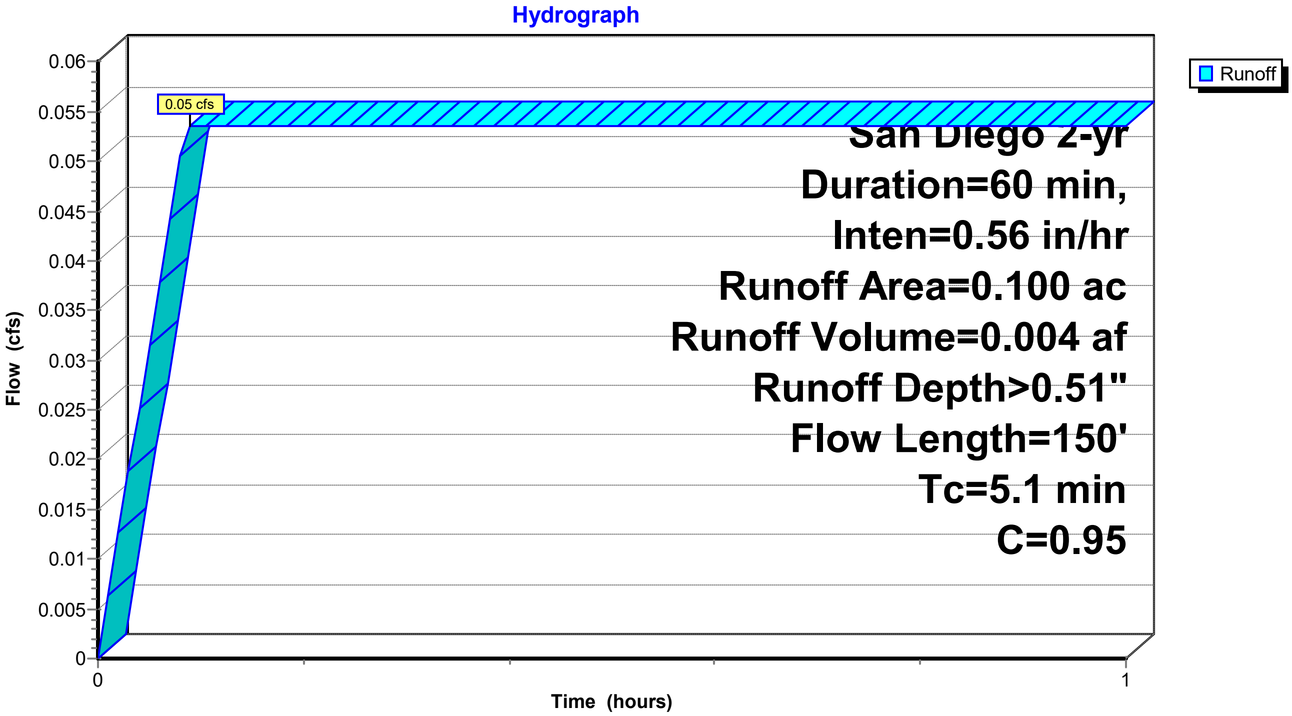
Runoff = 0.05 cfs @ 0.09 hrs, Volume= 0.004 af, Depth> 0.51"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs
San Diego 2-yr Duration=60 min, Inten=0.56 in/hr

Area (ac)	C	Description
0.100	0.95	
0.100		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	70	0.0050	1.44		**Shallow Concentrated Flow, Curb and Gutter** Paved Kv= 20.3 fps
4.3	80	0.1300	0.31		**Sheet Flow, Entrance Ramp** Smooth surfaces n= 0.011 P2= 0.04"
5.1	150	Total			

Subcatchment 22S: P-8



Summary for Subcatchment 26S: P-5

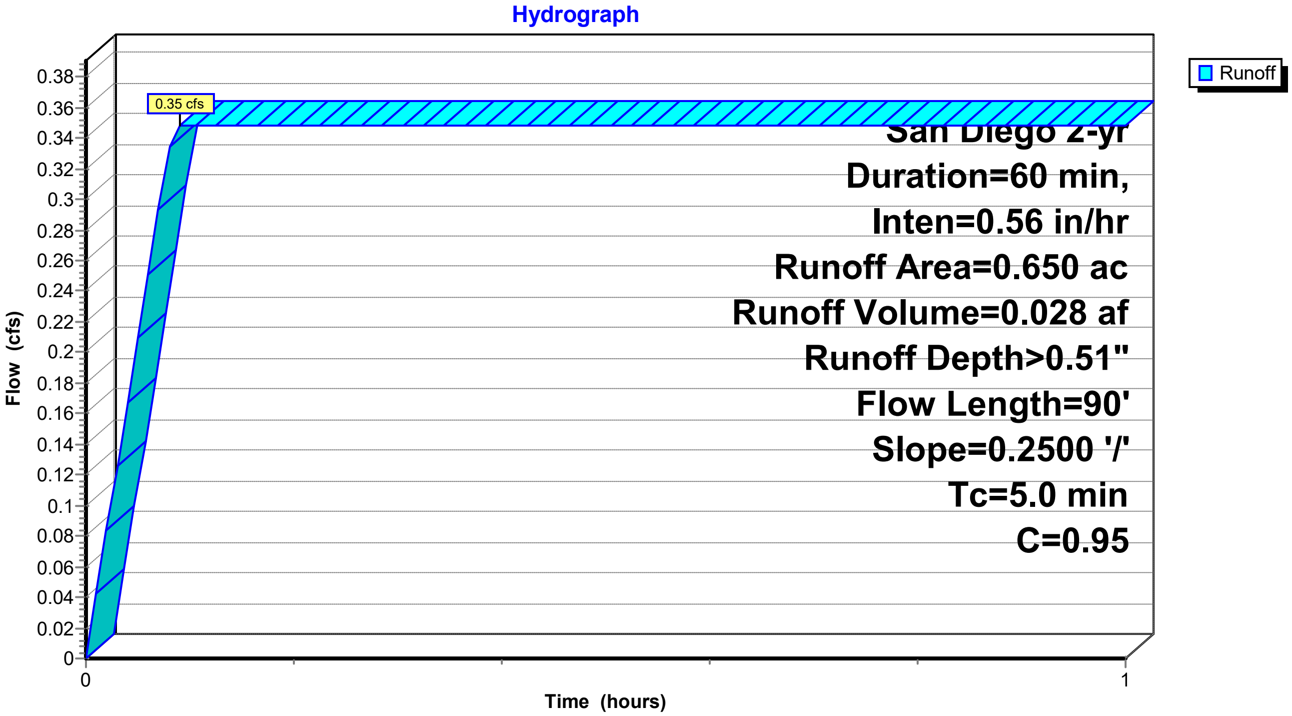
Runoff = 0.35 cfs @ 0.09 hrs, Volume= 0.028 af, Depth> 0.51"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs
San Diego 2-yr Duration=60 min, Inten=0.56 in/hr

Area (ac)	C	Description
0.650	0.95	
0.650		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	90	0.2500	0.41		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 0.04"
3.6	90	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 26S: P-5



Summary for Reach 5R: V-Ditch

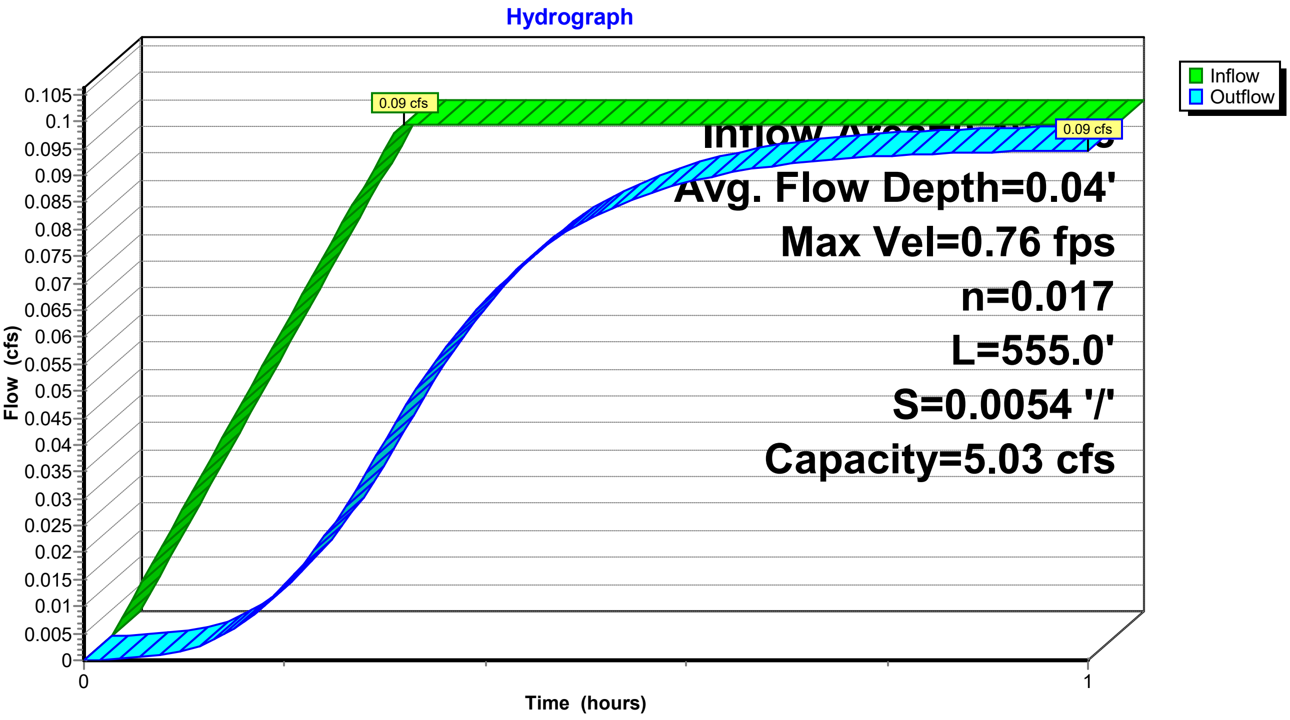
Inflow Area =	0.480 ac,	0.00% Impervious,	Inflow Depth >	0.17"	for 2-yr event
Inflow =	0.09 cfs @	0.29 hrs,	Volume=	0.007 af	
Outflow =	0.09 cfs @	1.00 hrs,	Volume=	0.005 af,	Atten= 0%, Lag= 42.6 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 0.76 fps, Min. Travel Time= 12.2 min
Avg. Velocity = 0.60 fps, Avg. Travel Time= 15.4 min

Peak Storage= 69 cf @ 1.00 hrs
Average Depth at Peak Storage= 0.04'
Bank-Full Depth= 0.50' Flow Area= 1.5 sf, Capacity= 5.03 cfs

3.00' x 0.50' deep channel, n= 0.017 Concrete, unfinished
Length= 555.0' Slope= 0.0054 '/'
Inlet Invert= 26.34', Outlet Invert= 23.32'

Reach 5R: V-Ditch



Summary for Reach 13R: Roof Drain Collector Pipe

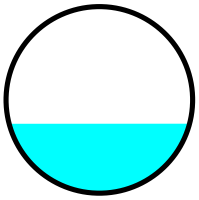
```
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area =       1.190 ac,100.00% Impervious,  Inflow Depth >   0.51"    for  2-yr event
Inflow      =       0.64 cfs @    0.09 hrs,  Volume=          0.051 af
Outflow     =       0.64 cfs @    0.10 hrs,  Volume=          0.051 af,  Atten= 0%,  Lag= 0.6 min

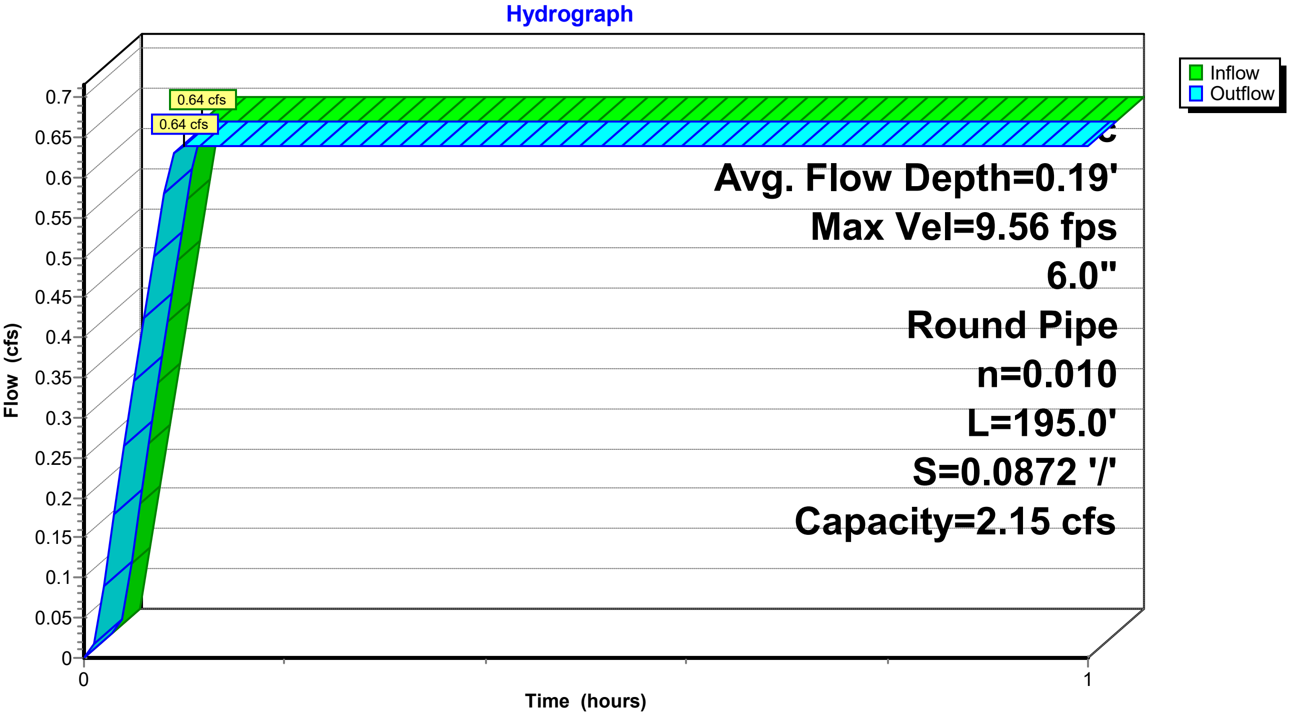
Routing by Dyn-Stor-Ind method, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 9.56 fps,  Min. Travel Time= 0.3 min
Avg. Velocity = 9.37 fps,  Avg. Travel Time= 0.3 min

Peak Storage= 13 cf @ 0.10 hrs
Average Depth at Peak Storage= 0.19'
Bank-Full Depth= 0.50'  Flow Area= 0.2 sf,  Capacity= 2.15 cfs

6.0"  Round Pipe
n= 0.010  PVC, smooth interior
Length= 195.0'   Slope= 0.0872 '/'
Inlet Invert= 53.33',  Outlet Invert= 36.33'
```



Reach 13R: Roof Drain Collector Pipe



Summary for Reach 15R: Storm Drain

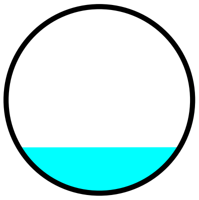
```
[52] Hint: Inlet/Outlet conditions not evaluated

Inflow Area =      0.280 ac,100.00% Impervious,  Inflow Depth >   0.44"    for  2-yr event
Inflow      =      0.15 cfs @     0.38 hrs,  Volume=          0.010 af
Outflow     =      0.15 cfs @     0.38 hrs,  Volume=          0.010 af,  Atten= 0%,  Lag= 0.0 min

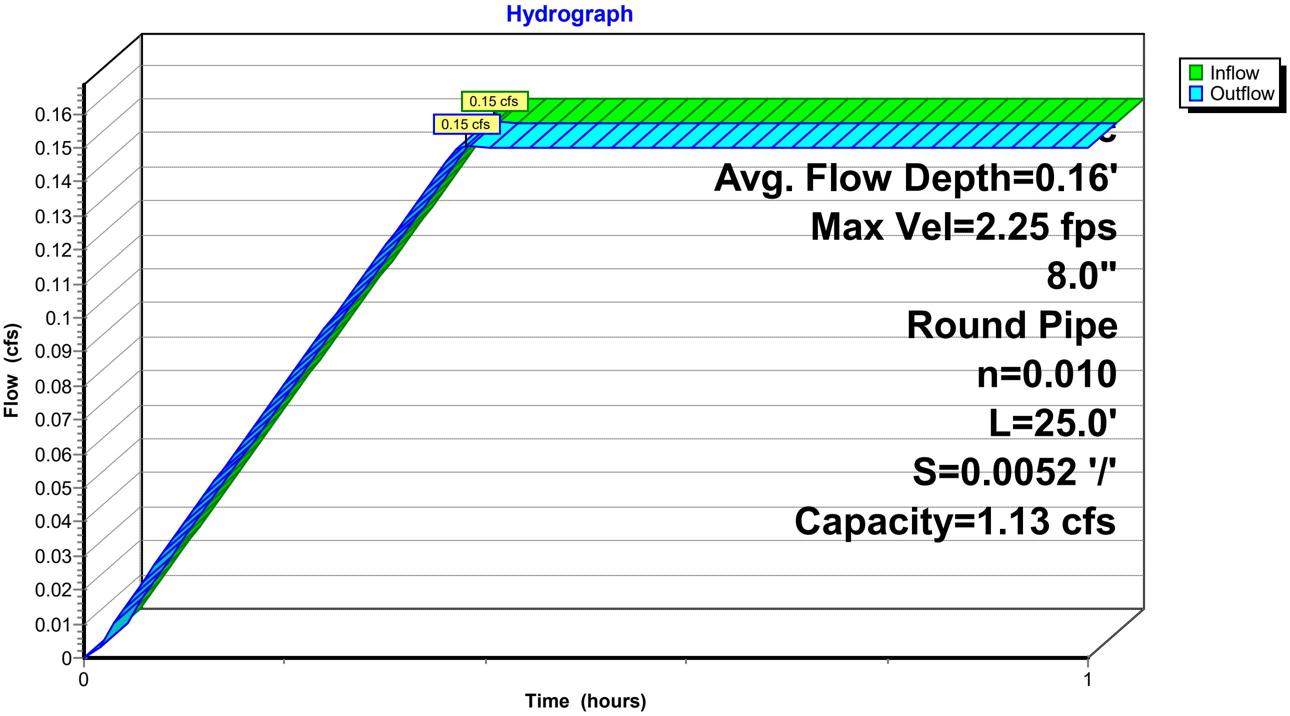
Routing by Dyn-Stor-Ind method, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 2.25 fps,  Min. Travel Time= 0.2 min
Avg. Velocity = 2.07 fps,  Avg. Travel Time= 0.2 min

Peak Storage= 2 cf @ 0.38 hrs
Average Depth at Peak Storage= 0.16'
Bank-Full Depth= 0.67'  Flow Area= 0.3 sf,  Capacity= 1.13 cfs

8.0"  Round Pipe
n= 0.010  PVC, smooth interior
Length= 25.0'   Slope= 0.0052 '/'
Inlet Invert= 18.13',  Outlet Invert= 18.00'
```



Reach 15R: Storm Drain



Summary for Reach 16R: Storm Drain

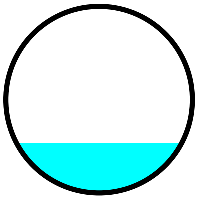
[52] Hint: Inlet/Outlet conditions not evaluated
[62] Hint: Exceeded Reach 15R OUTLET depth by 0.02' @ 0.29 hrs

```
Inflow Area =     0.470 ac,100.00% Impervious,  Inflow Depth >   0.44"    for  2-yr event
Inflow      =     0.25 cfs @    0.38 hrs,  Volume=          0.017 af
Outflow     =     0.25 cfs @    0.39 hrs,  Volume=          0.017 af,  Atten= 0%,  Lag= 0.6 min
```

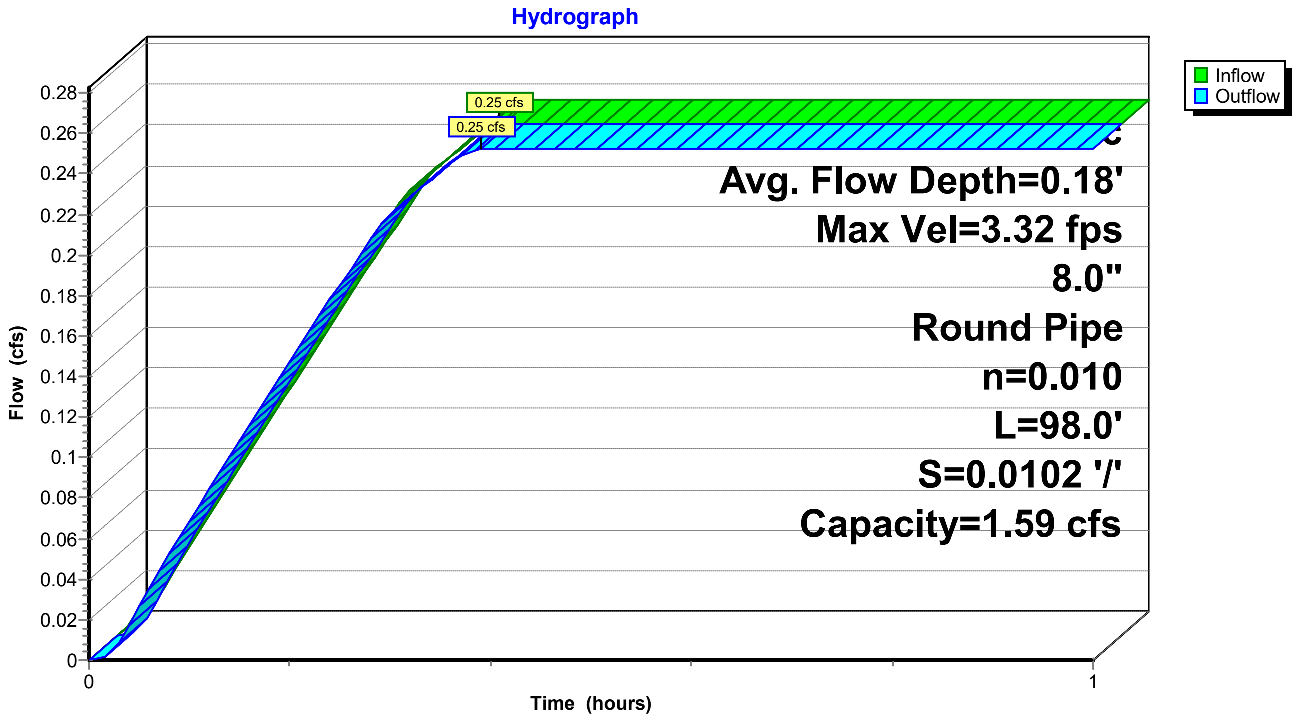
Routing by Dyn-Stor-Ind method, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 3.32 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 3.05 fps, Avg. Travel Time= 0.5 min

Peak Storage= 7 cf @ 0.39 hrs
Average Depth at Peak Storage= 0.18'
Bank-Full Depth= 0.67' Flow Area= 0.3 sf, Capacity= 1.59 cfs

8.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 98.0' Slope= 0.0102 '/'
Inlet Invert= 18.00', Outlet Invert= 17.00'



Reach 16R: Storm Drain



Summary for Reach 17R: Storm Drain

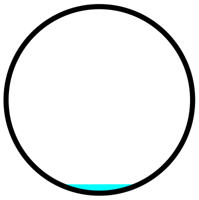
[52] Hint: Inlet/Outlet conditions not evaluated
[61] Hint: Exceeded Reach 16R outlet invert by 0.03' @ 0.39 hrs

```
Inflow Area =       0.470 ac,100.00% Impervious,  Inflow Depth >   0.44"    for  2-yr event
Inflow      =       0.25 cfs @    0.39 hrs,  Volume=          0.017 af
Outflow     =       0.25 cfs @    0.39 hrs,  Volume=          0.017 af,  Atten= 0%,  Lag= 0.0 min
```

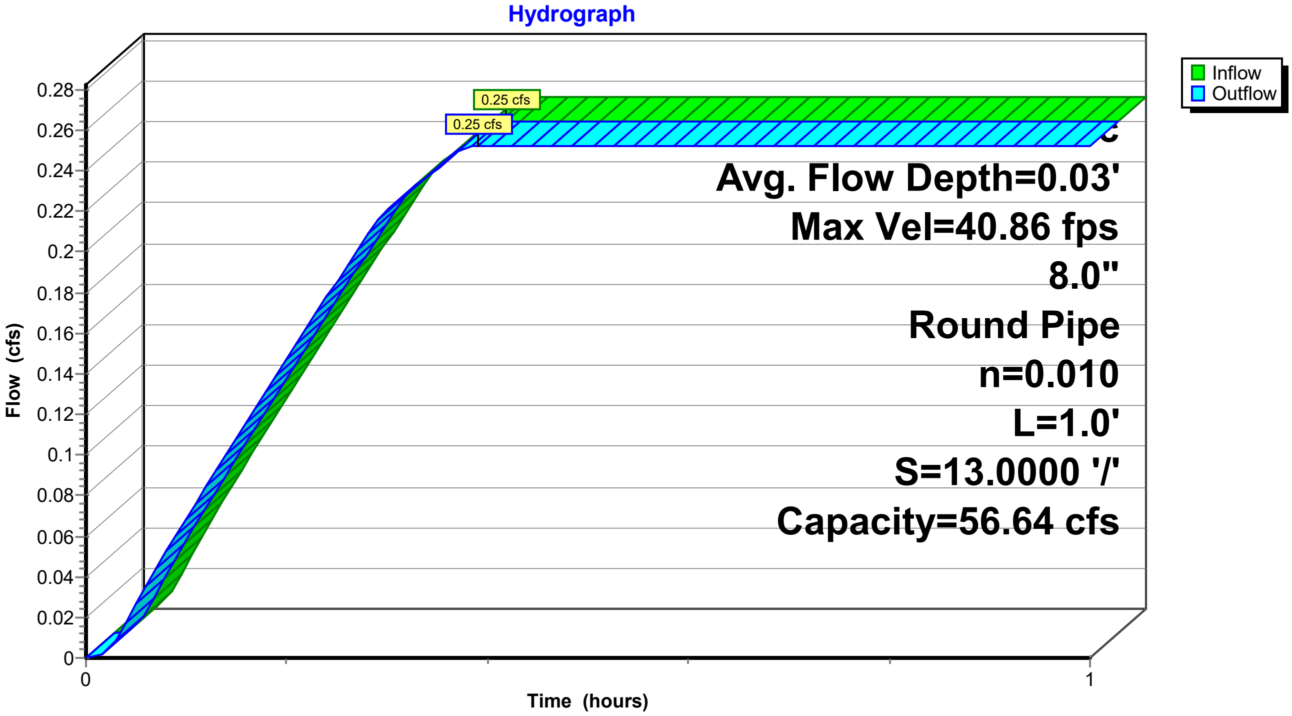
Routing by Dyn-Stor-Ind method, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 40.86 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 37.82 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.39 hrs
Average Depth at Peak Storage= 0.03'
Bank-Full Depth= 0.67' Flow Area= 0.3 sf, Capacity= 56.64 cfs

8.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 1.0' Slope= 13.0000 '/'
Inlet Invert= 17.00', Outlet Invert= 4.00'



Reach 17R: Storm Drain



Summary for Reach 18R: Storm Drain

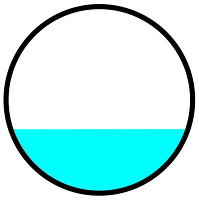
[52] Hint: Inlet/Outlet conditions not evaluated
[62] Hint: Exceeded Reach 17R OUTLET depth by 0.20' @ 0.39 hrs

```
Inflow Area =        0.680 ac,100.00% Impervious,  Inflow Depth >   0.45"    for  2-yr event
Inflow      =        0.36 cfs @     0.39 hrs,  Volume=           0.026 af
Outflow     =        0.36 cfs @     0.39 hrs,  Volume=           0.026 af,  Atten= 0%,  Lag= 0.0 min
```

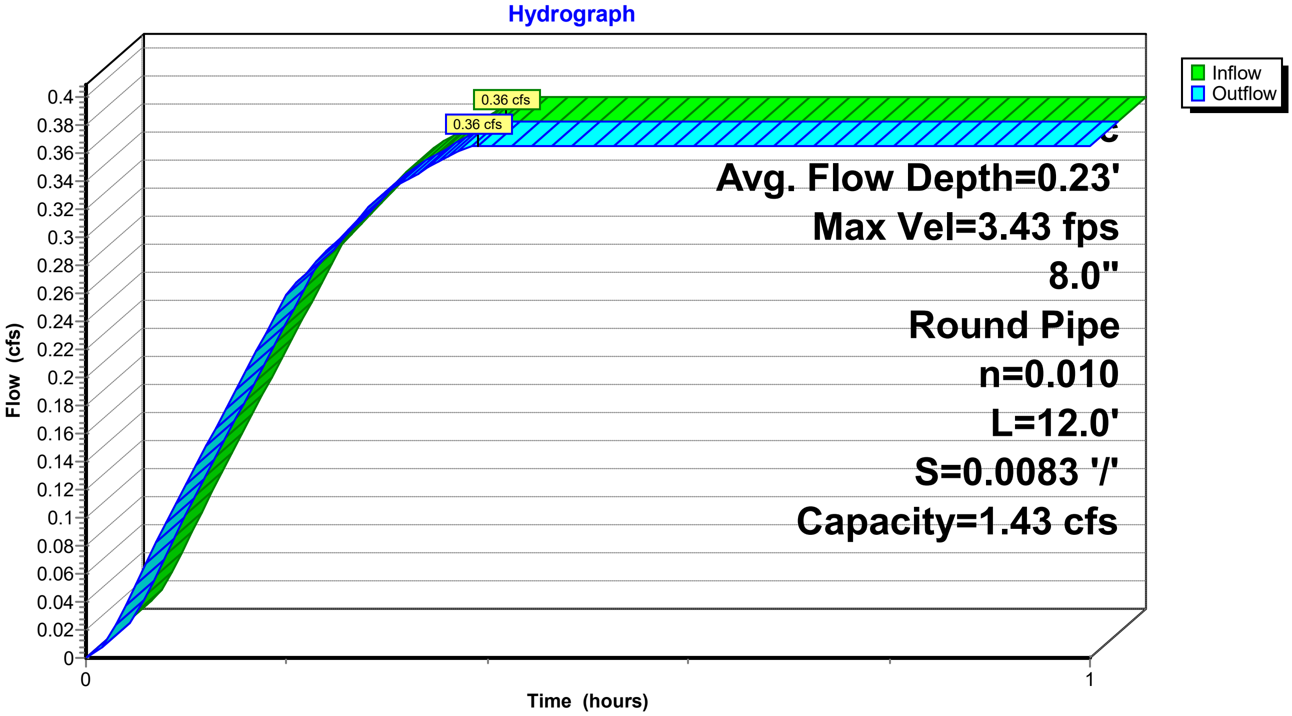
Routing by Dyn-Stor-Ind method, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 3.43 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 3.20 fps, Avg. Travel Time= 0.1 min

Peak Storage= 1 cf @ 0.39 hrs
Average Depth at Peak Storage= 0.23'
Bank-Full Depth= 0.67' Flow Area= 0.3 sf, Capacity= 1.43 cfs

8.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 12.0' Slope= 0.0083 '/'
Inlet Invert= 4.00', Outlet Invert= 3.90'



Reach 18R: Storm Drain



Summary for Reach 19R: Storm Drain

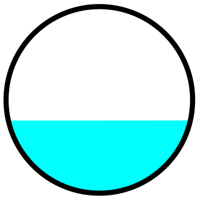
[52] Hint: Inlet/Outlet conditions not evaluated
[63] Warning: Exceeded Reach 18R INLET depth by 0.43' @ 0.47 hrs

```
Inflow Area =      0.680 ac,100.00% Impervious,  Inflow Depth >   0.45"    for  2-yr event
Inflow      =      0.36 cfs @    0.39 hrs,  Volume=           0.026 af
Outflow     =      0.36 cfs @    0.49 hrs,  Volume=           0.025 af,  Atten= 0%,  Lag= 6.1 min
```

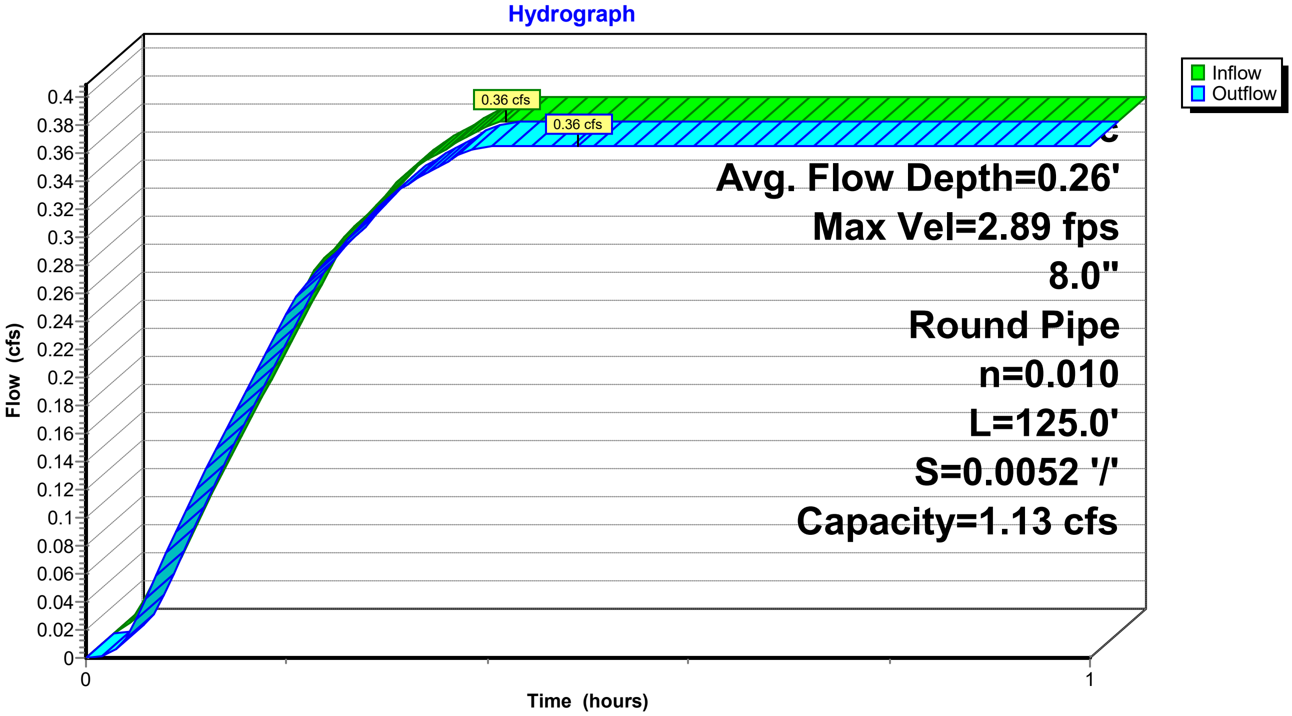
Routing by Dyn-Stor-Ind method, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 2.89 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 2.66 fps, Avg. Travel Time= 0.8 min

Peak Storage= 16 cf @ 0.49 hrs
Average Depth at Peak Storage= 0.26'
Bank-Full Depth= 0.67' Flow Area= 0.3 sf, Capacity= 1.13 cfs

8.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 125.0' Slope= 0.0052 '/'
Inlet Invert= 4.40', Outlet Invert= 3.75'



Reach 19R: Storm Drain



Summary for Reach 25R: Existing 15-inch

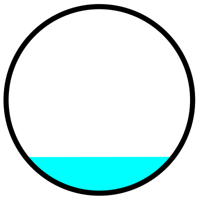
[52] Hint: Inlet/Outlet conditions not evaluated

```
Inflow Area =       1.970 ac,100.00% Impervious,  Inflow Depth >   0.21"    for  2-yr event
Inflow      =       0.61 cfs @    0.55 hrs,  Volume=            0.035 af
Outflow     =       0.60 cfs @    0.52 hrs,  Volume=            0.033 af,  Atten= 1%,  Lag= 0.0 min
```

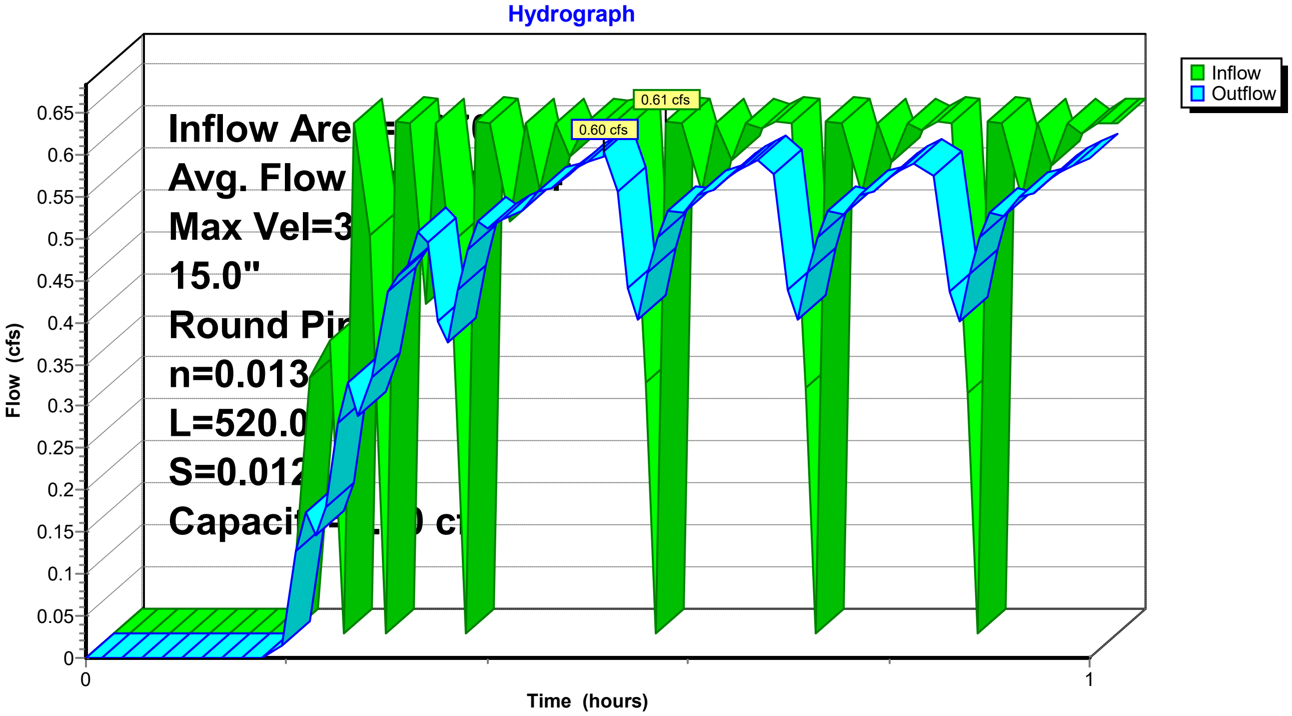
Routing by Dyn-Stor-Ind method, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 3.56 fps, Min. Travel Time= 2.4 min
Avg. Velocity = 3.31 fps, Avg. Travel Time= 2.6 min

Peak Storage= 88 cf @ 0.52 hrs
Average Depth at Peak Storage= 0.24'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 7.20 cfs

15.0" Round Pipe
n= 0.013 Concrete pipe, bends & connections
Length= 520.0' Slope= 0.0124 '/'
Inlet Invert= 17.46', Outlet Invert= 11.00'



Reach 25R: Existing 15-inch



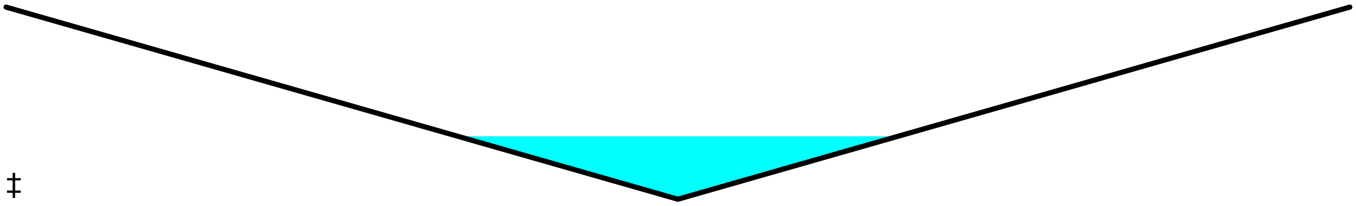
Summary for Reach 26R: Cross Gutter

Inflow Area = 0.530 ac, 0.00% Impervious, Inflow Depth > 0.13" for 2-yr event
Inflow = 0.10 cfs @ 1.00 hrs, Volume= 0.006 af
Outflow = 0.10 cfs @ 1.00 hrs, Volume= 0.006 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 0.83 fps, Min. Travel Time= 2.0 min
Avg. Velocity = 0.69 fps, Avg. Travel Time= 2.4 min

Peak Storage= 13 cf @ 1.00 hrs
Average Depth at Peak Storage= 0.07'
Bank-Full Depth= 0.20' Flow Area= 1.2 sf, Capacity= 2.05 cfs

0.00' x 0.20' deep channel, n= 0.013
Side Slope Z-value= 29.4 '/' Top Width= 11.76'
Length= 100.0' Slope= 0.0050 '/'
Inlet Invert= 21.60', Outlet Invert= 21.10'



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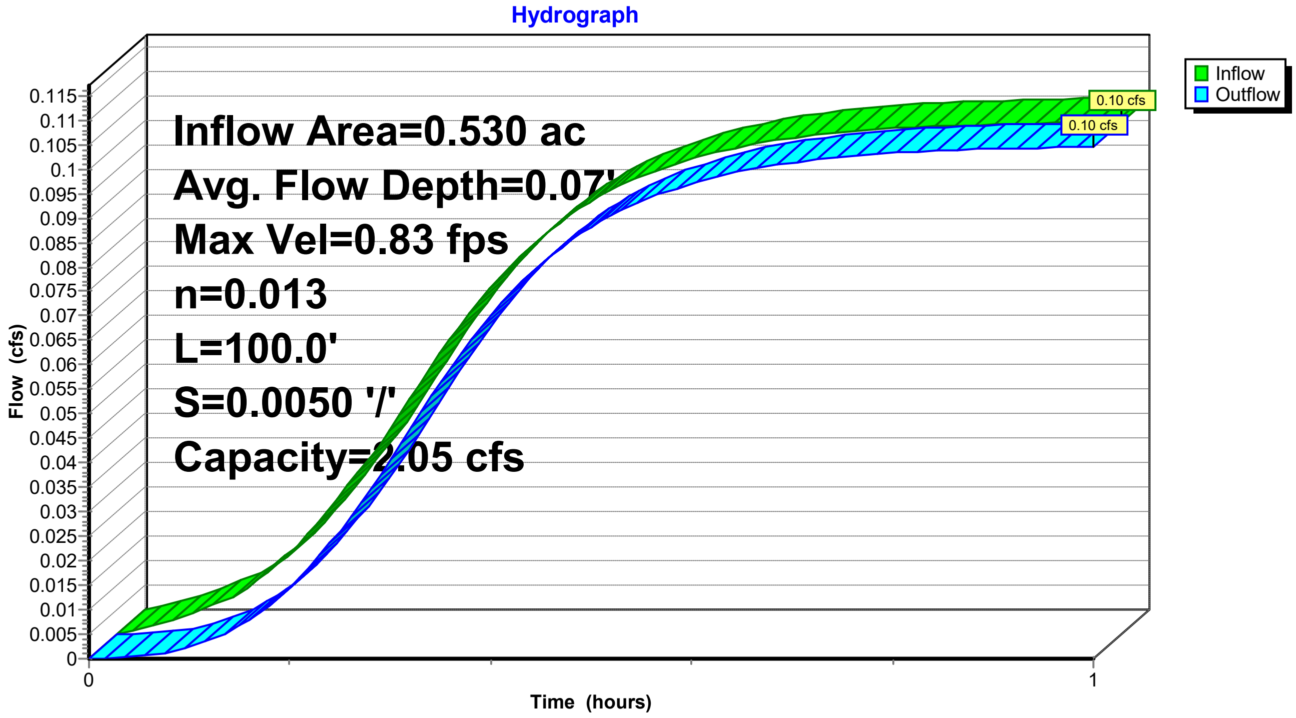
Reach 26R: Cross Gutter



Summary for Pond 7P: Trench Drain

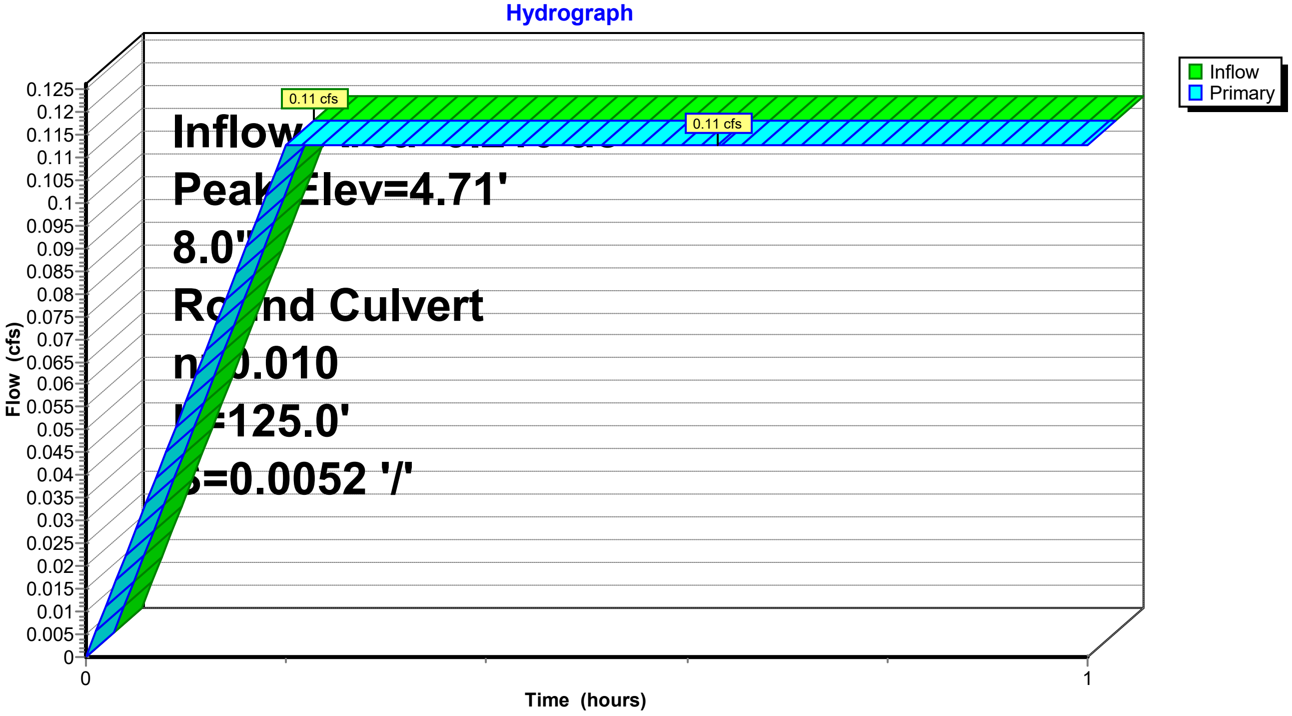
Inflow Area = 0.210 ac,100.00% Impervious, Inflow Depth > 0.48" for 2-yr event
Inflow = 0.11 cfs @ 0.20 hrs, Volume= 0.008 af
Outflow = 0.11 cfs @ 0.63 hrs, Volume= 0.008 af, Atten= 0%, Lag= 25.8 min
Primary = 0.11 cfs @ 0.63 hrs, Volume= 0.008 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 4.71' @ 0.39 hrs
Flood Elev= 6.75'

Device	Routing	Invert	Outlet Devices
#1	Primary	4.50'	**8.0" Round Culvert** L= 125.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 4.50' / 3.85' S= 0.0052 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.11 cfs @ 0.63 hrs HW=4.71' TW=4.23' (Dynamic Tailwater)
└—**1=Culvert** (Outlet Controls 0.11 cfs @ 1.76 fps)

Pond 7P: Trench Drain



Summary for Pond 9P: Catch Basin

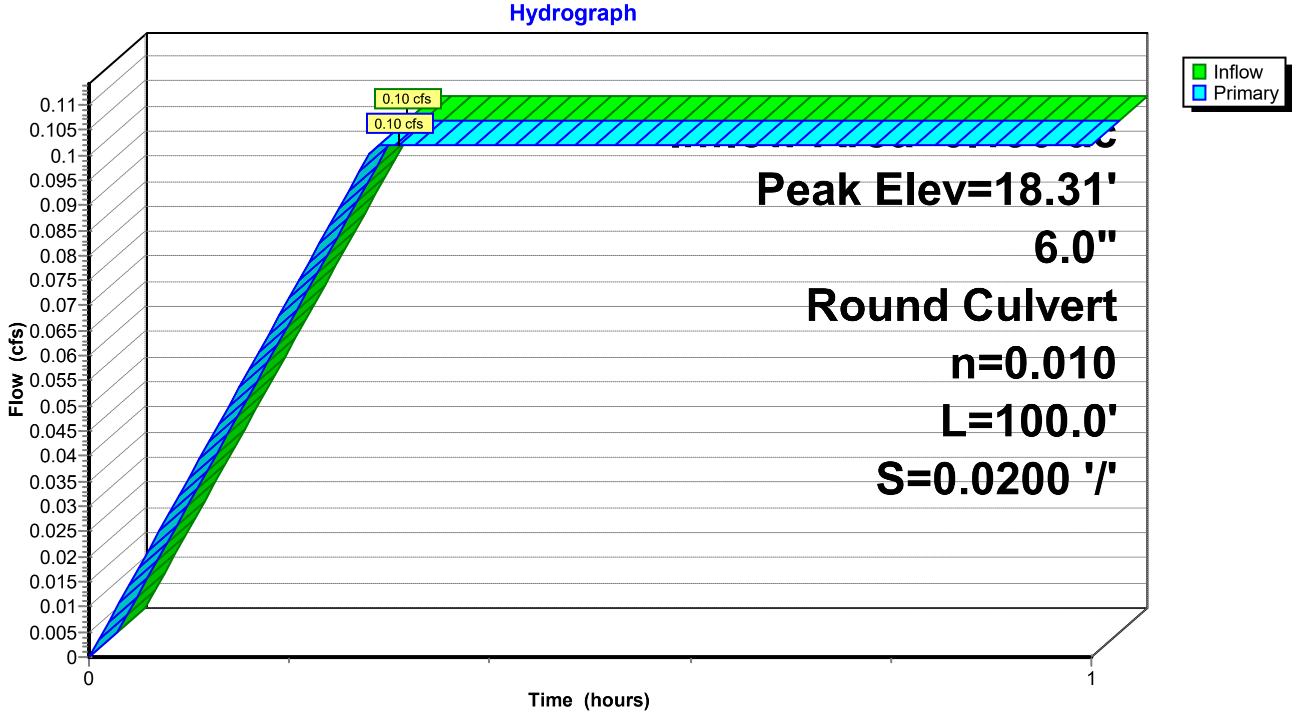
Inflow Area = 0.190 ac,100.00% Impervious, Inflow Depth > 0.46" for 2-yr event
Inflow = 0.10 cfs @ 0.29 hrs, Volume= 0.007 af
Outflow = 0.10 cfs @ 0.31 hrs, Volume= 0.007 af, Atten= 0%, Lag= 1.2 min
Primary = 0.10 cfs @ 0.31 hrs, Volume= 0.007 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 18.31' @ 0.39 hrs
Flood Elev= 23.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	18.00'	**6.0" Round Culvert** L= 100.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 18.00' / 16.00' S= 0.0200 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=0.10 cfs @ 0.31 hrs HW=18.31' TW=18.17' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.10 cfs @ 1.16 fps)

Pond 9P: Catch Basin



Summary for Pond 11P: Trench Drain

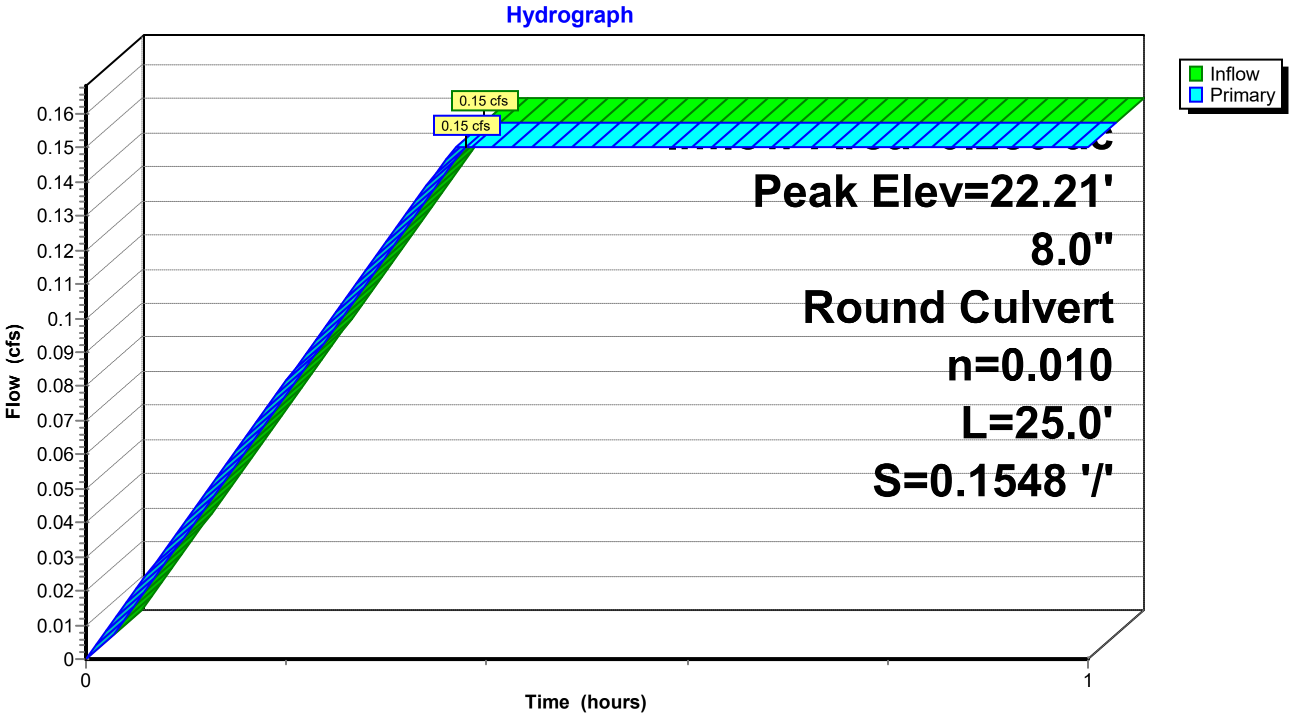
Inflow Area = 0.280 ac,100.00% Impervious, Inflow Depth > 0.44" for 2-yr event
Inflow = 0.15 cfs @ 0.37 hrs, Volume= 0.010 af
Outflow = 0.15 cfs @ 0.38 hrs, Volume= 0.010 af, Atten= 0%, Lag= 0.6 min
Primary = 0.15 cfs @ 0.38 hrs, Volume= 0.010 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 22.21' @ 0.37 hrs
Flood Elev= 23.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	22.00'	**8.0" Round Culvert** L= 25.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 22.00' / 18.13' S= 0.1548 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.15 cfs @ 0.38 hrs HW=22.21' TW=18.29' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 0.15 cfs @ 1.57 fps)

Pond 11P: Trench Drain



Summary for Pond 21P: Pump Vault

Inflow Area = 1.970 ac,100.00% Impervious, Inflow Depth > 0.18" for 2-yr event
Inflow = 0.42 cfs @ 0.49 hrs, Volume= 0.030 af
Outflow = 0.61 cfs @ 0.55 hrs, Volume= 0.028 af, Atten= 0%, Lag= 3.5 min
Primary = 0.61 cfs @ 0.55 hrs, Volume= 0.035 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 0.17' @ 0.55 hrs Surf.Area= 0.002 ac Storage= 0.002 af
Flood Elev= 6.88' Surf.Area= 0.002 ac Storage= 0.015 af

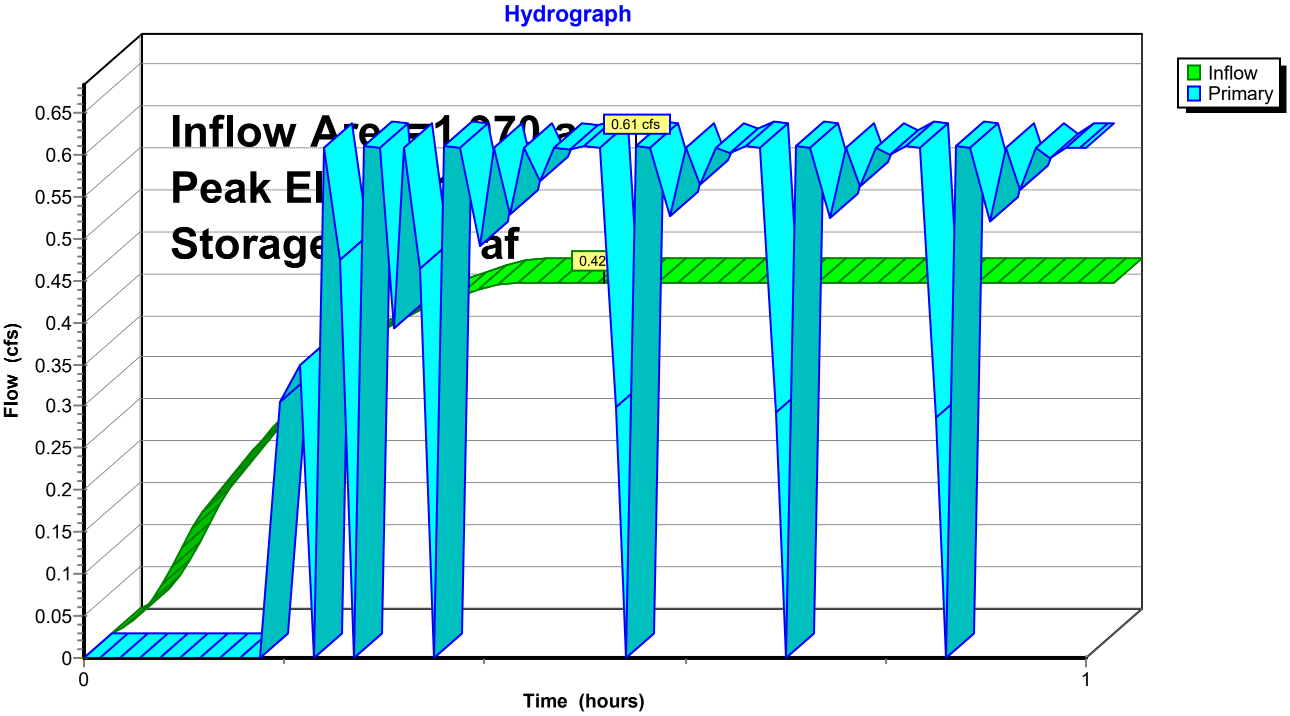
Plug-Flow detention time= 4.0 min calculated for 0.027 af (93% of inflow)
Center-of-Mass det. time= 2.4 min (36.7 - 34.3)

Volume	Invert	Avail.Storage	Storage Description
#1	-1.12'	0.015 af	**6.00'W x 14.00'L x 8.00'H Prismatoid**

Device	Routing	Invert	Outlet Devices
#1	Primary	0.13'	**Sample Pump 101** Discharges@19.00' Turns Off@-0.12' 6.0" Diam. x 19.0' Long Discharge, Hazen-Williams C= 130 Flow (gpm)= 0.0 60.0 120.0 180.0 240.0 270.0 285.0 300.0 315.0 330.0 Head (feet)= 40.00 36.00 32.00 28.00 24.00 20.00 16.00 12.00 10.00 8.00 -Loss (feet)= 0.00 0.01 0.03 0.06 0.10 0.12 0.14 0.15 0.17 0.18 =Lift (feet)= 40.00 35.99 31.97 27.94 23.90 19.88 15.86 11.85 9.83 7.82

Primary OutFlow Max=0.61 cfs @ 0.55 hrs HW=0.17' TW=17.66' (Dynamic Tailwater)
↳**1=Sample Pump 101** (Pump Controls 0.61 cfs)

Pond 21P: Pump Vault



Summary for Pond 23P: Trench Drain

[57] Hint: Peaked at 14.13' (Flood elevation advised)

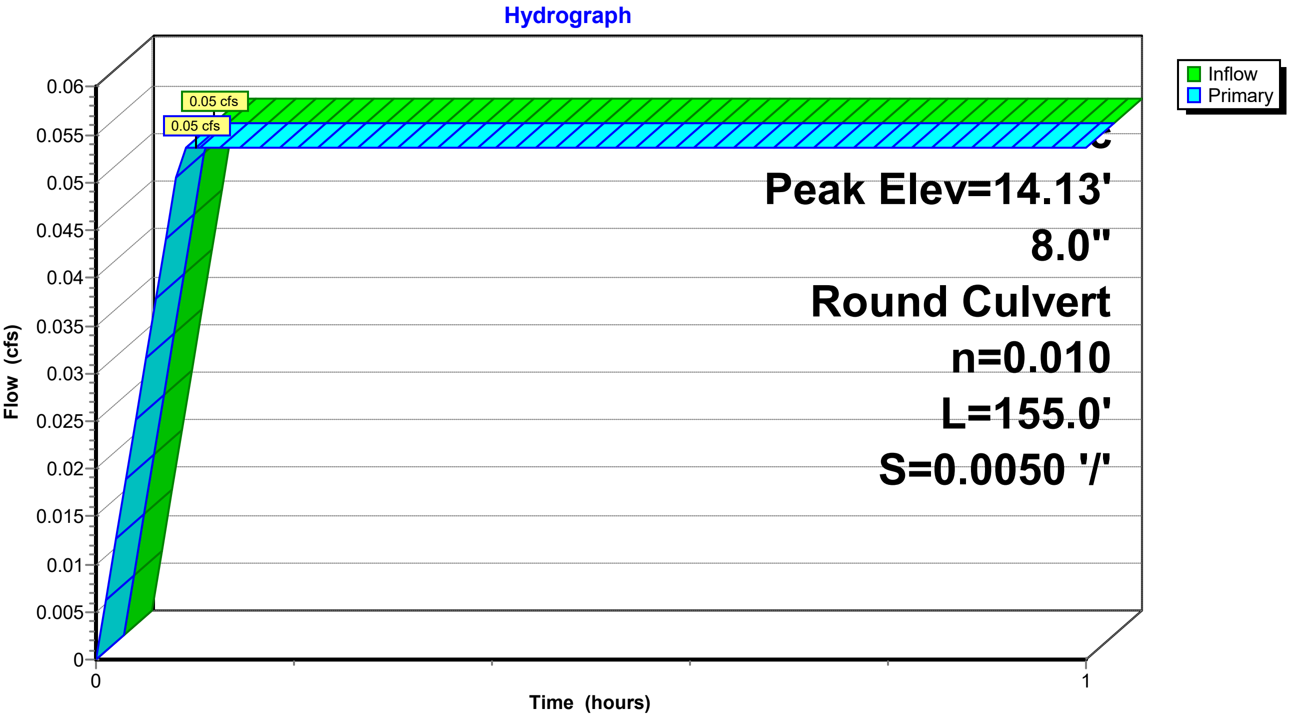
Inflow Area = 0.100 ac,100.00% Impervious, Inflow Depth > 0.51" for 2-yr event
Inflow = 0.05 cfs @ 0.09 hrs, Volume= 0.004 af
Outflow = 0.05 cfs @ 0.10 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.6 min
Primary = 0.05 cfs @ 0.10 hrs, Volume= 0.004 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 14.13' @ 0.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	14.00'	**8.0" Round Culvert** L= 155.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 14.00' / 13.22' S= 0.0050 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.05 cfs @ 0.10 hrs HW=14.13' TW=-0.83' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 0.05 cfs @ 1.62 fps)

Pond 23P: Trench Drain



Summary for Pond 24P: Rainwater Harvest Tanks

Inflow Area = 1.190 ac,100.00% Impervious, Inflow Depth > 0.51" for 2-yr event
Inflow = 0.64 cfs @ 0.10 hrs, Volume= 0.051 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 33.01' @ 1.00 hrs Surf.Area= 0.005 ac Storage= 0.050 af

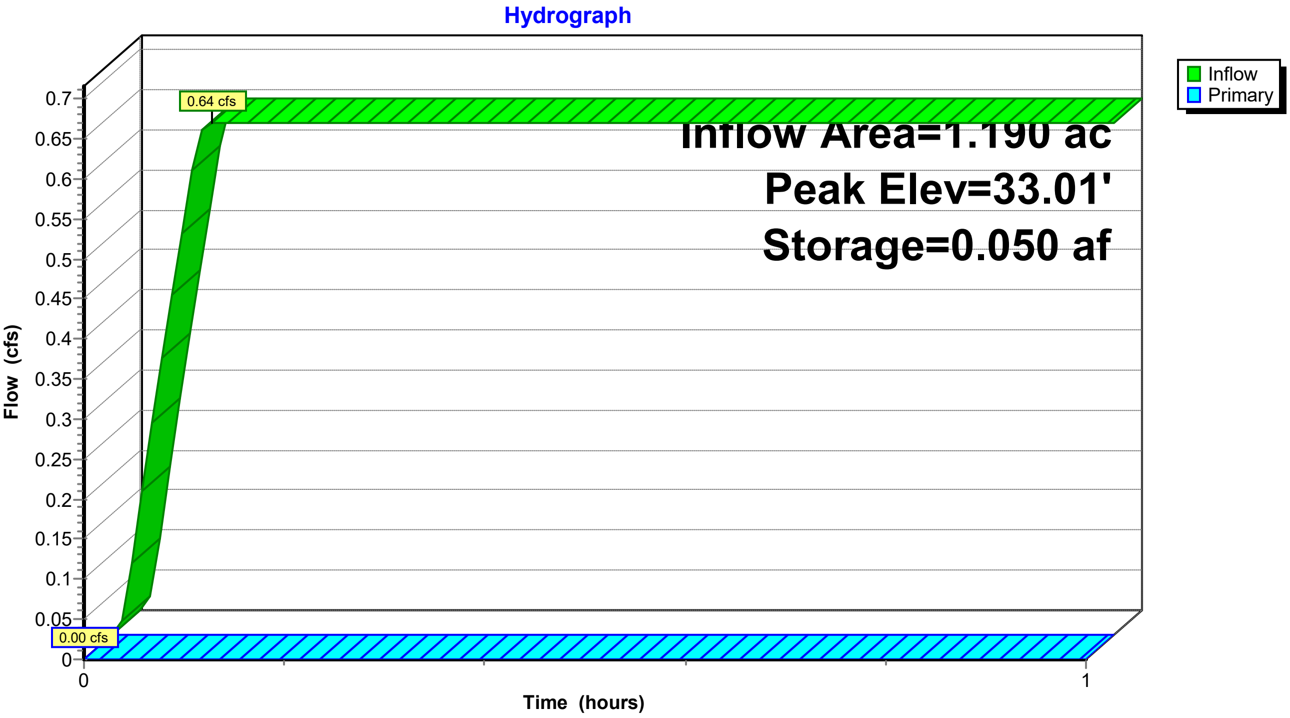
Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

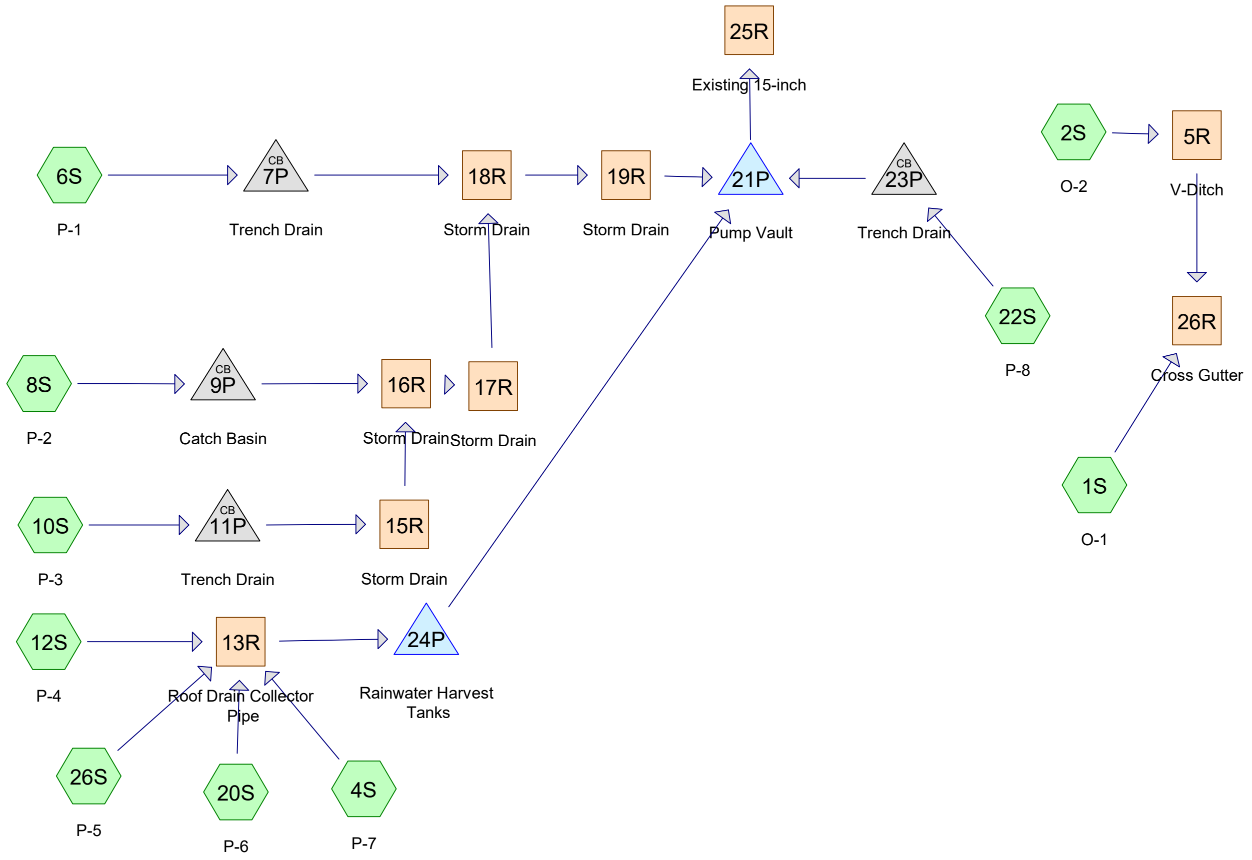
Volume	Invert	Avail.Storage	Storage Description
#1	23.33'	0.104 af	**12.00'D x 20.00'H Vertical Cone/Cylinder** x 2

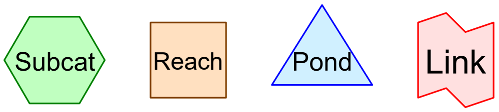
Device	Routing	Invert	Outlet Devices
#1	Primary	42.33'	**6.0" Vert. Overflow** C= 0.600

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=23.33' TW=-1.12' (Dynamic Tailwater)
└─**1=Overflow** (Controls 0.00 cfs)

Pond 24P: Rainwater Harvest Tanks







Routing Diagram for Dalbergia Street Proposed Conditions Rev4
Prepared by Paul J. Hacunda, PE, Printed 1/3/2018
HydroCAD® 10.00-20 s/n 04689 © 2017 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	C	Description (subcatchment-numbers)
0.530	0.35	(1S, 2S)
1.970	0.95	(4S, 6S, 8S, 10S, 12S, 20S, 22S, 26S)
2.500	**0.82**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
2.500	Other	1S, 2S, 4S, 6S, 8S, 10S, 12S, 20S, 22S, 26S
2.500		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	2.500	2.500		1S, 2S, 4S, 6S, 8S, 10S, 12S, 20S, 22S, 26S
0.000	**0.000**	**0.000**	**0.000**	**2.500**	**2.500**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	13R	53.33	36.33	195.0	0.0872	0.010	6.0	0.0	0.0
2	15R	18.13	18.00	25.0	0.0052	0.010	8.0	0.0	0.0
3	16R	18.00	17.00	98.0	0.0102	0.010	8.0	0.0	0.0
4	17R	17.00	4.00	1.0	13.0000	0.010	8.0	0.0	0.0
5	18R	4.00	3.90	12.0	0.0083	0.010	8.0	0.0	0.0
6	19R	4.40	3.75	125.0	0.0052	0.010	8.0	0.0	0.0
7	25R	17.46	11.00	520.0	0.0124	0.013	15.0	0.0	0.0
8	7P	4.50	3.85	125.0	0.0052	0.010	8.0	0.0	0.0
9	9P	18.00	16.00	100.0	0.0200	0.010	6.0	0.0	0.0
10	11P	22.00	18.13	25.0	0.1548	0.010	8.0	0.0	0.0
11	23P	14.00	13.22	155.0	0.0050	0.010	8.0	0.0	0.0

Time span=0.00-1.00 hrs, dt=0.01 hrs, 101 points x 3
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: O-1 Runoff Area=0.050 ac 0.00% Impervious Runoff Depth>0.29"
Flow Length=107' Tc=13.5 min C=0.35 Runoff=0.02 cfs 0.001 af

Subcatchment 2S: O-2 Runoff Area=0.480 ac 0.00% Impervious Runoff Depth>0.28"
Flow Length=583' Tc=17.1 min C=0.35 Runoff=0.16 cfs 0.011 af

Subcatchment 4S: P-7 Runoff Area=0.100 ac 100.00% Impervious Runoff Depth>0.85"
Flow Length=60' Slope=0.2500 '/' Tc=5.0 min C=0.95 Runoff=0.09 cfs 0.007 af

Subcatchment 6S: P-1 Runoff Area=0.210 ac 100.00% Impervious Runoff Depth>0.80"
Flow Length=240' Slope=0.0900 '/' Tc=12.0 min C=0.95 Runoff=0.19 cfs 0.014 af

Subcatchment 8S: P-2 Runoff Area=0.190 ac 100.00% Impervious Runoff Depth>0.76"
Flow Length=125' Slope=0.0100 '/' Tc=17.1 min C=0.95 Runoff=0.17 cfs 0.012 af

Subcatchment 10S: P-3 Runoff Area=0.280 ac 100.00% Impervious Runoff Depth>0.73"
Flow Length=300' Tc=22.1 min C=0.95 Runoff=0.25 cfs 0.017 af

Subcatchment 12S: P-4 Runoff Area=0.100 ac 100.00% Impervious Runoff Depth>0.85"
Flow Length=55' Slope=0.2500 '/' Tc=5.0 min C=0.95 Runoff=0.09 cfs 0.007 af

Subcatchment 20S: P-6 Runoff Area=0.340 ac 100.00% Impervious Runoff Depth>0.85"
Flow Length=60' Slope=0.2500 '/' Tc=5.0 min C=0.95 Runoff=0.30 cfs 0.024 af

Subcatchment 22S: P-8 Runoff Area=0.100 ac 100.00% Impervious Runoff Depth>0.85"
Flow Length=150' Tc=5.1 min C=0.95 Runoff=0.09 cfs 0.007 af

Subcatchment 26S: P-5 Runoff Area=0.650 ac 100.00% Impervious Runoff Depth>0.85"
Flow Length=90' Slope=0.2500 '/' Tc=5.0 min C=0.95 Runoff=0.58 cfs 0.046 af

Reach 5R: V-Ditch Avg. Flow Depth=0.06' Max Vel=0.93 fps Inflow=0.16 cfs 0.011 af
n=0.017 L=555.0' S=0.0054 '/' Capacity=5.03 cfs Outflow=0.16 cfs 0.009 af

Reach 13R: Roof Drain Collector Pipe Avg. Flow Depth=0.25' Max Vel=10.93 fps Inflow=1.06 cfs 0.084 af
6.0" Round Pipe n=0.010 L=195.0' S=0.0872 '/' Capacity=2.15 cfs Outflow=1.06 cfs 0.084 af

Reach 15R: Storm Drain Avg. Flow Depth=0.21' Max Vel=2.60 fps Inflow=0.25 cfs 0.017 af
8.0" Round Pipe n=0.010 L=25.0' S=0.0052 '/' Capacity=1.13 cfs Outflow=0.25 cfs 0.017 af

Reach 16R: Storm Drain Avg. Flow Depth=0.23' Max Vel=3.84 fps Inflow=0.42 cfs 0.029 af
8.0" Round Pipe n=0.010 L=98.0' S=0.0102 '/' Capacity=1.59 cfs Outflow=0.42 cfs 0.029 af

Reach 17R: Storm Drain Avg. Flow Depth=0.04' Max Vel=47.60 fps Inflow=0.42 cfs 0.029 af
8.0" Round Pipe n=0.010 L=1.0' S=13.0000 '/' Capacity=56.64 cfs Outflow=0.42 cfs 0.029 af

Reach 18R: Storm Drain Avg. Flow Depth=0.30' Max Vel=3.94 fps Inflow=0.61 cfs 0.043 af
8.0" Round Pipe n=0.010 L=12.0' S=0.0083 '/' Capacity=1.43 cfs Outflow=0.61 cfs 0.043 af

Reach 19R: Storm Drain Avg. Flow Depth=0.35' Max Vel=3.30 fps Inflow=0.61 cfs 0.043 af
8.0" Round Pipe n=0.010 L=125.0' S=0.0052 '/' Capacity=1.13 cfs Outflow=0.61 cfs 0.042 af

Reach 25R: Existing 15-inch Avg. Flow Depth=0.34' Max Vel=4.28 fps Inflow=1.22 cfs 0.066 af
15.0" Round Pipe n=0.013 L=520.0' S=0.0124 '/' Capacity=7.20 cfs Outflow=1.14 cfs 0.063 af

Reach 26R: Cross Gutter Avg. Flow Depth=0.08' Max Vel=0.94 fps Inflow=0.17 cfs 0.010 af
n=0.013 L=100.0' S=0.0050 '/' Capacity=2.05 cfs Outflow=0.17 cfs 0.010 af

Pond 7P: Trench Drain Peak Elev=4.78' Inflow=0.19 cfs 0.014 af
8.0" Round Culvert n=0.010 L=125.0' S=0.0052 '/' Outflow=0.19 cfs 0.014 af

Pond 9P: Catch Basin Peak Elev=18.40' Inflow=0.17 cfs 0.012 af
6.0" Round Culvert n=0.010 L=100.0' S=0.0200 '/' Outflow=0.17 cfs 0.012 af

Pond 11P: Trench Drain Peak Elev=22.28' Inflow=0.25 cfs 0.017 af
8.0" Round Culvert n=0.010 L=25.0' S=0.1548 '/' Outflow=0.25 cfs 0.017 af

Pond 21P: Pump Vault Peak Elev=0.16' Storage=0.002 af Inflow=0.69 cfs 0.049 af
Outflow=1.22 cfs 0.047 af

Pond 23P: Trench Drain Peak Elev=14.17' Inflow=0.09 cfs 0.007 af
8.0" Round Culvert n=0.010 L=155.0' S=0.0050 '/' Outflow=0.09 cfs 0.007 af

Pond 24P: Rainwater Harvest Tanks Peak Elev=39.41' Storage=0.084 af Inflow=1.06 cfs 0.084 af
Outflow=0.00 cfs 0.000 af

Total Runoff Area = 2.500 ac Runoff Volume = 0.147 af Average Runoff Depth = 0.71"
21.20% Pervious = 0.530 ac 78.80% Impervious = 1.970 ac

Summary for Subcatchment 1S: O-1

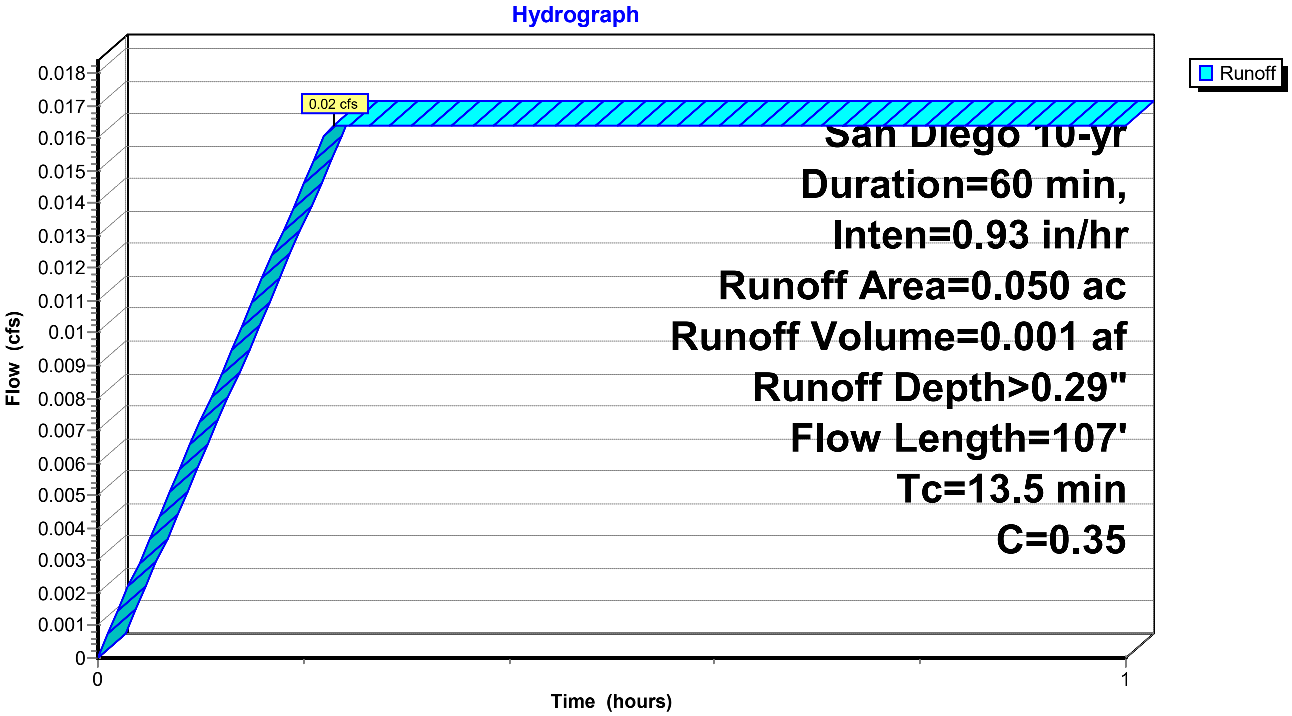
Runoff = 0.02 cfs @ 0.23 hrs, Volume= 0.001 af, Depth> 0.29"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs
San Diego 10-yr Duration=60 min, Inten=0.93 in/hr

Area (ac)	C	Description
0.050	0.35	
0.050		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	27	0.5000	0.04		**Sheet Flow, Caltrans Slope** Grass: Dense n= 0.240 P2= 0.04"
1.1	80	0.0050	1.24	0.10	**Trap/Vee/Rect Channel Flow, V-Ditch** Bot.W=0.00' D=0.20' Z= 2.0 '/' Top.W=0.80' n= 0.017 Concrete, unfinished
13.5	107	Total			

Subcatchment 1S: O-1



Summary for Subcatchment 2S: O-2

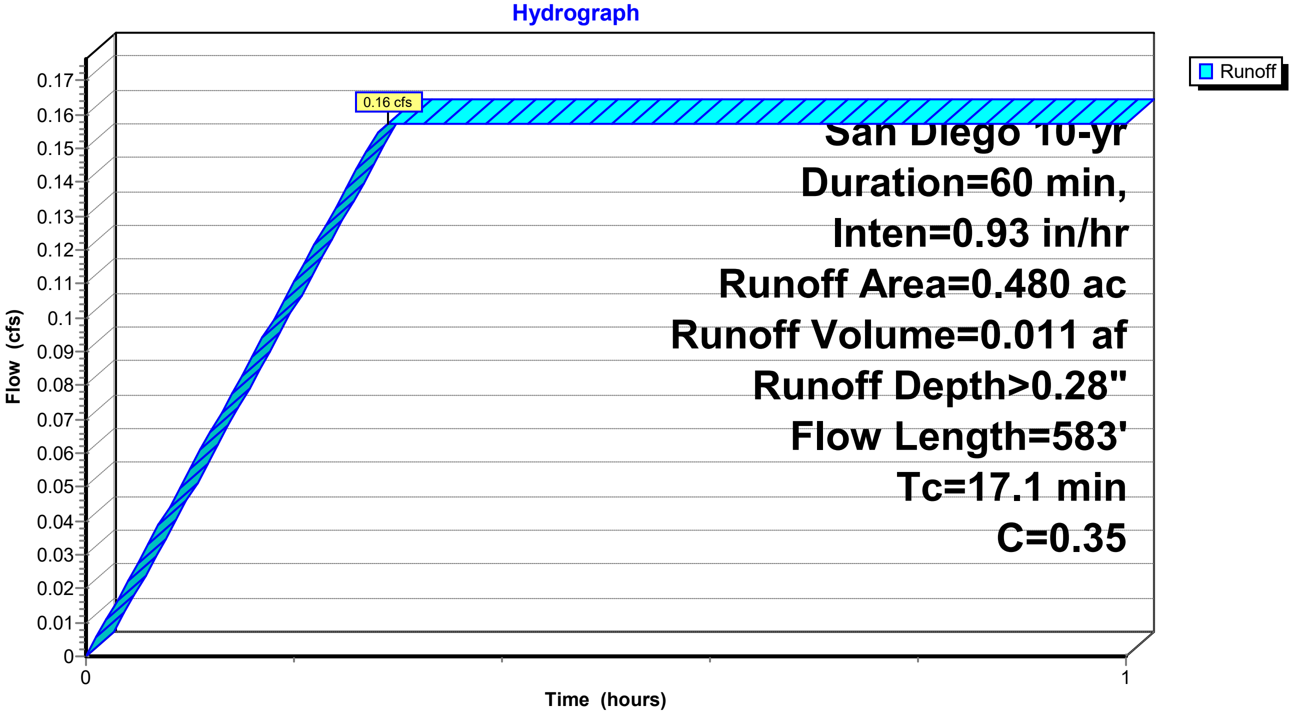
Runoff = 0.16 cfs @ 0.29 hrs, Volume= 0.011 af, Depth> 0.28"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs
San Diego 10-yr Duration=60 min, Inten=0.93 in/hr

Area (ac)	C	Description
0.480	0.35	
0.480		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	28	0.5000	0.04		**Sheet Flow, Caltrans R/W** Grass: Dense n= 0.240 P2= 0.04"
4.4	555	0.0050	2.12	0.38	**Trap/Vee/Rect Channel Flow, V-Ditch** Bot.W=0.00' D=0.30' Z= 2.0 '/' Top.W=1.20' n= 0.013 Concrete, trowel finish
17.1	583	Total			

Subcatchment 2S: O-2



Summary for Subcatchment 4S: P-7

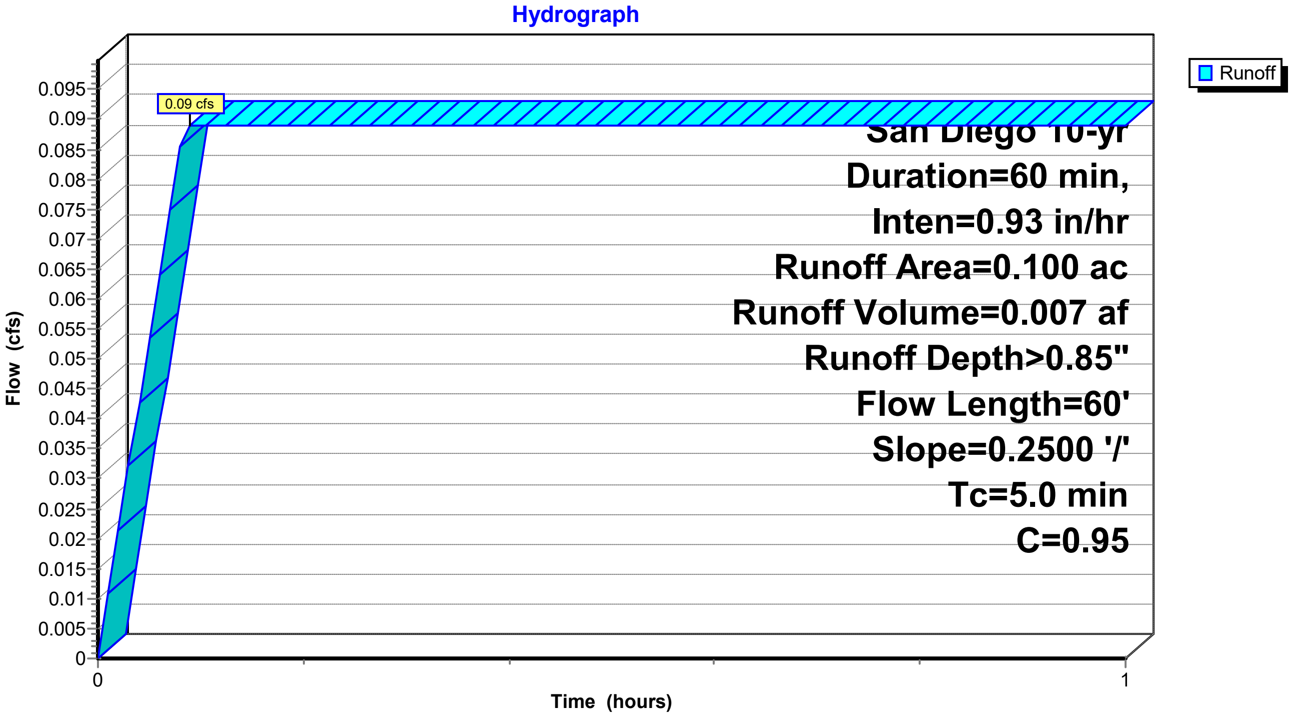
Runoff = 0.09 cfs @ 0.09 hrs, Volume= 0.007 af, Depth> 0.85"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs
San Diego 10-yr Duration=60 min, Inten=0.93 in/hr

Area (ac)	C	Description
0.100	0.95	
0.100		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.6	60	0.2500	0.38		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 0.04"
2.6	60	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 4S: P-7



Summary for Subcatchment 6S: P-1

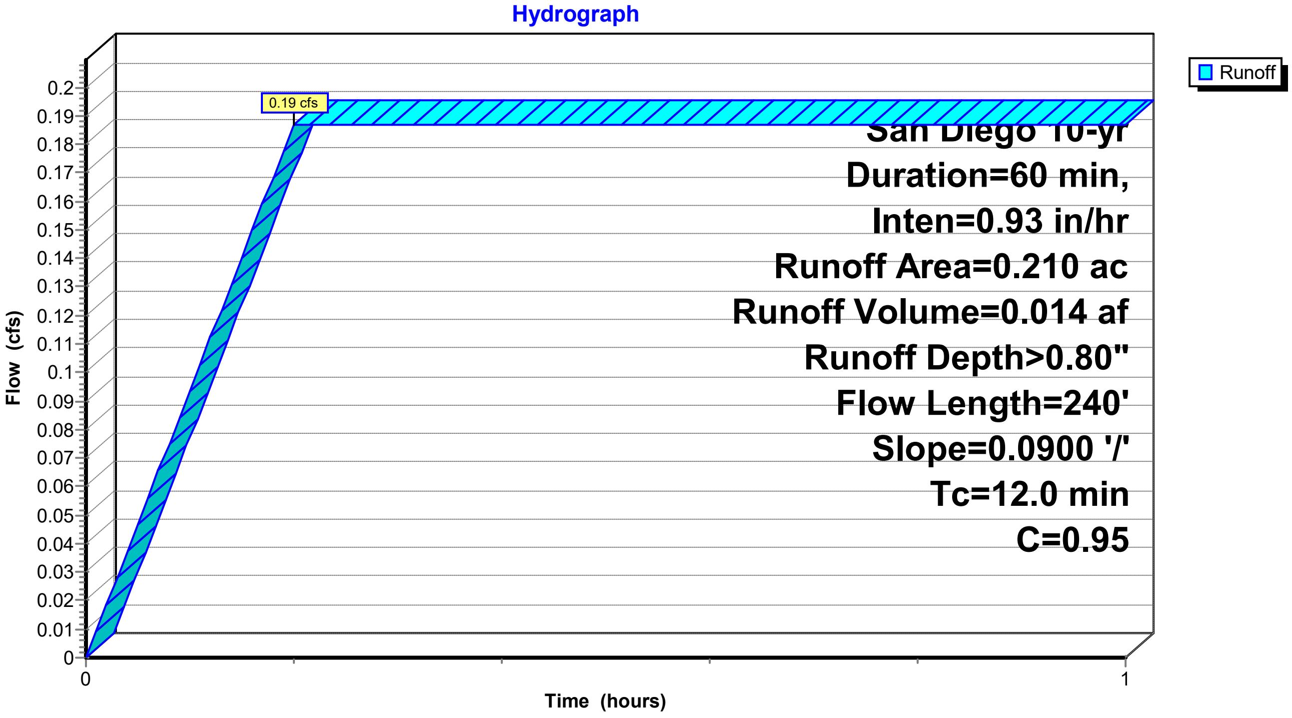
Runoff = 0.19 cfs @ 0.20 hrs, Volume= 0.014 af, Depth> 0.80"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs
San Diego 10-yr Duration=60 min, Inten=0.93 in/hr

Area (ac)	C	Description
0.210	0.95	
0.210		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0	240	0.0900	0.33		**Sheet Flow, Exit Ramp** Smooth surfaces n= 0.011 P2= 0.04"

Subcatchment 6S: P-1



Summary for Subcatchment 8S: P-2

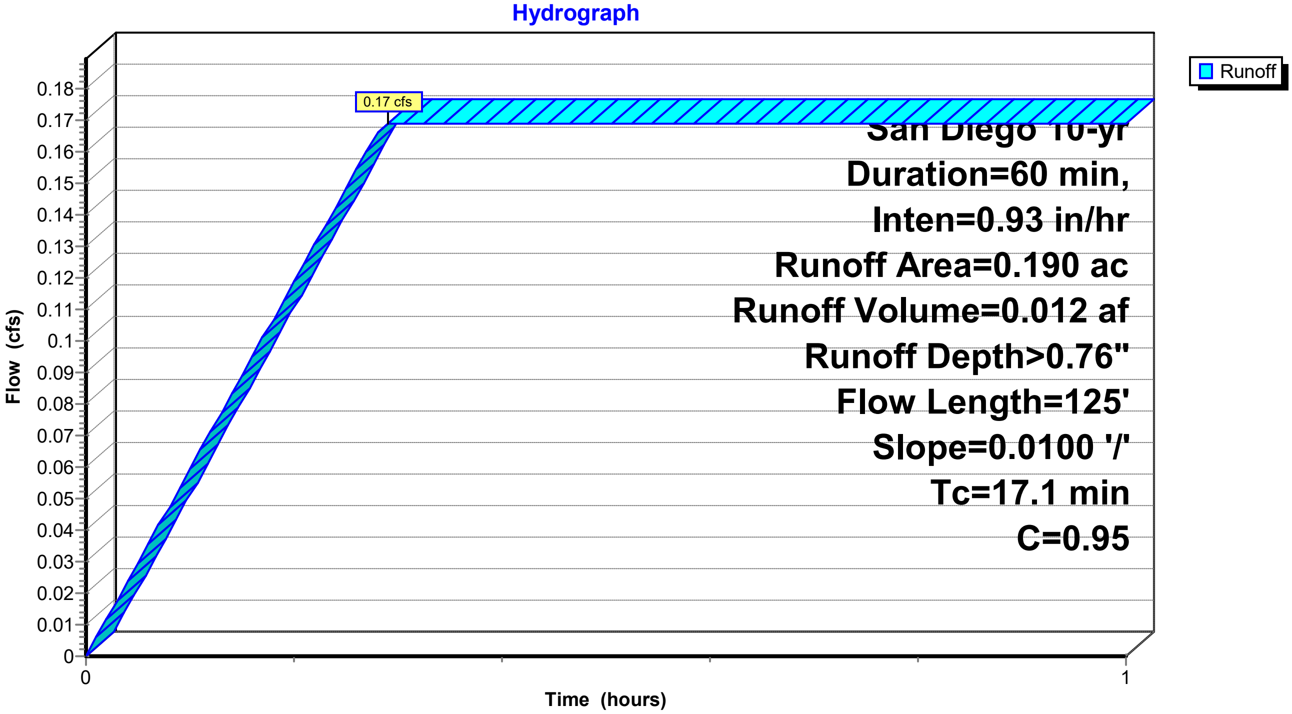
Runoff = 0.17 cfs @ 0.29 hrs, Volume= 0.012 af, Depth> 0.76"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs
San Diego 10-yr Duration=60 min, Inten=0.93 in/hr

Area (ac)	C	Description
0.190	0.95	
0.190		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.1	125	0.0100	0.12		**Sheet Flow, Exit Area** Smooth surfaces n= 0.011 P2= 0.04"

Subcatchment 8S: P-2



Summary for Subcatchment 10S: P-3

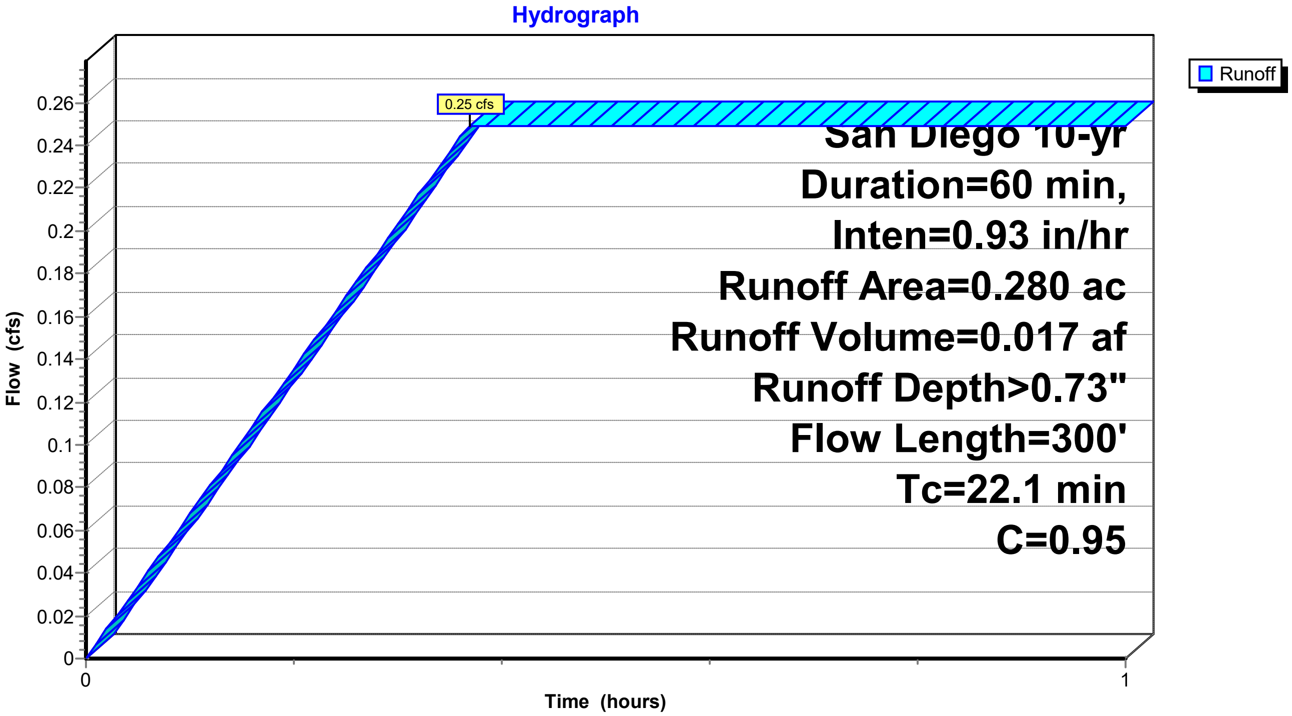
Runoff = 0.25 cfs @ 0.37 hrs, Volume= 0.017 af, Depth> 0.73"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs
San Diego 10-yr Duration=60 min, Inten=0.93 in/hr

Area (ac)	C	Description
0.280	0.95	
0.280		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.7	140	0.0100	0.12		**Sheet Flow, Pavement** Smooth surfaces n= 0.011 P2= 0.04"
3.4	160	0.0060	0.77		**Shallow Concentrated Flow, Landscape Area** Nearly Bare & Untilled Kv= 10.0 fps
22.1	300	Total			

Subcatchment 10S: P-3



Summary for Subcatchment 12S: P-4

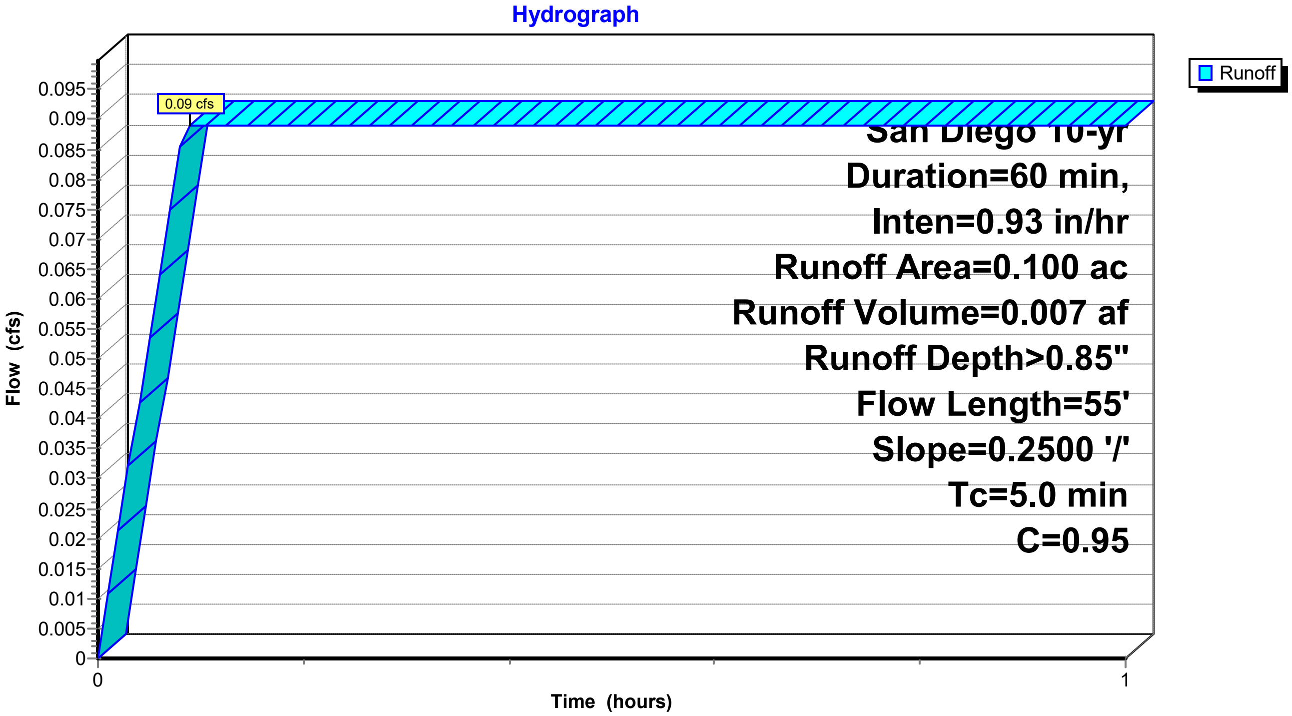
Runoff = 0.09 cfs @ 0.09 hrs, Volume= 0.007 af, Depth> 0.85"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs
San Diego 10-yr Duration=60 min, Inten=0.93 in/hr

Area (ac)	C	Description
0.100	0.95	
0.100		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	55	0.2500	0.37		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 0.04"
2.4	55	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 12S: P-4



Summary for Subcatchment 20S: P-6

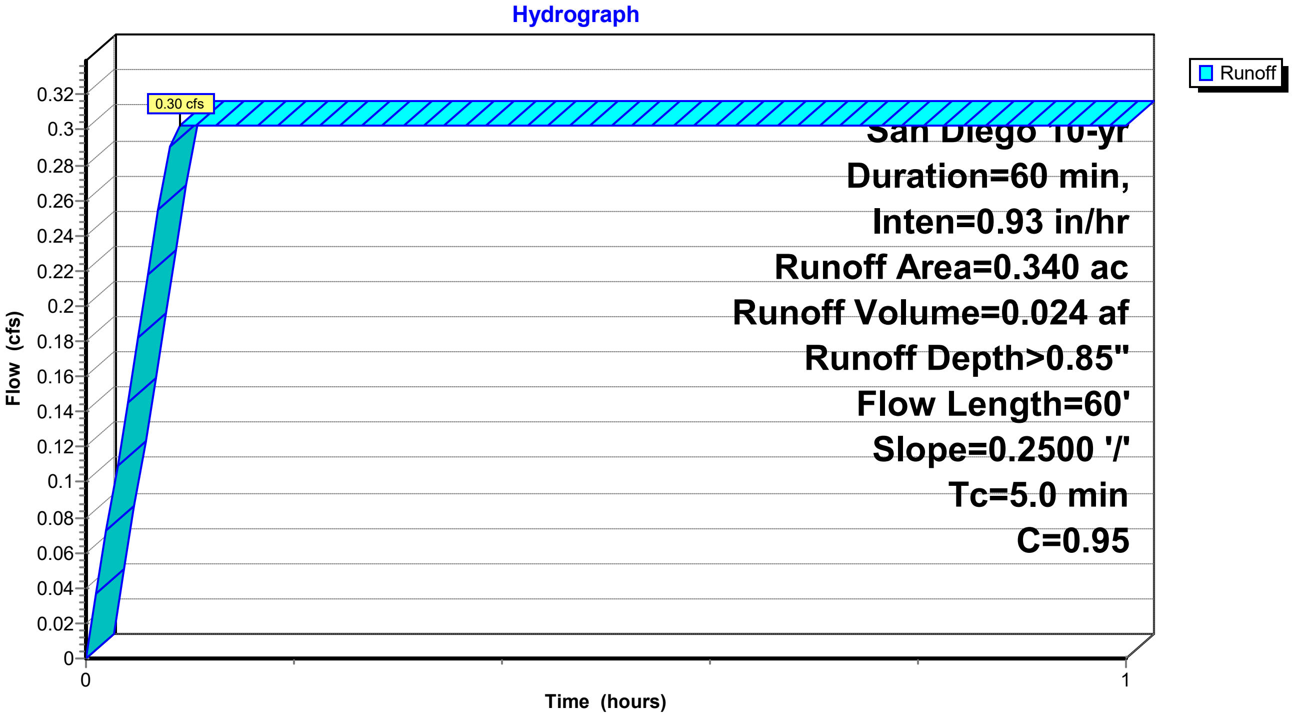
Runoff = 0.30 cfs @ 0.09 hrs, Volume= 0.024 af, Depth> 0.85"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs
San Diego 10-yr Duration=60 min, Inten=0.93 in/hr

Area (ac)	C	Description
0.340	0.95	
0.340		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.6	60	0.2500	0.38		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 0.04"
2.6	60	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 20S: P-6



Summary for Subcatchment 22S: P-8

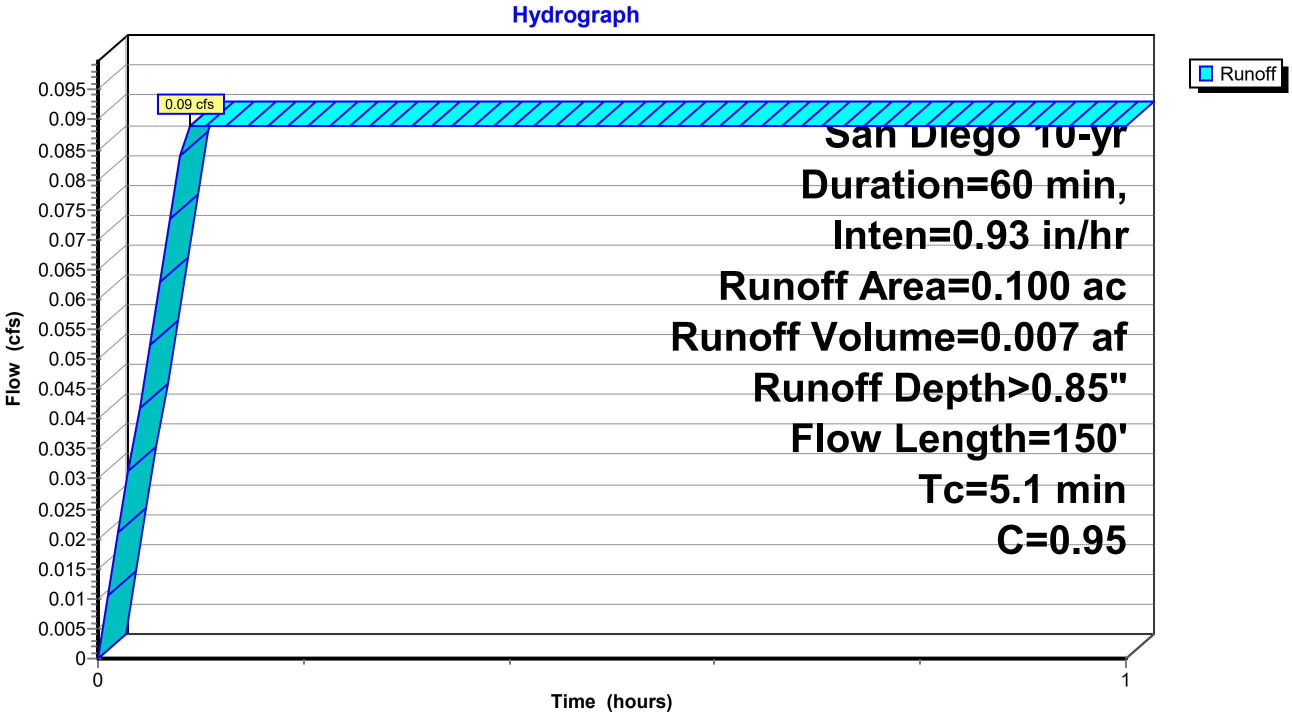
Runoff = 0.09 cfs @ 0.09 hrs, Volume= 0.007 af, Depth> 0.85"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs
San Diego 10-yr Duration=60 min, Inten=0.93 in/hr

Area (ac)	C	Description
0.100	0.95	
0.100		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	70	0.0050	1.44		**Shallow Concentrated Flow, Curb and Gutter** Paved Kv= 20.3 fps
4.3	80	0.1300	0.31		**Sheet Flow, Entrance Ramp** Smooth surfaces n= 0.011 P2= 0.04"
5.1	150	Total			

Subcatchment 22S: P-8



Summary for Subcatchment 26S: P-5

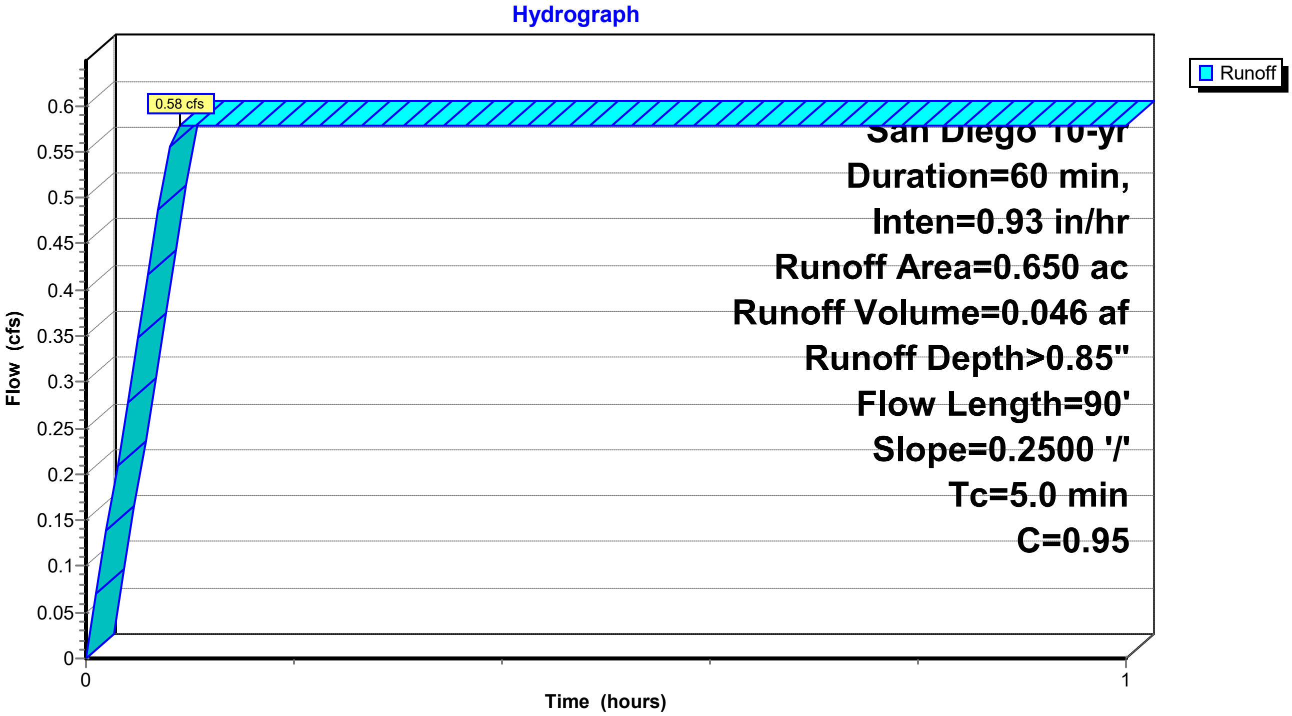
Runoff = 0.58 cfs @ 0.09 hrs, Volume= 0.046 af, Depth> 0.85"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs
San Diego 10-yr Duration=60 min, Inten=0.93 in/hr

Area (ac)	C	Description
0.650	0.95	
0.650		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	90	0.2500	0.41		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 0.04"
3.6	90	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 26S: P-5



Summary for Reach 5R: V-Ditch

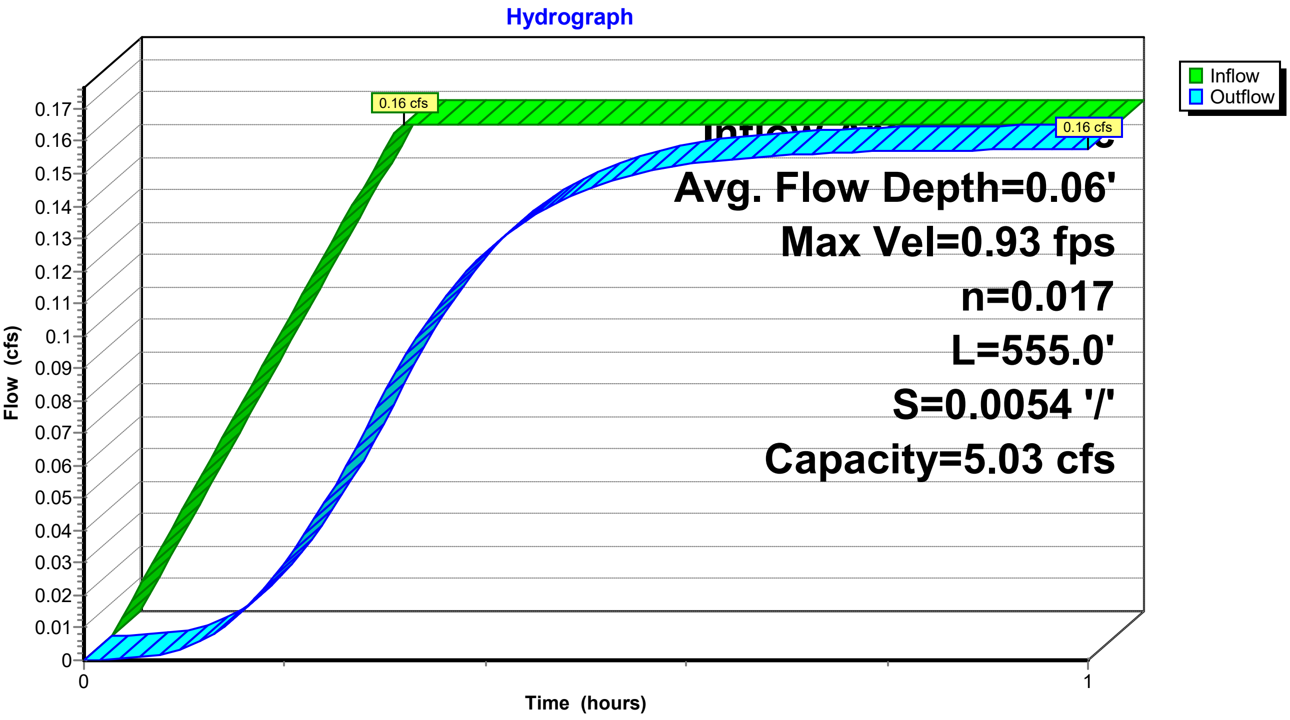
Inflow Area =	0.480 ac,	0.00% Impervious,	Inflow Depth >	0.28"	for 10-yr event
Inflow =	0.16 cfs @	0.29 hrs,	Volume=	0.011 af	
Outflow =	0.16 cfs @	1.00 hrs,	Volume=	0.009 af,	Atten= 0%, Lag= 42.6 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 0.93 fps, Min. Travel Time= 10.0 min
Avg. Velocity = 0.75 fps, Avg. Travel Time= 12.4 min

Peak Storage= 94 cf @ 1.00 hrs
Average Depth at Peak Storage= 0.06'
Bank-Full Depth= 0.50' Flow Area= 1.5 sf, Capacity= 5.03 cfs

3.00' x 0.50' deep channel, n= 0.017 Concrete, unfinished
Length= 555.0' Slope= 0.0054 '/'
Inlet Invert= 26.34', Outlet Invert= 23.32'

Reach 5R: V-Ditch



Summary for Reach 13R: Roof Drain Collector Pipe

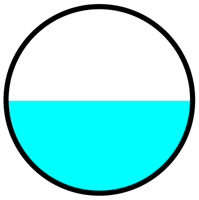
[52] Hint: Inlet/Outlet conditions not evaluated

```
Inflow Area =          1.190 ac,100.00% Impervious,  Inflow Depth >   0.85"    for  10-yr event
Inflow       =        1.06 cfs @     0.09 hrs,  Volume=              0.084 af
Outflow      =        1.06 cfs @     0.10 hrs,  Volume=              0.084 af,  Atten= 0%,  Lag= 0.6 min
```

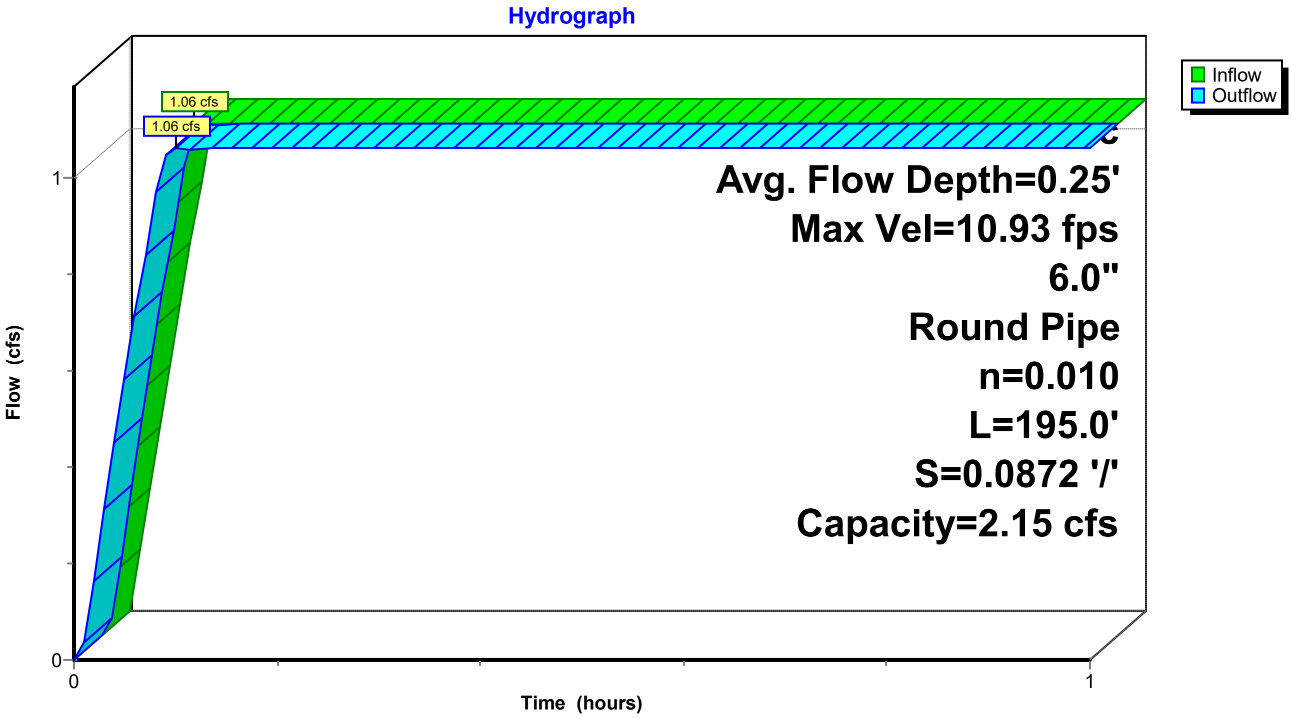
Routing by Dyn-Stor-Ind method, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 10.93 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 10.72 fps, Avg. Travel Time= 0.3 min

Peak Storage= 19 cf @ 0.10 hrs
Average Depth at Peak Storage= 0.25'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 2.15 cfs

6.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 195.0' Slope= 0.0872 '/'
Inlet Invert= 53.33', Outlet Invert= 36.33'



Reach 13R: Roof Drain Collector Pipe



Summary for Reach 15R: Storm Drain

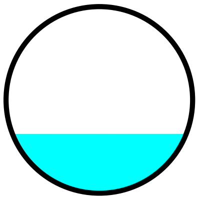
[52] Hint: Inlet/Outlet conditions not evaluated

```
Inflow Area =      0.280 ac,100.00% Impervious,  Inflow Depth >   0.73"    for  10-yr event
Inflow      =      0.25 cfs @    0.37 hrs,  Volume=          0.017 af
Outflow     =      0.25 cfs @    0.38 hrs,  Volume=          0.017 af,  Atten= 0%,  Lag= 0.6 min
```

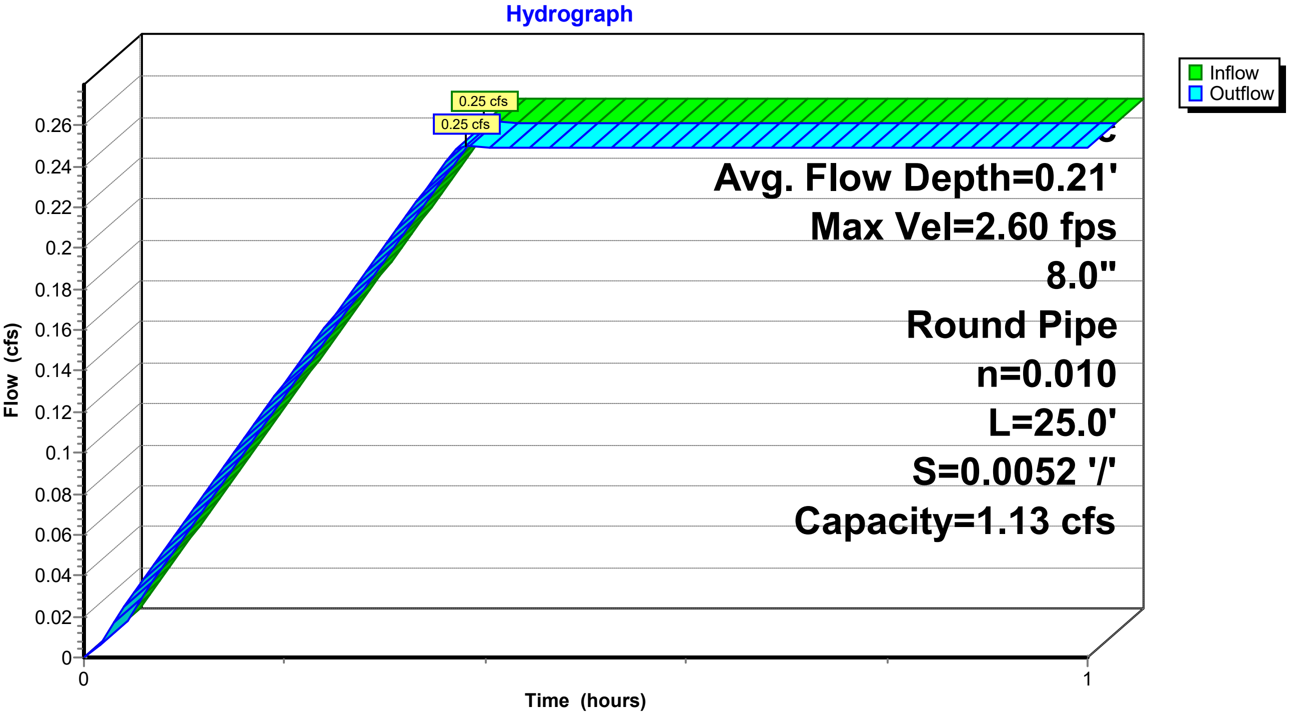
Routing by Dyn-Stor-Ind method, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 2.60 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.39 fps, Avg. Travel Time= 0.2 min

Peak Storage= 2 cf @ 0.38 hrs
Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 0.67' Flow Area= 0.3 sf, Capacity= 1.13 cfs

8.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 25.0' Slope= 0.0052 '/'
Inlet Invert= 18.13', Outlet Invert= 18.00'



Reach 15R: Storm Drain



Summary for Reach 16R: Storm Drain

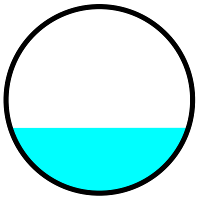
[52] Hint: Inlet/Outlet conditions not evaluated
[62] Hint: Exceeded Reach 15R OUTLET depth by 0.03' @ 0.29 hrs

```
Inflow Area =       0.470 ac,100.00% Impervious,  Inflow Depth >   0.74"    for  10-yr event
Inflow      =       0.42 cfs @    0.38 hrs,  Volume=          0.029 af
Outflow     =       0.42 cfs @    0.39 hrs,  Volume=          0.029 af,  Atten= 0%,  Lag= 0.6 min
```

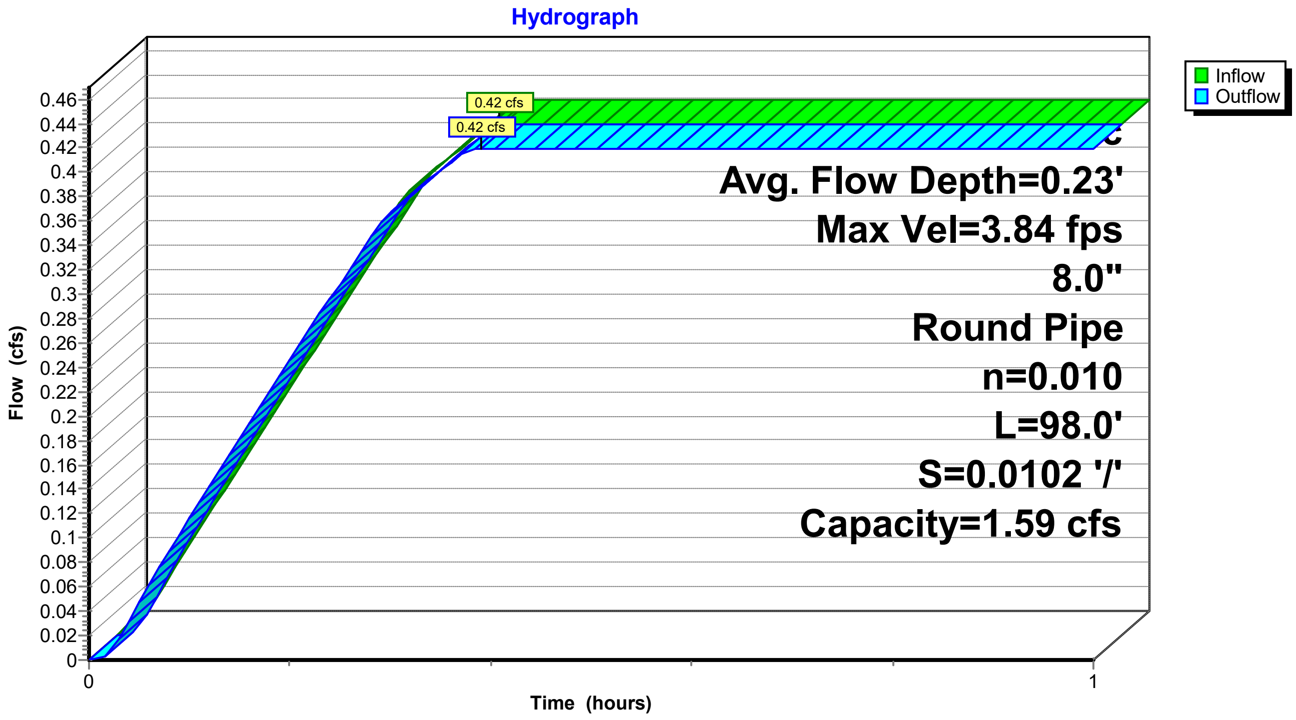
Routing by Dyn-Stor-Ind method, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 3.84 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 3.53 fps, Avg. Travel Time= 0.5 min

Peak Storage= 11 cf @ 0.39 hrs
Average Depth at Peak Storage= 0.23'
Bank-Full Depth= 0.67' Flow Area= 0.3 sf, Capacity= 1.59 cfs

8.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 98.0' Slope= 0.0102 '/'
Inlet Invert= 18.00', Outlet Invert= 17.00'



Reach 16R: Storm Drain



Summary for Reach 17R: Storm Drain

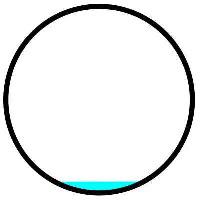
```
[52] Hint: Inlet/Outlet conditions not evaluated
[61] Hint: Exceeded Reach 16R outlet invert by 0.04' @ 0.39 hrs

Inflow Area =       0.470 ac,100.00% Impervious,  Inflow Depth >   0.73"    for  10-yr event
Inflow      =       0.42 cfs @     0.39 hrs,  Volume=           0.029 af
Outflow     =       0.42 cfs @     0.39 hrs,  Volume=           0.029 af,  Atten= 0%,  Lag= 0.0 min

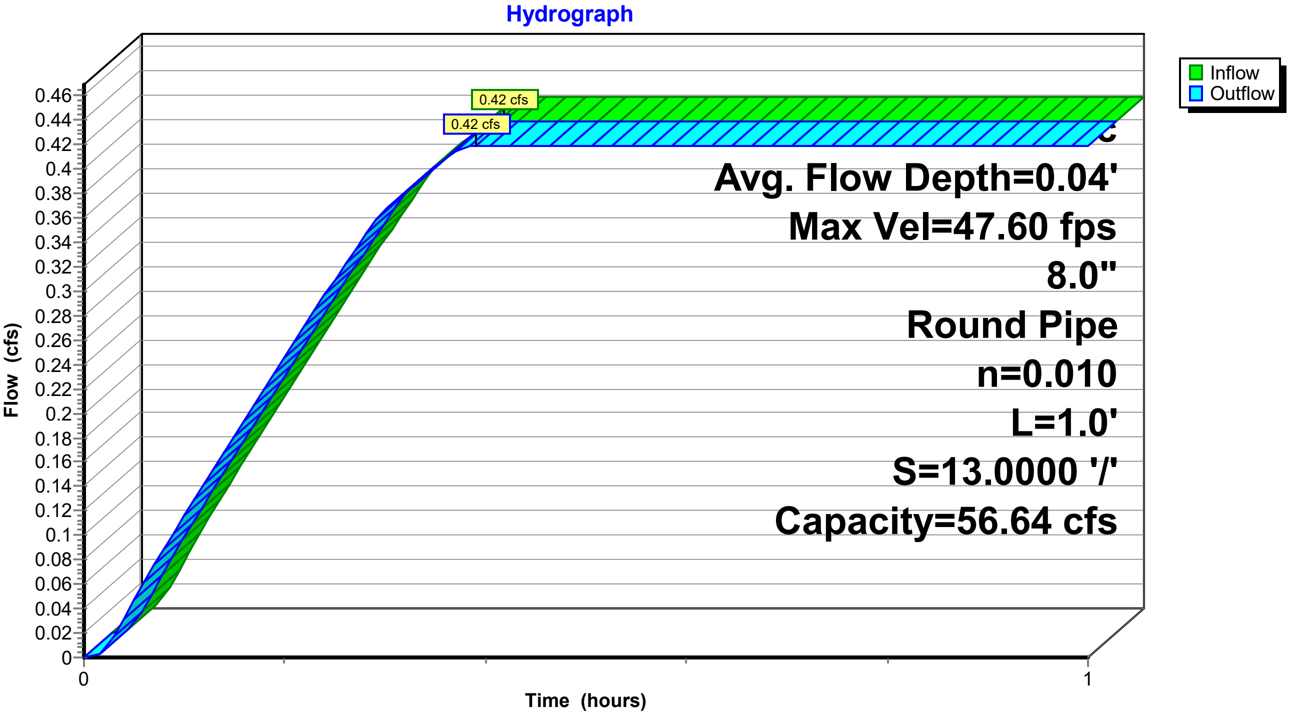
Routing by Dyn-Stor-Ind method, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 47.60 fps,  Min. Travel Time= 0.0 min
Avg. Velocity = 44.08 fps,  Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.39 hrs
Average Depth at Peak Storage= 0.04'
Bank-Full Depth= 0.67'  Flow Area= 0.3 sf,  Capacity= 56.64 cfs

8.0"  Round Pipe
n= 0.010  PVC, smooth interior
Length= 1.0'   Slope= 13.0000 '/'
Inlet Invert= 17.00',  Outlet Invert= 4.00'
```



Reach 17R: Storm Drain



Summary for Reach 18R: Storm Drain

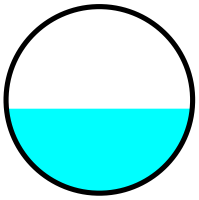
[52] Hint: Inlet/Outlet conditions not evaluated
[62] Hint: Exceeded Reach 17R OUTLET depth by 0.26' @ 0.39 hrs

```
Inflow Area =       0.680 ac,100.00% Impervious,  Inflow Depth >   0.75"    for  10-yr event
Inflow      =       0.61 cfs @     0.39 hrs,  Volume=          0.043 af
Outflow     =       0.61 cfs @     0.39 hrs,  Volume=          0.043 af,  Atten= 0%,  Lag= 0.0 min
```

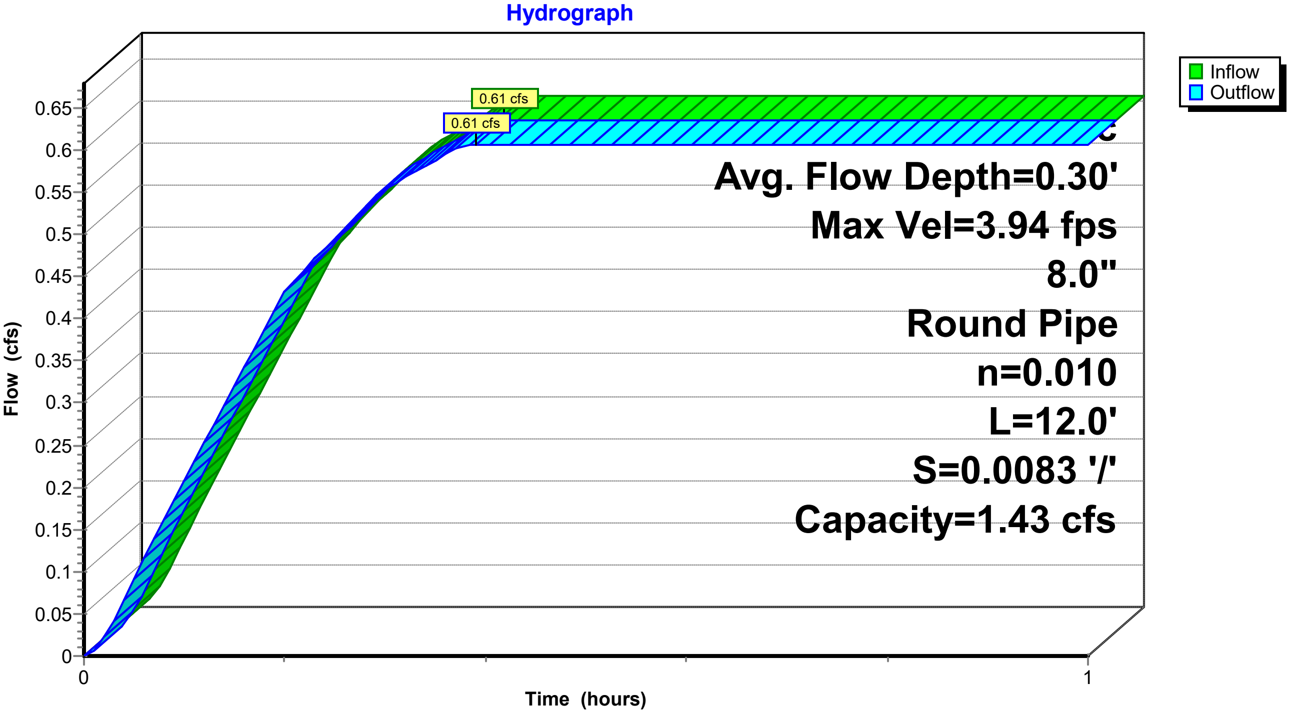
Routing by Dyn-Stor-Ind method, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 3.94 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 3.68 fps, Avg. Travel Time= 0.1 min

Peak Storage= 2 cf @ 0.39 hrs
Average Depth at Peak Storage= 0.30'
Bank-Full Depth= 0.67' Flow Area= 0.3 sf, Capacity= 1.43 cfs

8.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 12.0' Slope= 0.0083 '/'
Inlet Invert= 4.00', Outlet Invert= 3.90'



Reach 18R: Storm Drain



Summary for Reach 19R: Storm Drain

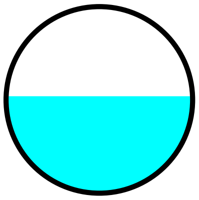
[52] Hint: Inlet/Outlet conditions not evaluated
[63] Warning: Exceeded Reach 18R INLET depth by 0.44' @ 0.42 hrs

```
Inflow Area =      0.680 ac,100.00% Impervious,  Inflow Depth >   0.75"    for  10-yr event
Inflow      =      0.61 cfs @    0.39 hrs,  Volume=          0.043 af
Outflow     =      0.61 cfs @    0.44 hrs,  Volume=          0.042 af,  Atten= 0%,  Lag= 3.0 min
```

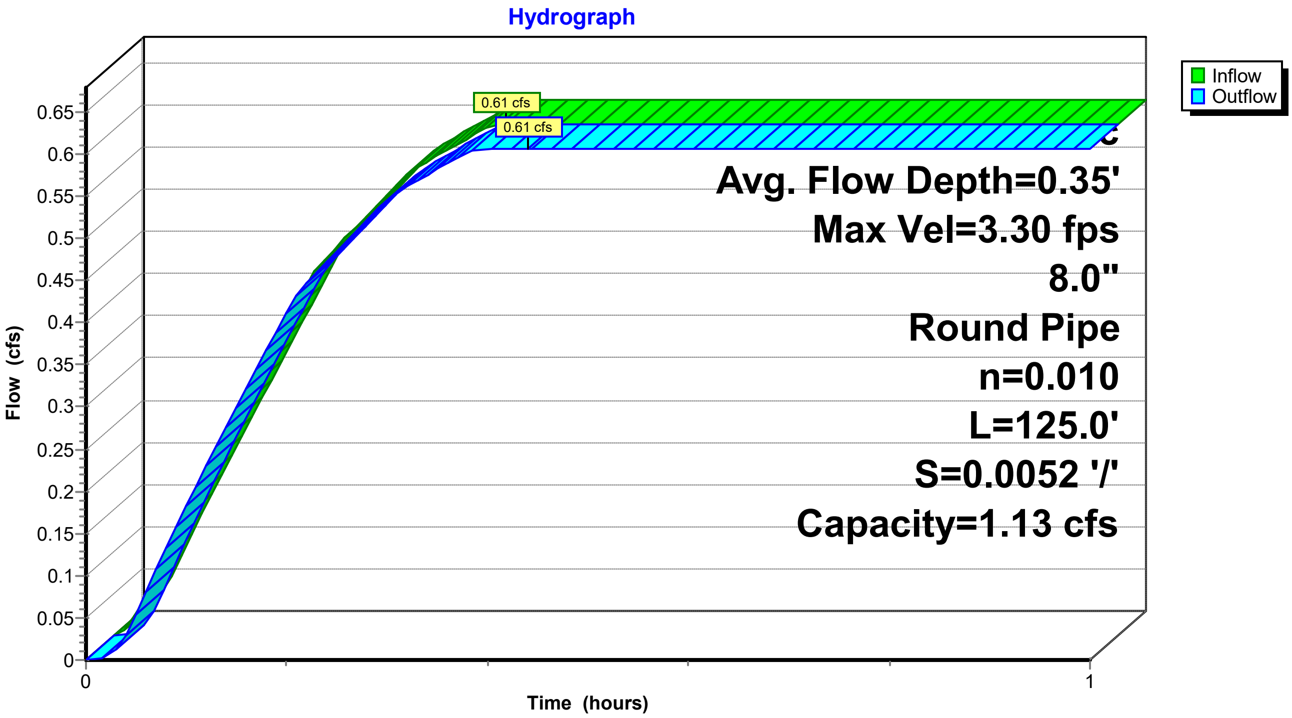
Routing by Dyn-Stor-Ind method, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 3.30 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 3.05 fps, Avg. Travel Time= 0.7 min

Peak Storage= 23 cf @ 0.44 hrs
Average Depth at Peak Storage= 0.35'
Bank-Full Depth= 0.67' Flow Area= 0.3 sf, Capacity= 1.13 cfs

8.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 125.0' Slope= 0.0052 '/'
Inlet Invert= 4.40', Outlet Invert= 3.75'



Reach 19R: Storm Drain



Summary for Reach 25R: Existing 15-inch

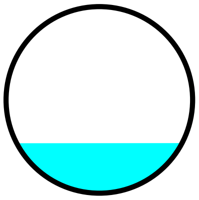
[52] Hint: Inlet/Outlet conditions not evaluated

```
Inflow Area =         1.970 ac,100.00% Impervious,  Inflow Depth >   0.40"    for  10-yr event
Inflow      =         1.22 cfs @     0.41 hrs,  Volume=            0.066 af
Outflow     =         1.14 cfs @     0.33 hrs,  Volume=            0.063 af,  Atten= 7%,  Lag= 0.0 min
```

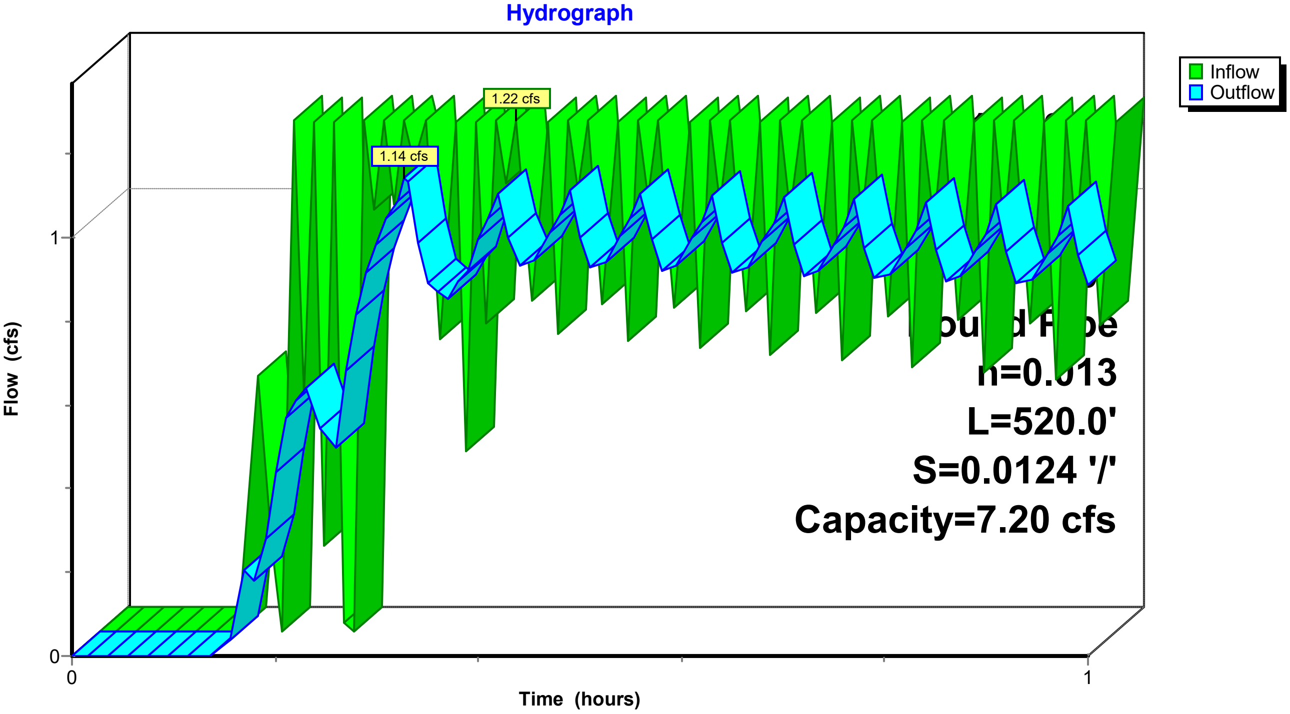
Routing by Dyn-Stor-Ind method, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 4.28 fps, Min. Travel Time= 2.0 min
Avg. Velocity = 3.96 fps, Avg. Travel Time= 2.2 min

Peak Storage= 138 cf @ 0.33 hrs
Average Depth at Peak Storage= 0.34'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 7.20 cfs

15.0" Round Pipe
n= 0.013 Concrete pipe, bends & connections
Length= 520.0' Slope= 0.0124 '/'
Inlet Invert= 17.46', Outlet Invert= 11.00'



Reach 25R: Existing 15-inch



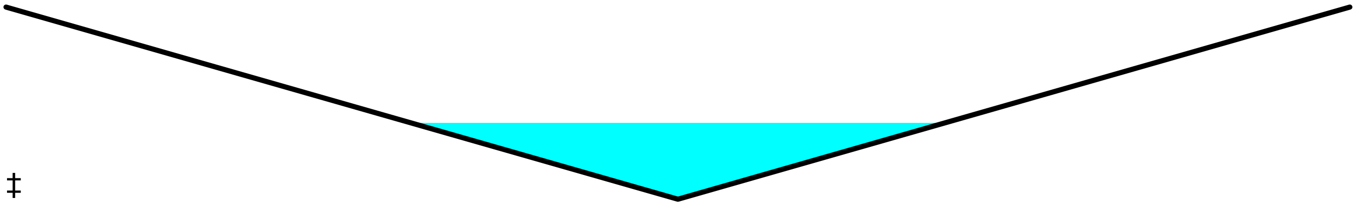
Summary for Reach 26R: Cross Gutter

```
Inflow Area =         0.530 ac,   0.00% Impervious,  Inflow Depth >   0.23"    for  10-yr event
Inflow      =        0.17 cfs @     1.00 hrs,  Volume=            0.010 af
Outflow     =        0.17 cfs @     1.00 hrs,  Volume=            0.010 af,  Atten= 0%,  Lag= 0.0 min
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 0.94 fps, Min. Travel Time= 1.8 min
Avg. Velocity = 0.79 fps, Avg. Travel Time= 2.1 min

Peak Storage= 18 cf @ 1.00 hrs
Average Depth at Peak Storage= 0.08'
Bank-Full Depth= 0.20' Flow Area= 1.2 sf, Capacity= 2.05 cfs

0.00' x 0.20' deep channel, n= 0.013
Side Slope Z-value= 29.4 '/' Top Width= 11.76'
Length= 100.0' Slope= 0.0050 '/'
Inlet Invert= 21.60', Outlet Invert= 21.10'



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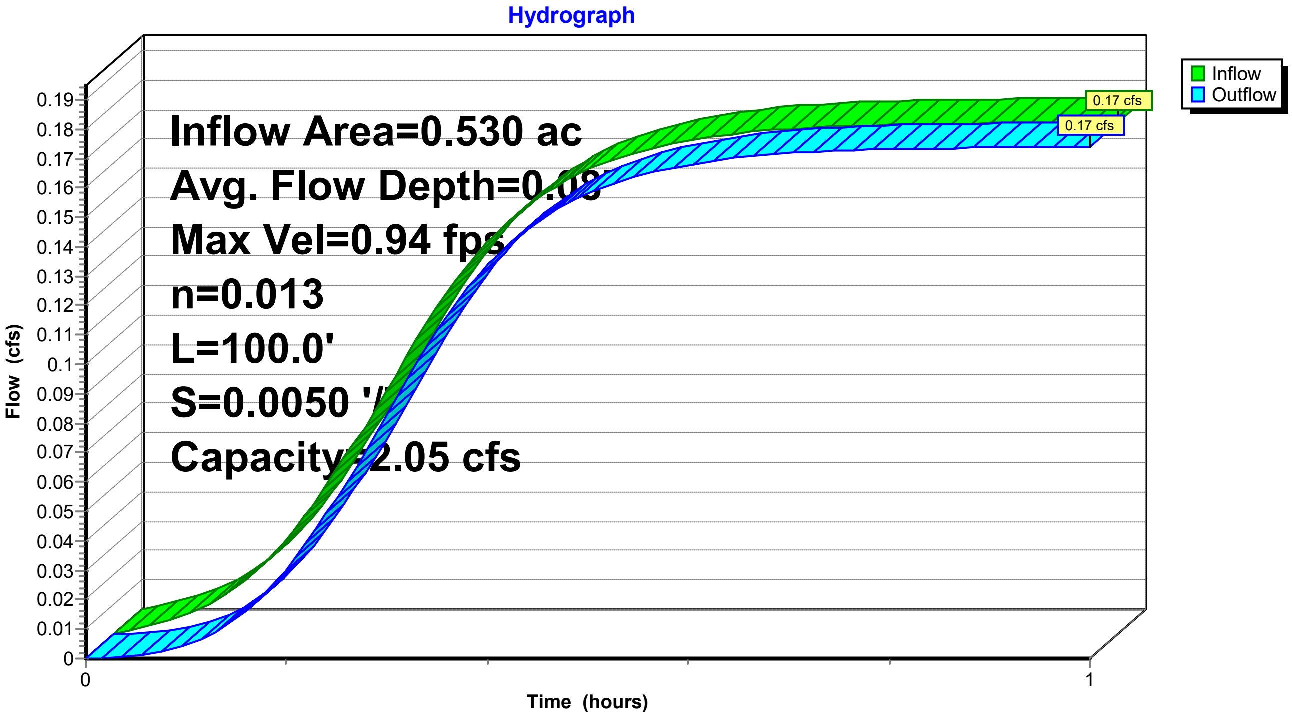
Reach 26R: Cross Gutter



Summary for Pond 7P: Trench Drain

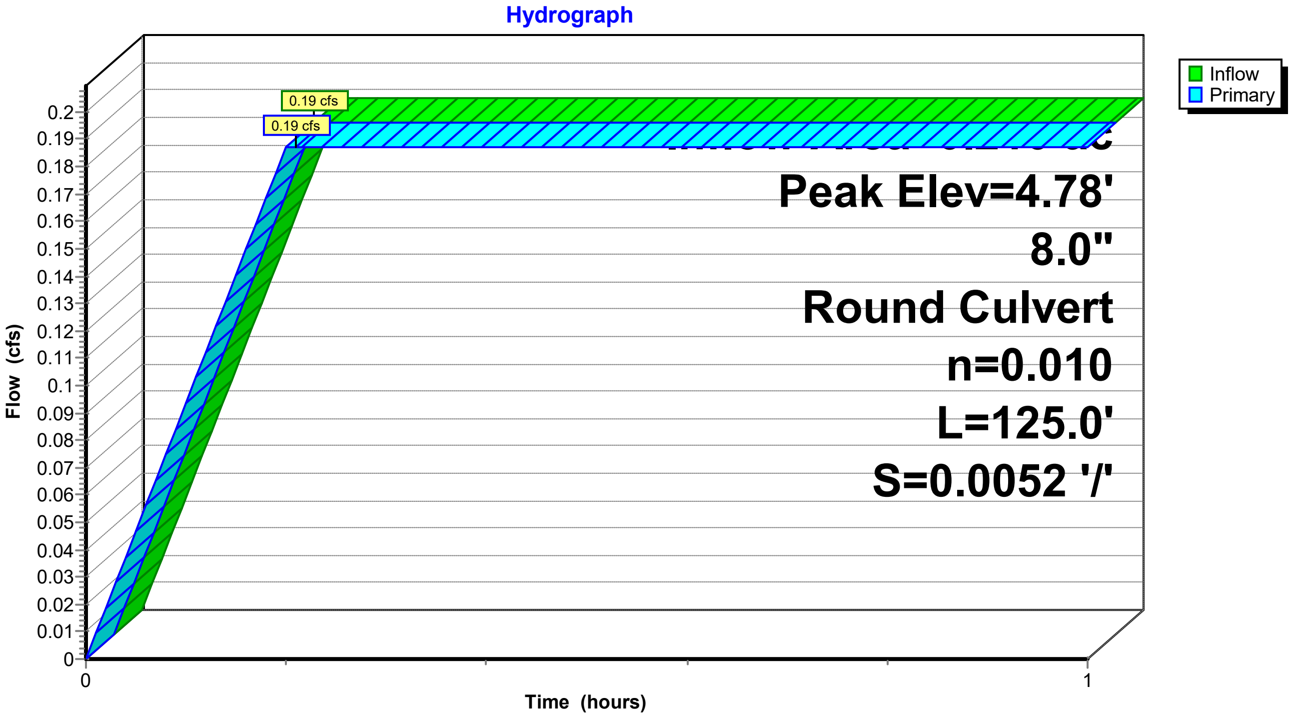
Inflow Area = 0.210 ac,100.00% Impervious, Inflow Depth > 0.80" for 10-yr event
Inflow = 0.19 cfs @ 0.20 hrs, Volume= 0.014 af
Outflow = 0.19 cfs @ 0.21 hrs, Volume= 0.014 af, Atten= 0%, Lag= 0.6 min
Primary = 0.19 cfs @ 0.21 hrs, Volume= 0.014 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 4.78' @ 0.39 hrs
Flood Elev= 6.75'

Device	Routing	Invert	Outlet Devices
#1	Primary	4.50'	**8.0" Round Culvert** L= 125.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 4.50' / 3.85' S= 0.0052 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.19 cfs @ 0.21 hrs HW=4.77' TW=4.25' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.19 cfs @ 2.05 fps)

Pond 7P: Trench Drain



Summary for Pond 9P: Catch Basin

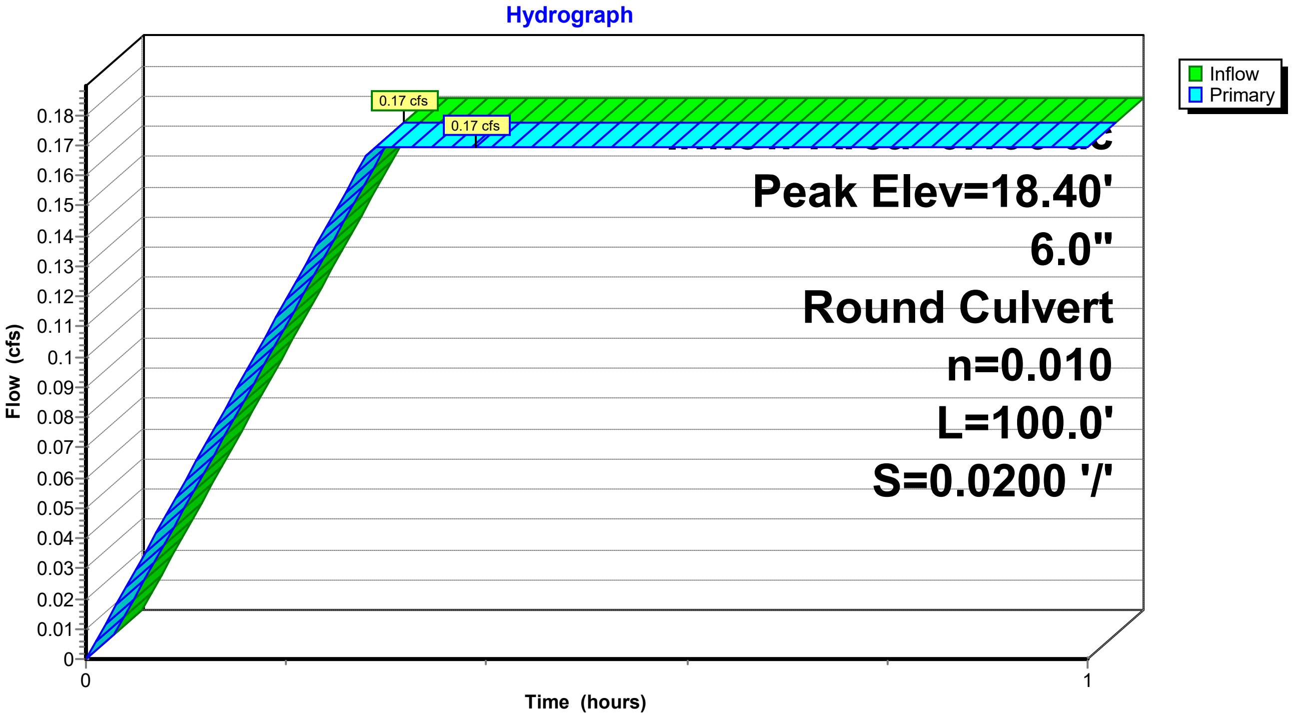
```
Inflow Area =       0.190 ac,100.00% Impervious,  Inflow Depth >  0.76"    for  10-yr event
Inflow     =       0.17 cfs @    0.29 hrs,  Volume=           0.012 af
Outflow    =       0.17 cfs @    0.39 hrs,  Volume=           0.012 af,  Atten= 0%,  Lag= 6.0 min
Primary    =       0.17 cfs @    0.39 hrs,  Volume=           0.012 af
```

```
Routing by Dyn-Stor-Ind method, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 18.40' @ 0.39 hrs
Flood Elev= 23.00'
```

```
Device   Routing          Invert   Outlet Devices
   #1    Primary          18.00'   6.0"  Round Culvert
                                   L= 100.0'   CPP, square edge headwall,  Ke= 0.500
                                   Inlet / Outlet Invert= 18.00' / 16.00'   S= 0.0200 '/'   Cc= 0.900
                                   n= 0.010  PVC, smooth interior,  Flow Area= 0.20 sf
```

Primary OutFlow Max=0.17 cfs @ 0.39 hrs HW=18.40' TW=18.23' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.17 cfs @ 1.38 fps)

Pond 9P: Catch Basin



Summary for Pond 11P: Trench Drain

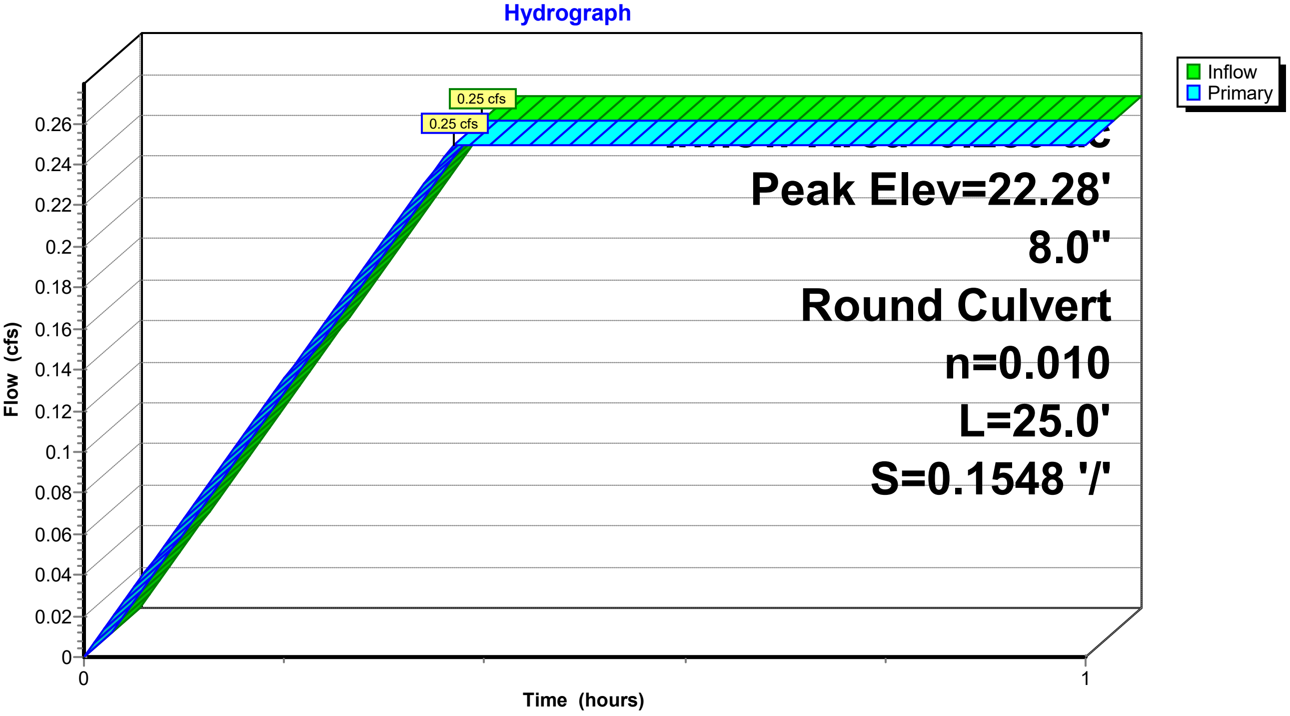
Inflow Area = 0.280 ac,100.00% Impervious, Inflow Depth > 0.73" for 10-yr event
Inflow = 0.25 cfs @ 0.37 hrs, Volume= 0.017 af
Outflow = 0.25 cfs @ 0.37 hrs, Volume= 0.017 af, Atten= 0%, Lag= 0.0 min
Primary = 0.25 cfs @ 0.37 hrs, Volume= 0.017 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 22.28' @ 0.37 hrs
Flood Elev= 23.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	22.00'	**8.0" Round Culvert** L= 25.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 22.00' / 18.13' S= 0.1548 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.25 cfs @ 0.37 hrs HW=22.28' TW=18.34' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 0.25 cfs @ 1.80 fps)

Pond 11P: Trench Drain



Summary for Pond 21P: Pump Vault

Inflow Area = 1.970 ac,100.00% Impervious, Inflow Depth > 0.30" for 10-yr event
Inflow = 0.69 cfs @ 0.44 hrs, Volume= 0.049 af
Outflow = 1.22 cfs @ 0.41 hrs, Volume= 0.047 af, Atten= 0%, Lag= 0.0 min
Primary = 1.22 cfs @ 0.41 hrs, Volume= 0.066 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 0.16' @ 0.41 hrs Surf.Area= 0.002 ac Storage= 0.002 af
Flood Elev= 6.88' Surf.Area= 0.002 ac Storage= 0.015 af

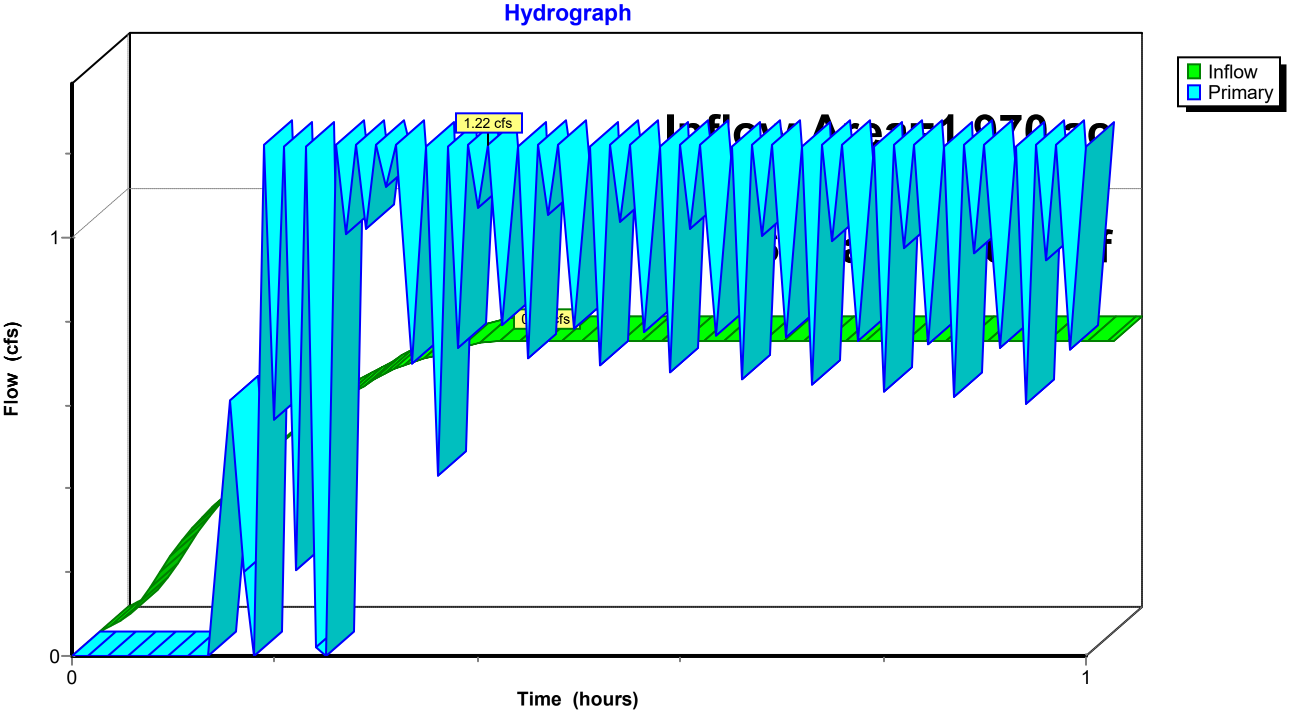
Plug-Flow detention time= 2.4 min calculated for 0.047 af (96% of inflow)
Center-of-Mass det. time= 1.5 min (35.8 - 34.3)

Volume	Invert	Avail.Storage	Storage Description
#1	-1.12'	0.015 af	**6.00'W x 14.00'L x 8.00'H Prismatoid**

Device	Routing	Invert	Outlet Devices
#1	Primary	0.13'	**Sample Pump 101 X 2.00** Discharges@19.00' Turns Off@-0.12' 6.0" Diam. x 19.0' Long Discharge, Hazen-Williams C= 130 Flow (gpm)= 0.0 60.0 120.0 180.0 240.0 270.0 285.0 300.0 315.0 330.0 Head (feet)= 40.00 36.00 32.00 28.00 24.00 20.00 16.00 12.00 10.00 8.00 -Loss (feet)= 0.00 0.01 0.03 0.06 0.10 0.12 0.14 0.15 0.17 0.18 =Lift (feet)= 40.00 35.99 31.97 27.94 23.90 19.88 15.86 11.85 9.83 7.82

Primary OutFlow Max=1.22 cfs @ 0.41 hrs HW=0.15' TW=17.78' (Dynamic Tailwater)
└─**1=Sample Pump 101** (Pump Controls 1.22 cfs)

Pond 21P: Pump Vault



Summary for Pond 23P: Trench Drain

[57] Hint: Peaked at 14.17' (Flood elevation advised)

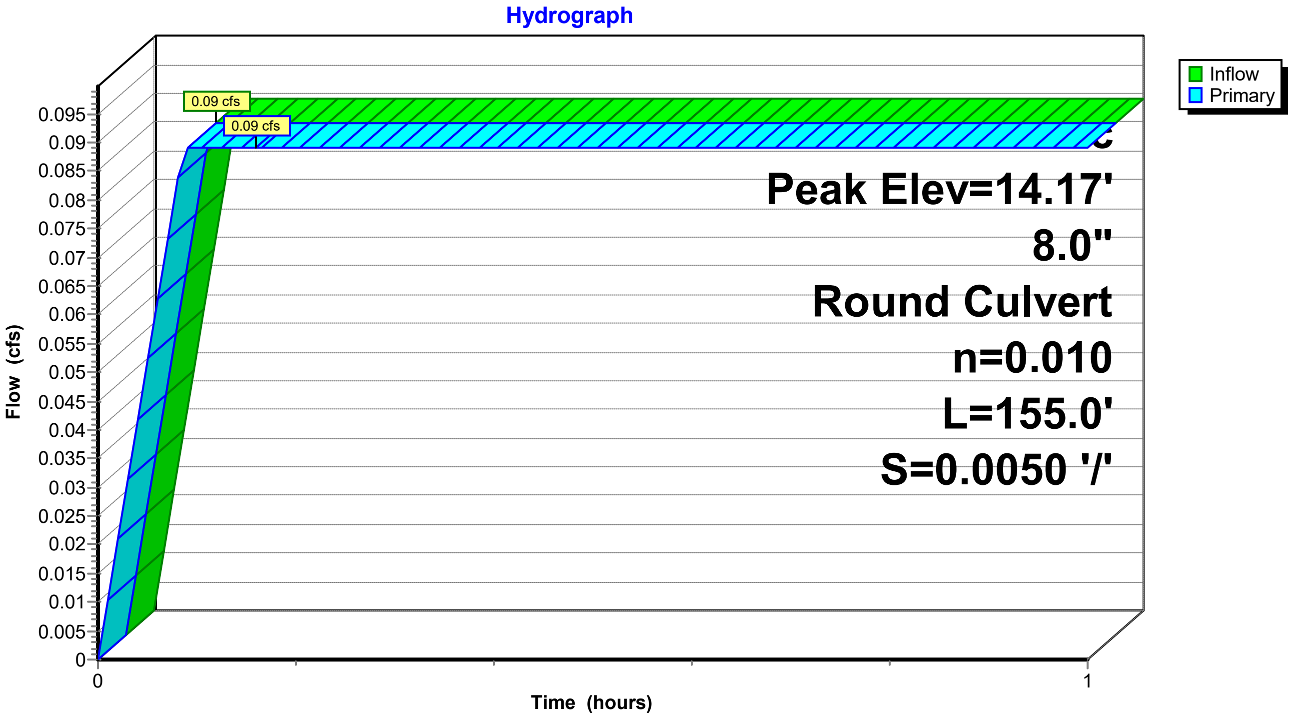
Inflow Area =	0.100 ac,100.00% Impervious,	Inflow Depth > 0.85"	for 10-yr event		
Inflow =	0.09 cfs @	0.09 hrs,	Volume=	0.007 af	
Outflow =	0.09 cfs @	0.16 hrs,	Volume=	0.007 af,	Atten= 0%, Lag= 4.2 min
Primary =	0.09 cfs @	0.16 hrs,	Volume=	0.007 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 14.17' @ 0.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	14.00'	**8.0" Round Culvert** L= 155.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 14.00' / 13.22' S= 0.0050 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.09 cfs @ 0.16 hrs HW=14.17' TW=0.00' (Dynamic Tailwater)
↑**1=Culvert** (Barrel Controls 0.09 cfs @ 1.88 fps)

Pond 23P: Trench Drain



Summary for Pond 24P: Rainwater Harvest Tanks

[62] Hint: Exceeded Reach 13R OUTLET depth by 2.67' @ 0.99 hrs

```
Inflow Area =       1.190 ac,100.00% Impervious,  Inflow Depth >   0.85"    for  10-yr event
Inflow      =      1.06 cfs @     0.10 hrs,  Volume=           0.084 af
Outflow     =      0.00 cfs @     0.00 hrs,  Volume=           0.000 af,  Atten= 100%,  Lag= 0.0 min
Primary     =      0.00 cfs @     0.00 hrs,  Volume=           0.000 af
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 39.41' @ 1.00 hrs Surf.Area= 0.005 ac Storage= 0.084 af

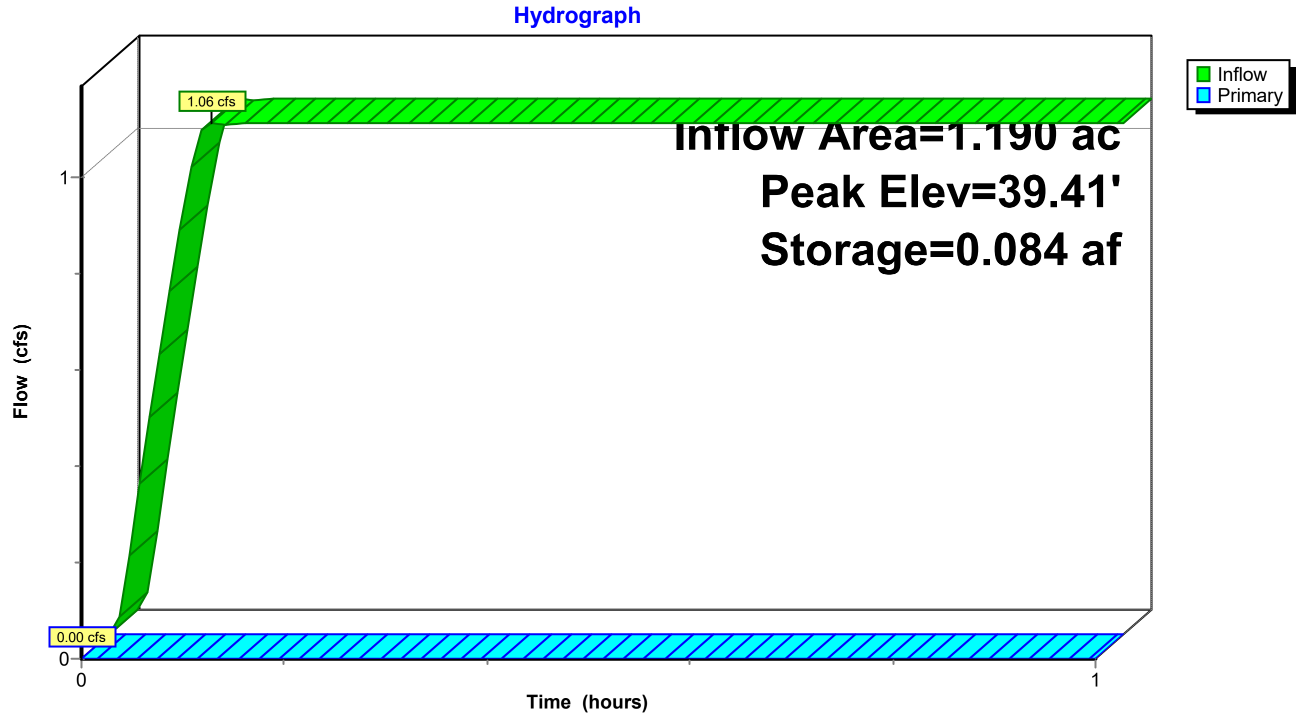
Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

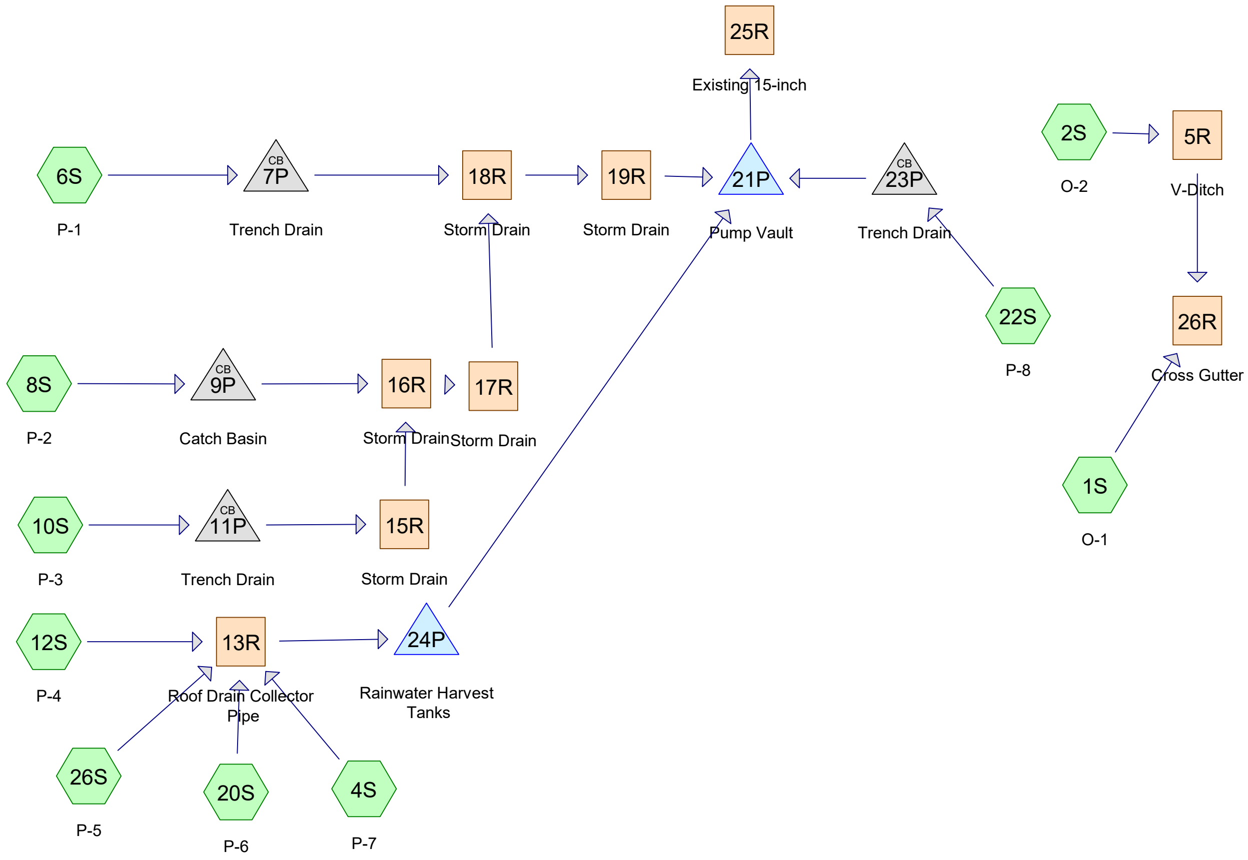
Volume	Invert	Avail.Storage	Storage Description
#1	23.33'	0.104 af	**12.00'D x 20.00'H Vertical Cone/Cylinder** x 2

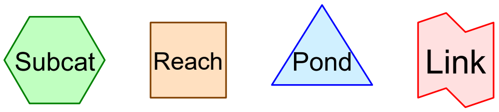
Device	Routing	Invert	Outlet Devices
#1	Primary	42.33'	**6.0" Vert. Overflow** C= 0.600

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=23.33' TW=-1.12' (Dynamic Tailwater)
└─**1=Overflow** (Controls 0.00 cfs)

Pond 24P: Rainwater Harvest Tanks







Routing Diagram for Dalbergia Street Proposed Conditions Rev4
Prepared by Paul J. Hacunda, PE, Printed 1/3/2018
HydroCAD® 10.00-20 s/n 04689 © 2017 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	C	Description (subcatchment-numbers)
0.530	0.35	(1S, 2S)
1.970	0.95	(4S, 6S, 8S, 10S, 12S, 20S, 22S, 26S)
2.500	**0.82**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
2.500	Other	1S, 2S, 4S, 6S, 8S, 10S, 12S, 20S, 22S, 26S
2.500		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	2.500	2.500		1S, 2S, 4S, 6S, 8S, 10S, 12S, 20S, 22S, 26S
0.000	**0.000**	**0.000**	**0.000**	**2.500**	**2.500**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	13R	53.33	36.33	195.0	0.0872	0.010	6.0	0.0	0.0
2	15R	18.13	18.00	25.0	0.0052	0.010	8.0	0.0	0.0
3	16R	18.00	17.00	98.0	0.0102	0.010	8.0	0.0	0.0
4	17R	17.00	4.00	1.0	13.0000	0.010	8.0	0.0	0.0
5	18R	4.00	3.90	12.0	0.0083	0.010	8.0	0.0	0.0
6	19R	4.40	3.75	125.0	0.0052	0.010	8.0	0.0	0.0
7	25R	17.46	11.00	520.0	0.0124	0.013	15.0	0.0	0.0
8	7P	4.50	3.85	125.0	0.0052	0.010	8.0	0.0	0.0
9	9P	18.00	16.00	100.0	0.0200	0.010	6.0	0.0	0.0
10	11P	22.00	18.13	25.0	0.1548	0.010	8.0	0.0	0.0
11	23P	14.00	13.22	155.0	0.0050	0.010	8.0	0.0	0.0

Time span=0.00-1.00 hrs, dt=0.01 hrs, 101 points x 3
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: O-1 Runoff Area=0.050 ac 0.00% Impervious Runoff Depth>0.44"
Flow Length=107' Tc=13.5 min C=0.35 Runoff=0.03 cfs 0.002 af

Subcatchment 2S: O-2 Runoff Area=0.480 ac 0.00% Impervious Runoff Depth>0.43"
Flow Length=583' Tc=17.1 min C=0.35 Runoff=0.24 cfs 0.017 af

Subcatchment 4S: P-7 Runoff Area=0.100 ac 100.00% Impervious Runoff Depth>1.30"
Flow Length=60' Slope=0.2500 '/' Tc=5.0 min C=0.95 Runoff=0.14 cfs 0.011 af

Subcatchment 6S: P-1 Runoff Area=0.210 ac 100.00% Impervious Runoff Depth>1.22"
Flow Length=240' Slope=0.0900 '/' Tc=12.0 min C=0.95 Runoff=0.29 cfs 0.021 af

Subcatchment 8S: P-2 Runoff Area=0.190 ac 100.00% Impervious Runoff Depth>1.16"
Flow Length=125' Slope=0.0100 '/' Tc=17.1 min C=0.95 Runoff=0.26 cfs 0.018 af

Subcatchment 10S: P-3 Runoff Area=0.280 ac 100.00% Impervious Runoff Depth>1.11"
Flow Length=300' Tc=22.1 min C=0.95 Runoff=0.38 cfs 0.026 af

Subcatchment 12S: P-4 Runoff Area=0.100 ac 100.00% Impervious Runoff Depth>1.30"
Flow Length=55' Slope=0.2500 '/' Tc=5.0 min C=0.95 Runoff=0.14 cfs 0.011 af

Subcatchment 20S: P-6 Runoff Area=0.340 ac 100.00% Impervious Runoff Depth>1.30"
Flow Length=60' Slope=0.2500 '/' Tc=5.0 min C=0.95 Runoff=0.46 cfs 0.037 af

Subcatchment 22S: P-8 Runoff Area=0.100 ac 100.00% Impervious Runoff Depth>1.30"
Flow Length=150' Tc=5.1 min C=0.95 Runoff=0.14 cfs 0.011 af

Subcatchment 26S: P-5 Runoff Area=0.650 ac 100.00% Impervious Runoff Depth>1.30"
Flow Length=90' Slope=0.2500 '/' Tc=5.0 min C=0.95 Runoff=0.88 cfs 0.070 af

Reach 5R: V-Ditch Avg. Flow Depth=0.07' Max Vel=1.09 fps Inflow=0.24 cfs 0.017 af
n=0.017 L=555.0' S=0.0054 '/' Capacity=5.03 cfs Outflow=0.24 cfs 0.014 af

Reach 13R: Roof Drain Collector Pipe Avg. Flow Depth=0.32' Max Vel=12.05 fps Inflow=1.62 cfs 0.129 af
6.0" Round Pipe n=0.010 L=195.0' S=0.0872 '/' Capacity=2.15 cfs Outflow=1.62 cfs 0.128 af

Reach 15R: Storm Drain Avg. Flow Depth=0.27' Max Vel=2.93 fps Inflow=0.38 cfs 0.026 af
8.0" Round Pipe n=0.010 L=25.0' S=0.0052 '/' Capacity=1.13 cfs Outflow=0.38 cfs 0.026 af

Reach 16R: Storm Drain Avg. Flow Depth=0.29' Max Vel=4.30 fps Inflow=0.64 cfs 0.044 af
8.0" Round Pipe n=0.010 L=98.0' S=0.0102 '/' Capacity=1.59 cfs Outflow=0.64 cfs 0.044 af

Reach 17R: Storm Drain Avg. Flow Depth=0.05' Max Vel=54.17 fps Inflow=0.64 cfs 0.044 af
8.0" Round Pipe n=0.010 L=1.0' S=13.0000 '/' Capacity=56.64 cfs Outflow=0.64 cfs 0.044 af

Reach 18R: Storm Drain Avg. Flow Depth=0.39' Max Vel=4.37 fps Inflow=0.93 cfs 0.065 af
8.0" Round Pipe n=0.010 L=12.0' S=0.0083 '/' Capacity=1.43 cfs Outflow=0.93 cfs 0.065 af

```
Reach 19R: Storm Drain                      Avg. Flow Depth=0.46'   Max Vel=3.62 fps   Inflow=0.93 cfs  0.065 af
                   8.0"  Round Pipe   n=0.010   L=125.0'   S=0.0052 '/'  Capacity=1.13 cfs   Outflow=0.92 cfs  0.064 af

Reach 25R: Existing 15-inch                 Avg. Flow Depth=0.44'   Max Vel=4.99 fps   Inflow=1.97 cfs  0.089 af
                  15.0"  Round Pipe   n=0.013   L=520.0'   S=0.0124 '/'  Capacity=7.20 cfs   Outflow=1.95 cfs  0.084 af

Reach 26R: Cross Gutter                     Avg. Flow Depth=0.09'   Max Vel=1.04 fps   Inflow=0.27 cfs  0.016 af
                                      n=0.013   L=100.0'   S=0.0050 '/'  Capacity=2.05 cfs   Outflow=0.27 cfs  0.016 af

Pond 7P: Trench Drain                                                 Peak Elev=4.86'   Inflow=0.29 cfs  0.021 af
                                 8.0"  Round Culvert  n=0.010  L=125.0'  S=0.0052 '/'   Outflow=0.29 cfs  0.021 af

Pond 9P: Catch Basin                                                 Peak Elev=18.50'   Inflow=0.26 cfs  0.018 af
                                 6.0"  Round Culvert  n=0.010  L=100.0'  S=0.0200 '/'   Outflow=0.26 cfs  0.018 af

Pond 11P: Trench Drain                                               Peak Elev=22.35'   Inflow=0.38 cfs  0.026 af
                                  8.0"  Round Culvert  n=0.010  L=25.0'  S=0.1548 '/'   Outflow=0.38 cfs  0.026 af

Pond 21P: Pump Vault                           Peak Elev=5.63'  Storage=0.013 af   Inflow=3.36 cfs  0.099 af
                                                                                       Outflow=1.97 cfs  0.086 af

Pond 23P: Trench Drain                                               Peak Elev=14.21'   Inflow=0.14 cfs  0.011 af
                                 8.0"  Round Culvert  n=0.010  L=155.0'  S=0.0050 '/'   Outflow=0.14 cfs  0.011 af

Pond 24P: Rainwater Harvest Tanks             Peak Elev=48.48'  Storage=0.104 af   Inflow=1.62 cfs  0.128 af
                                                                                       Outflow=2.30 cfs  0.024 af

                    Total Runoff Area = 2.500 ac   Runoff Volume = 0.224 af   Average Runoff Depth = 1.08"
                                               21.20% Pervious = 0.530 ac     78.80% Impervious = 1.970 ac
```

Summary for Subcatchment 1S: O-1

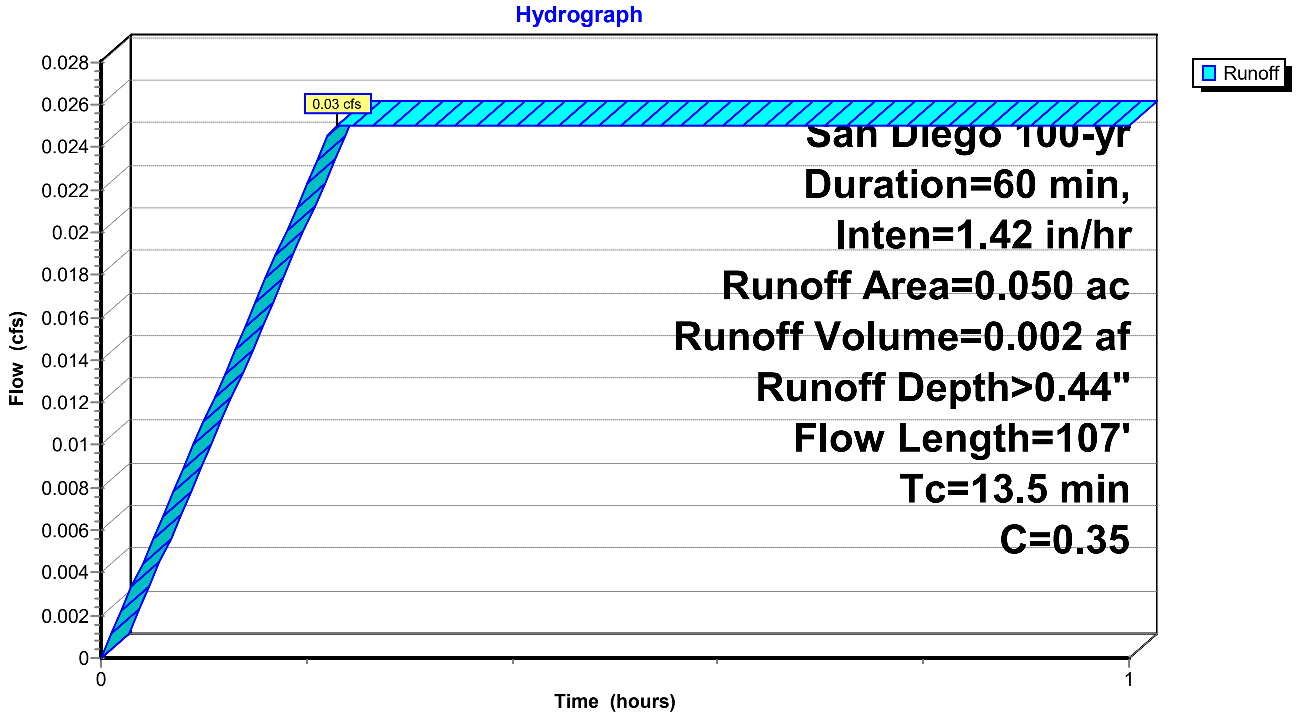
Runoff = 0.03 cfs @ 0.23 hrs, Volume= 0.002 af, Depth> 0.44"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs
San Diego 100-yr Duration=60 min, Inten=1.42 in/hr

Area (ac)	C	Description
0.050	0.35	
0.050		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	27	0.5000	0.04		**Sheet Flow, Caltrans Slope** Grass: Dense n= 0.240 P2= 0.04"
1.1	80	0.0050	1.24	0.10	**Trap/Vee/Rect Channel Flow, V-Ditch** Bot.W=0.00' D=0.20' Z= 2.0 '/' Top.W=0.80' n= 0.017 Concrete, unfinished
13.5	107	Total			

Subcatchment 1S: O-1



Summary for Subcatchment 2S: O-2

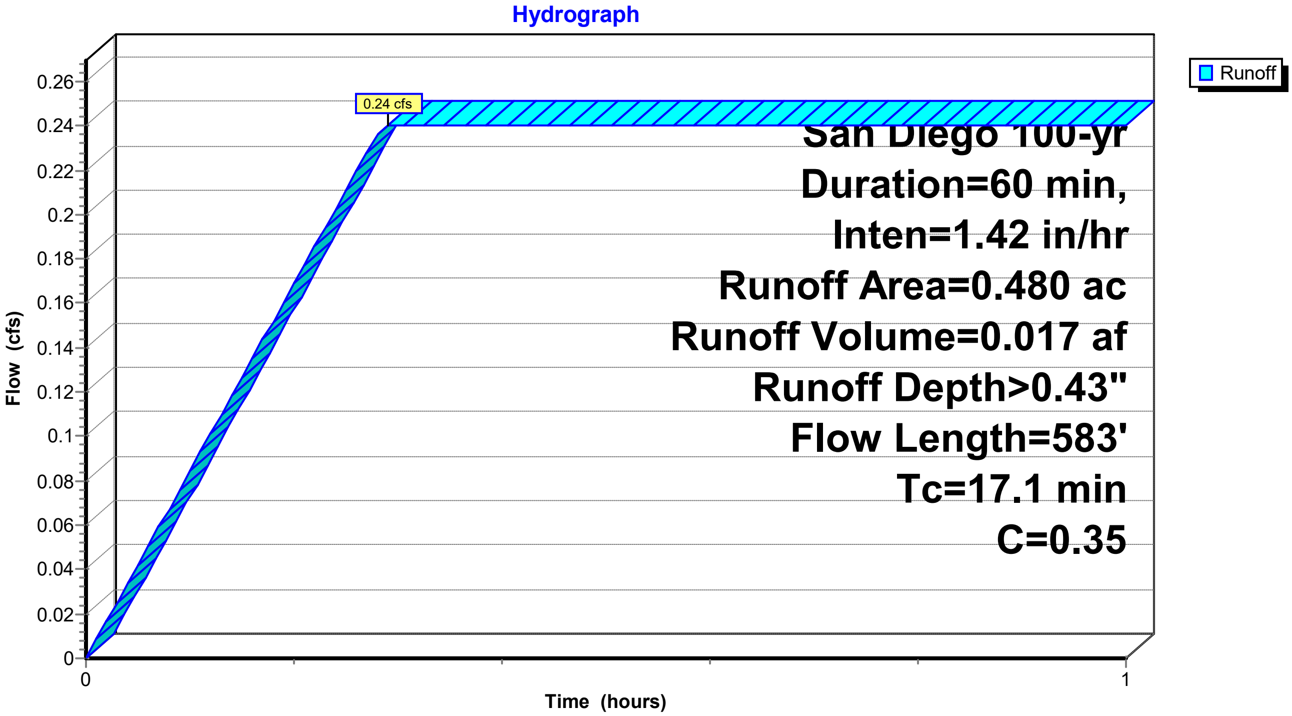
Runoff = 0.24 cfs @ 0.29 hrs, Volume= 0.017 af, Depth> 0.43"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs
San Diego 100-yr Duration=60 min, Inten=1.42 in/hr

Area (ac)	C	Description
0.480	0.35	
0.480		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	28	0.5000	0.04		**Sheet Flow, Caltrans R/W** Grass: Dense n= 0.240 P2= 0.04"
4.4	555	0.0050	2.12	0.38	**Trap/Vee/Rect Channel Flow, V-Ditch** Bot.W=0.00' D=0.30' Z= 2.0 '/' Top.W=1.20' n= 0.013 Concrete, trowel finish
17.1	583	Total			

Subcatchment 2S: O-2



Summary for Subcatchment 4S: P-7

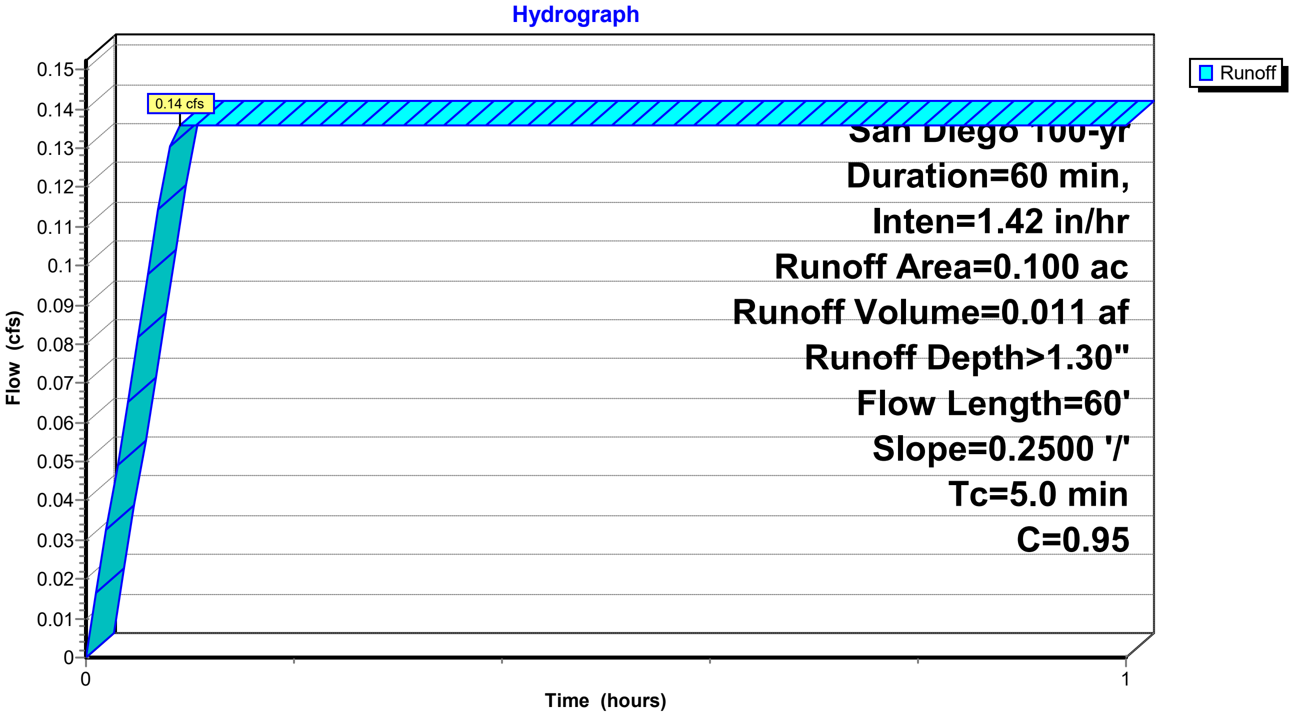
Runoff = 0.14 cfs @ 0.09 hrs, Volume= 0.011 af, Depth> 1.30"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs
San Diego 100-yr Duration=60 min, Inten=1.42 in/hr

Area (ac)	C	Description
0.100	0.95	
0.100		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.6	60	0.2500	0.38		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 0.04"
2.6	60	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 4S: P-7



Summary for Subcatchment 6S: P-1

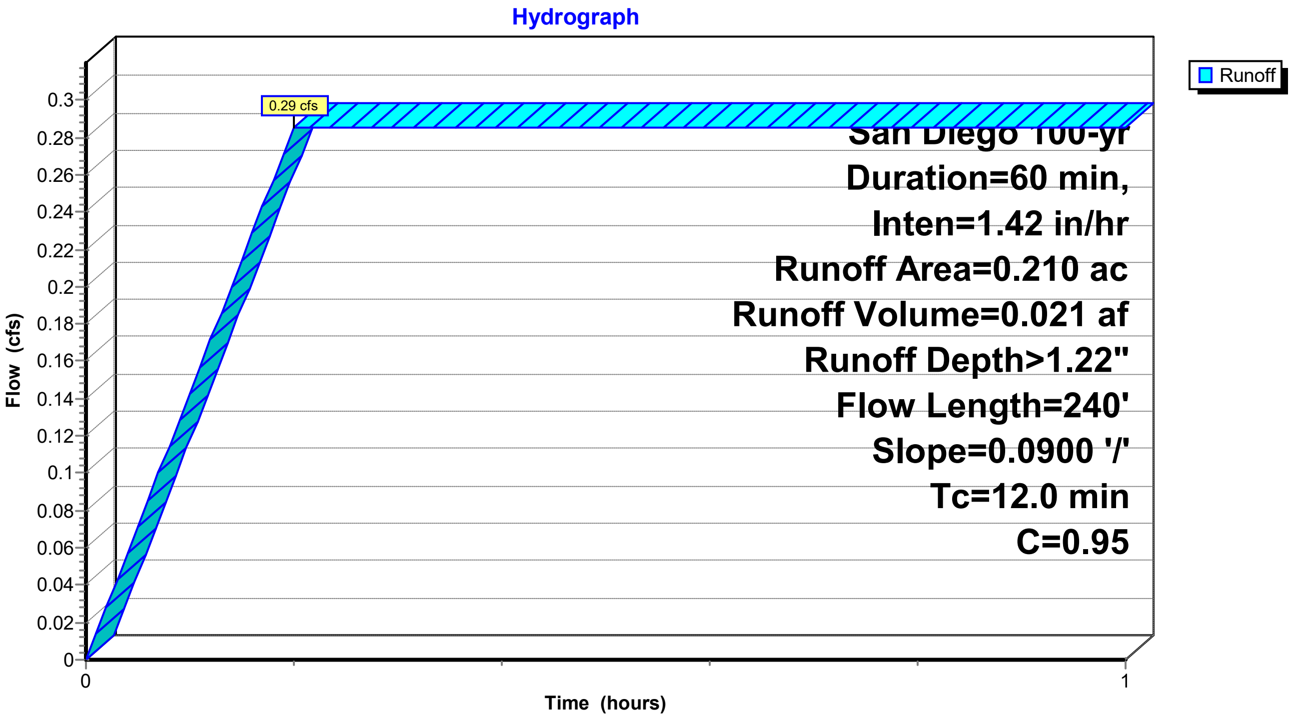
Runoff = 0.29 cfs @ 0.20 hrs, Volume= 0.021 af, Depth> 1.22"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs
San Diego 100-yr Duration=60 min, Inten=1.42 in/hr

Area (ac)	C	Description
0.210	0.95	
0.210		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0	240	0.0900	0.33		**Sheet Flow, Exit Ramp** Smooth surfaces n= 0.011 P2= 0.04"

Subcatchment 6S: P-1



Summary for Subcatchment 8S: P-2

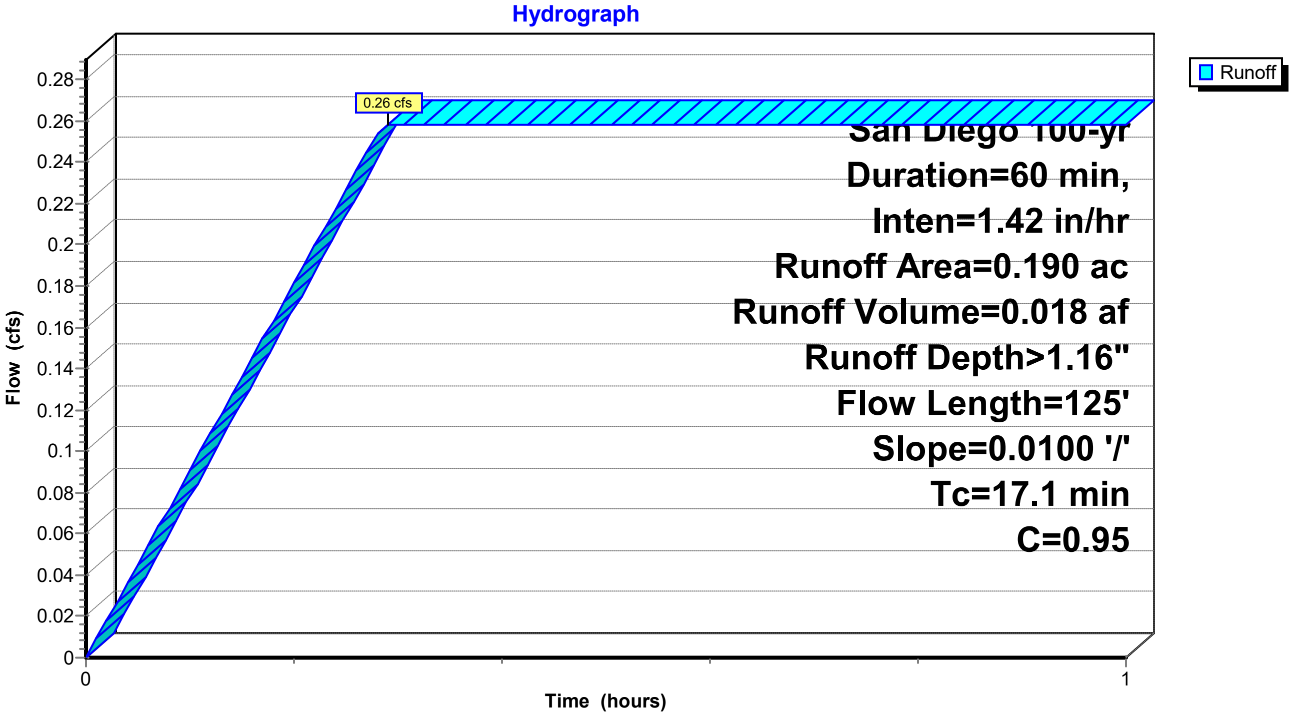
Runoff = 0.26 cfs @ 0.29 hrs, Volume= 0.018 af, Depth> 1.16"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs
San Diego 100-yr Duration=60 min, Inten=1.42 in/hr

Area (ac)	C	Description
0.190	0.95	
0.190		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.1	125	0.0100	0.12		**Sheet Flow, Exit Area** Smooth surfaces n= 0.011 P2= 0.04"

Subcatchment 8S: P-2



Summary for Subcatchment 10S: P-3

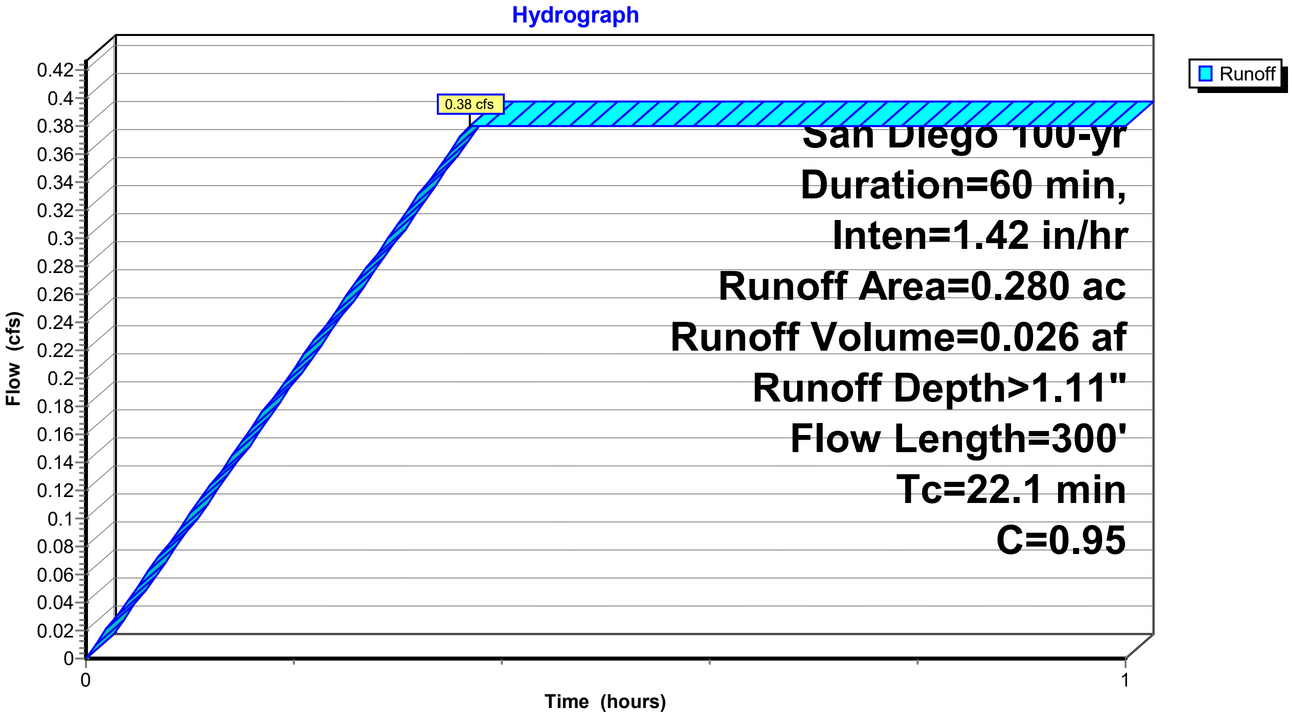
Runoff = 0.38 cfs @ 0.37 hrs, Volume= 0.026 af, Depth> 1.11"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs
San Diego 100-yr Duration=60 min, Inten=1.42 in/hr

Area (ac)	C	Description
0.280	0.95	
0.280		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.7	140	0.0100	0.12		**Sheet Flow, Pavement** Smooth surfaces n= 0.011 P2= 0.04"
3.4	160	0.0060	0.77		**Shallow Concentrated Flow, Landscape Area** Nearly Bare & Untilled Kv= 10.0 fps
22.1	300	Total			

Subcatchment 10S: P-3



Summary for Subcatchment 12S: P-4

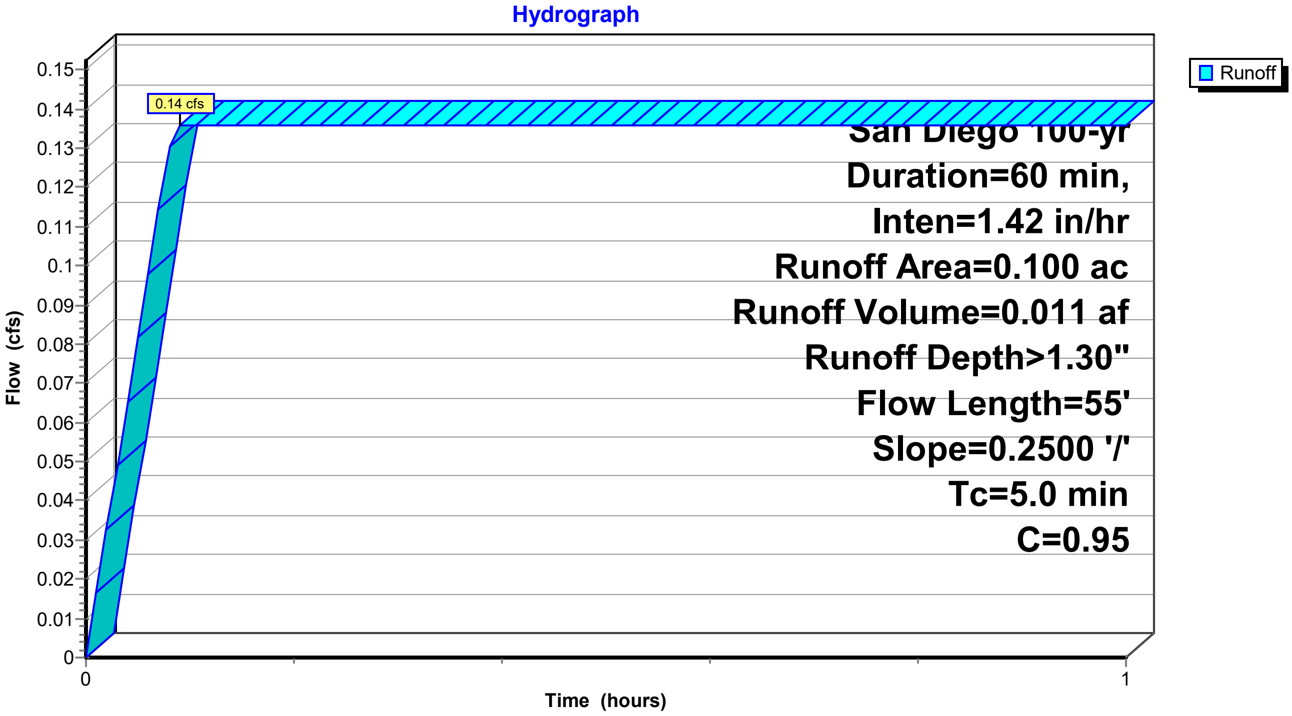
Runoff = 0.14 cfs @ 0.09 hrs, Volume= 0.011 af, Depth> 1.30"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs
San Diego 100-yr Duration=60 min, Inten=1.42 in/hr

Area (ac)	C	Description
0.100	0.95	
0.100		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	55	0.2500	0.37		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 0.04"
2.4	55	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 12S: P-4



Summary for Subcatchment 20S: P-6

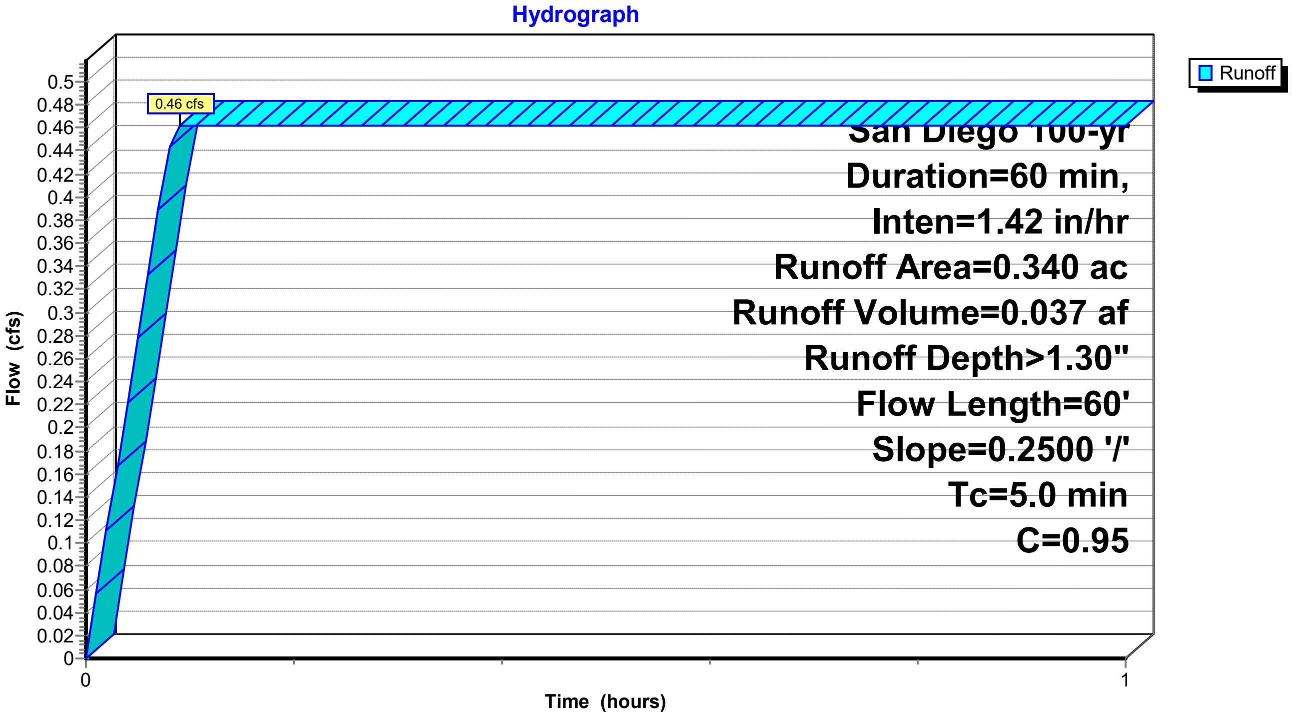
Runoff = 0.46 cfs @ 0.09 hrs, Volume= 0.037 af, Depth> 1.30"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs
San Diego 100-yr Duration=60 min, Inten=1.42 in/hr

Area (ac)	C	Description
0.340	0.95	
0.340		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.6	60	0.2500	0.38		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 0.04"
2.6	60	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 20S: P-6



Summary for Subcatchment 22S: P-8

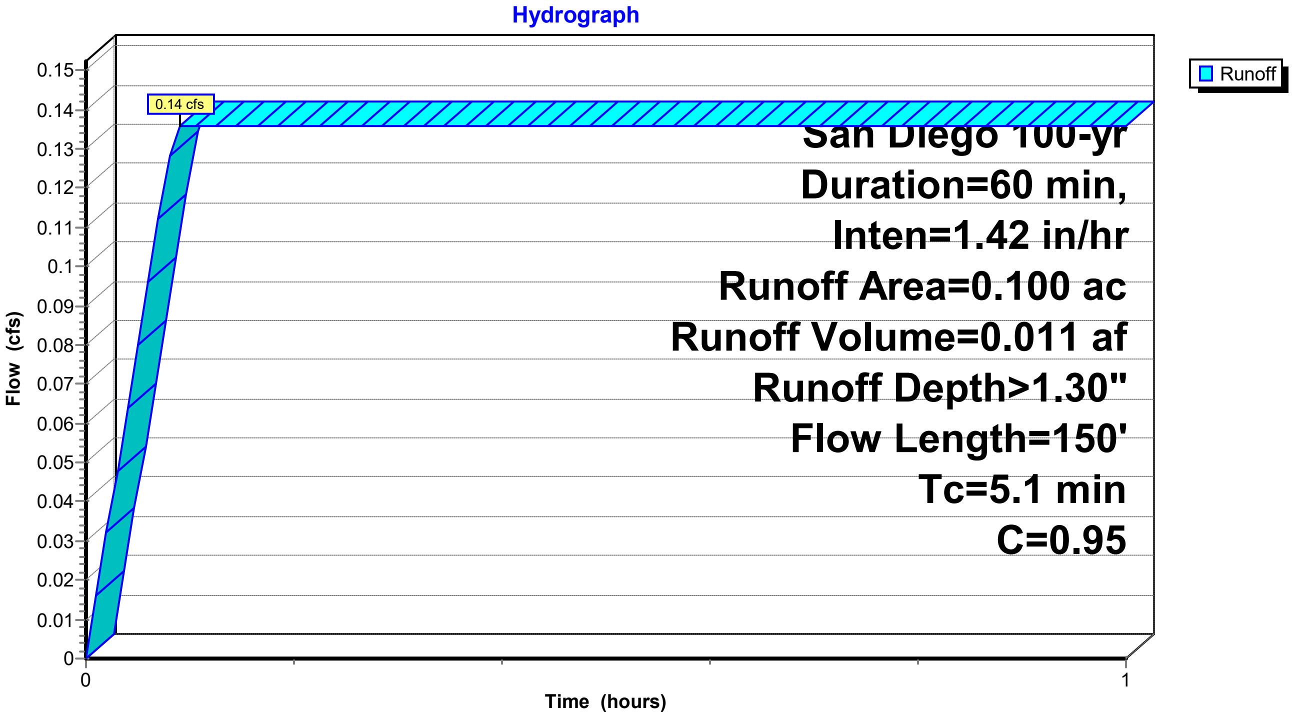
Runoff = 0.14 cfs @ 0.09 hrs, Volume= 0.011 af, Depth> 1.30"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs
San Diego 100-yr Duration=60 min, Inten=1.42 in/hr

Area (ac)	C	Description
0.100	0.95	
0.100		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	70	0.0050	1.44		**Shallow Concentrated Flow, Curb and Gutter** Paved Kv= 20.3 fps
4.3	80	0.1300	0.31		**Sheet Flow, Entrance Ramp** Smooth surfaces n= 0.011 P2= 0.04"
5.1	150	Total			

Subcatchment 22S: P-8



Summary for Subcatchment 26S: P-5

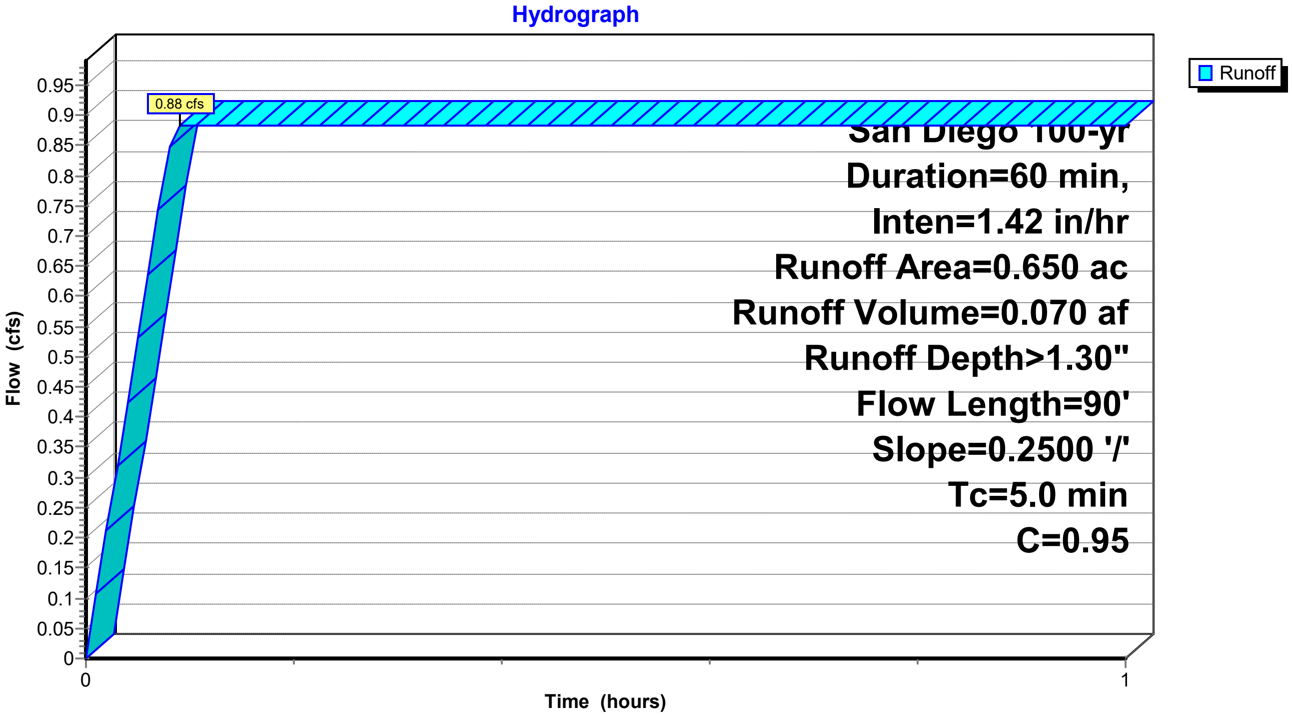
Runoff = 0.88 cfs @ 0.09 hrs, Volume= 0.070 af, Depth> 1.30"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs
San Diego 100-yr Duration=60 min, Inten=1.42 in/hr

Area (ac)	C	Description
0.650	0.95	
0.650		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.6	90	0.2500	0.41		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 0.04"
3.6	90	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 26S: P-5



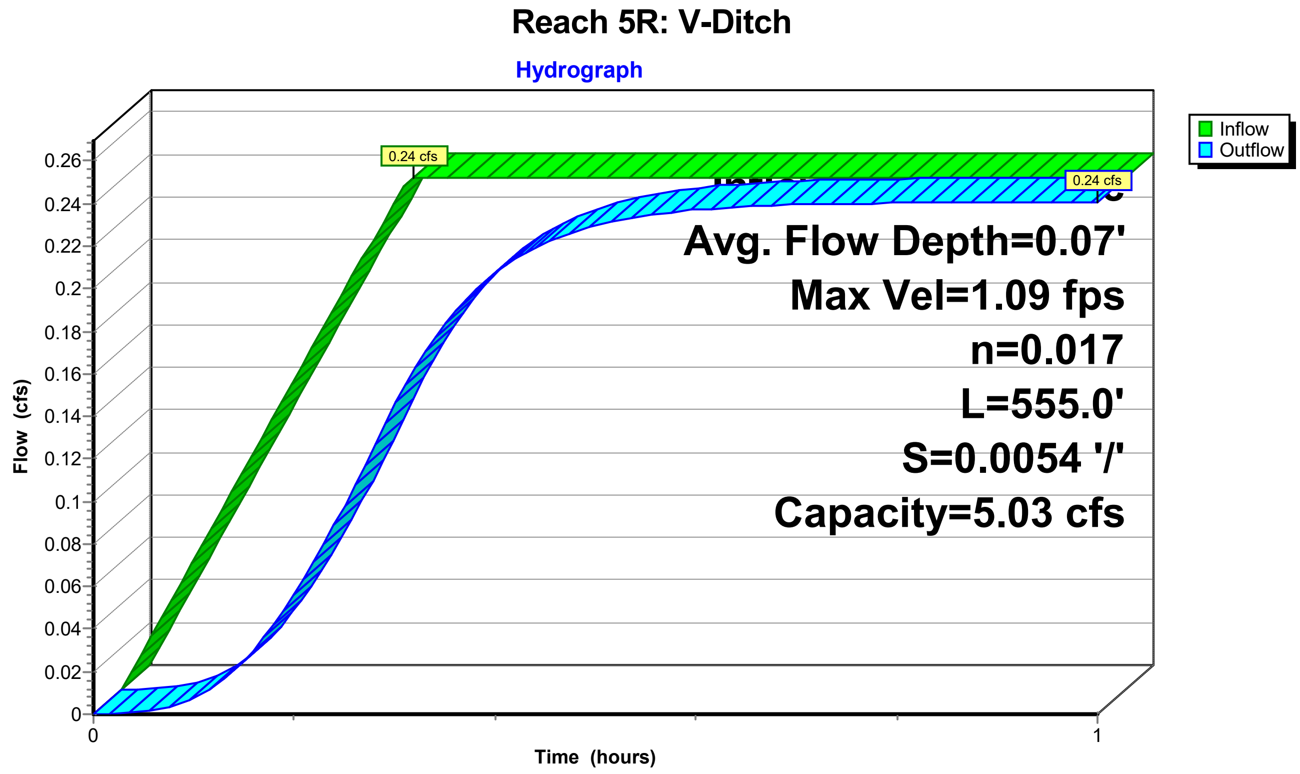
Summary for Reach 5R: V-Ditch

Inflow Area = 0.480 ac, 0.00% Impervious, Inflow Depth > 0.43" for 100-yr event
Inflow = 0.24 cfs @ 0.29 hrs, Volume= 0.017 af
Outflow = 0.24 cfs @ 1.00 hrs, Volume= 0.014 af, Atten= 0%, Lag= 42.6 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 1.09 fps, Min. Travel Time= 8.5 min
Avg. Velocity = 0.90 fps, Avg. Travel Time= 10.3 min

Peak Storage= 122 cf @ 1.00 hrs
Average Depth at Peak Storage= 0.07'
Bank-Full Depth= 0.50' Flow Area= 1.5 sf, Capacity= 5.03 cfs

3.00' x 0.50' deep channel, n= 0.017 Concrete, unfinished
Length= 555.0' Slope= 0.0054 '/'
Inlet Invert= 26.34', Outlet Invert= 23.32'



Summary for Reach 13R: Roof Drain Collector Pipe

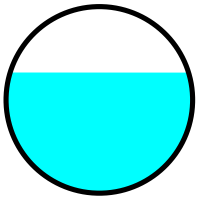
[52] Hint: Inlet/Outlet conditions not evaluated
[90] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 1.190 ac,100.00% Impervious, Inflow Depth > 1.30" for 100-yr event
Inflow = 1.62 cfs @ 0.09 hrs, Volume= 0.129 af
Outflow = 1.62 cfs @ 0.10 hrs, Volume= 0.128 af, Atten= 0%, Lag= 0.6 min

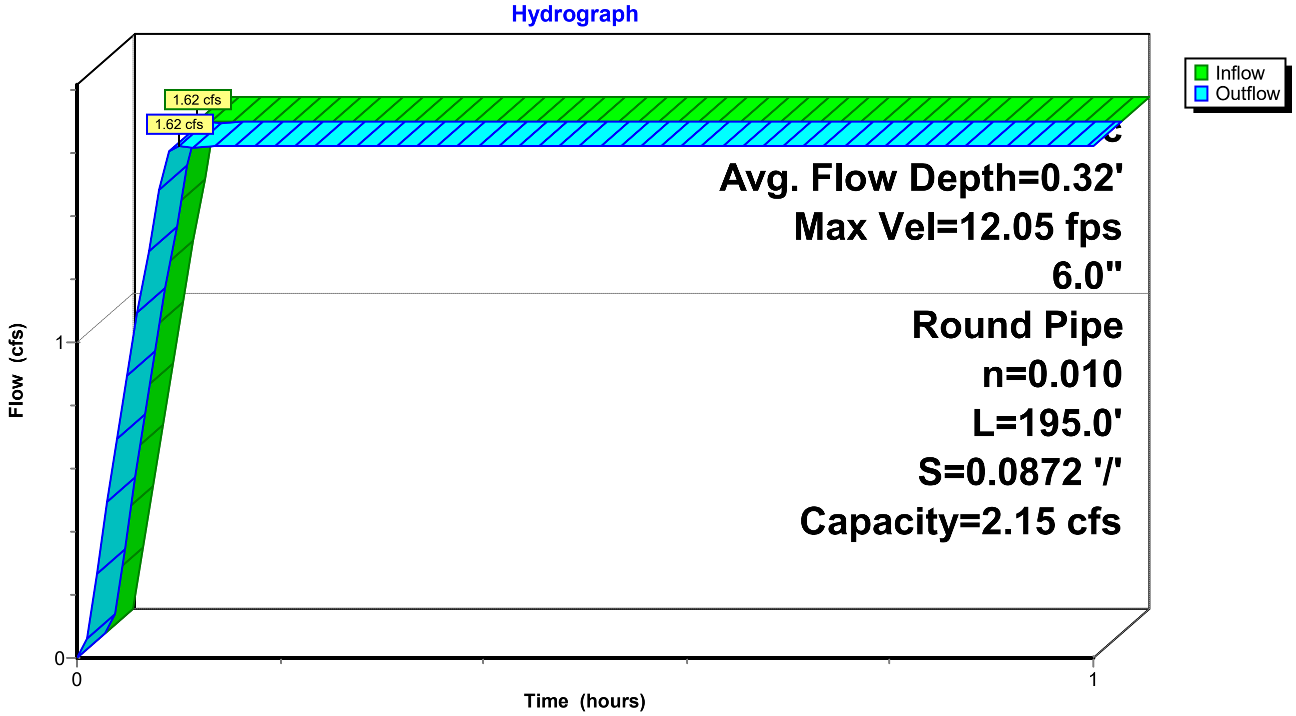
Routing by Dyn-Stor-Ind method, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 12.05 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 11.84 fps, Avg. Travel Time= 0.3 min

Peak Storage= 26 cf @ 0.10 hrs
Average Depth at Peak Storage= 0.32'
Bank-Full Depth= 0.50' Flow Area= 0.2 sf, Capacity= 2.15 cfs

6.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 195.0' Slope= 0.0872 '/'
Inlet Invert= 53.33', Outlet Invert= 36.33'



Reach 13R: Roof Drain Collector Pipe



Summary for Reach 15R: Storm Drain

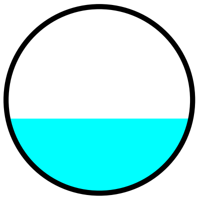
[52] Hint: Inlet/Outlet conditions not evaluated

```
Inflow Area =         0.280 ac,100.00% Impervious,  Inflow Depth >   1.11"    for  100-yr event
Inflow       =        0.38 cfs @     0.37 hrs,  Volume=             0.026 af
Outflow      =        0.38 cfs @     0.38 hrs,  Volume=             0.026 af,  Atten= 0%,  Lag= 0.6 min
```

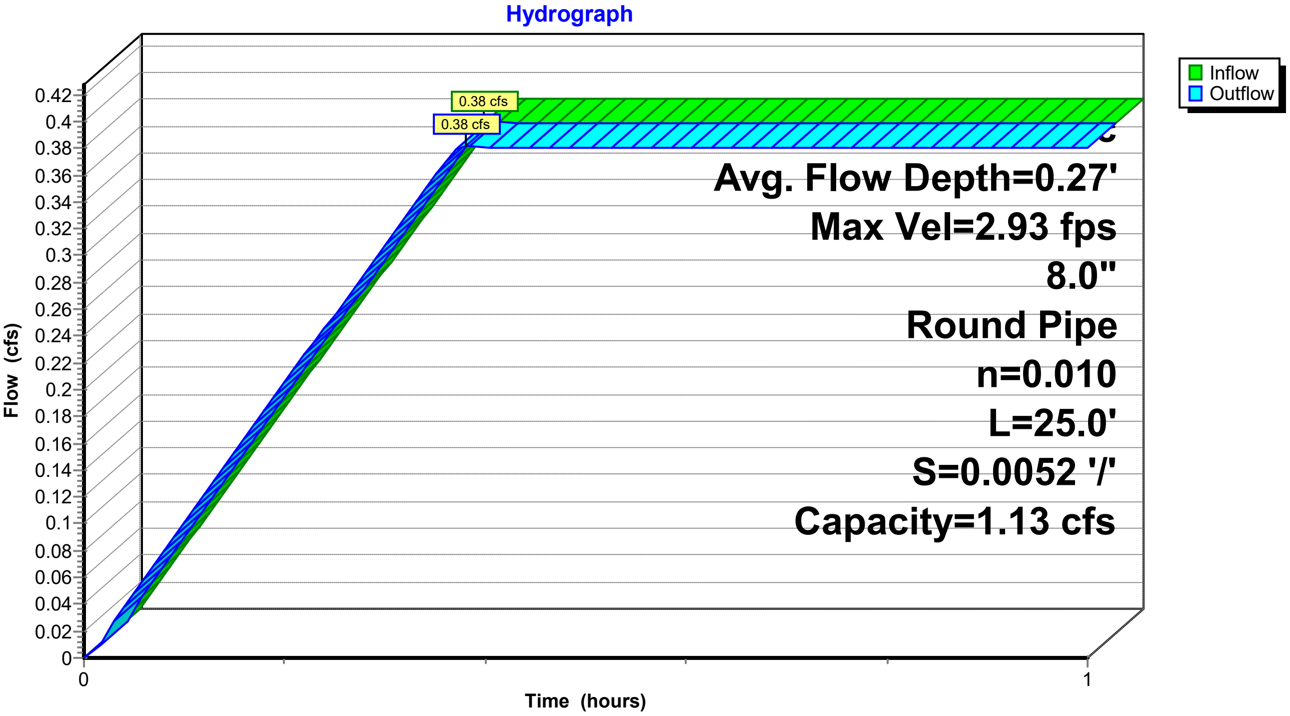
Routing by Dyn-Stor-Ind method, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 2.93 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.69 fps, Avg. Travel Time= 0.2 min

Peak Storage= 3 cf @ 0.38 hrs
Average Depth at Peak Storage= 0.27'
Bank-Full Depth= 0.67' Flow Area= 0.3 sf, Capacity= 1.13 cfs

8.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 25.0' Slope= 0.0052 '/'
Inlet Invert= 18.13', Outlet Invert= 18.00'



Reach 15R: Storm Drain



Summary for Reach 16R: Storm Drain

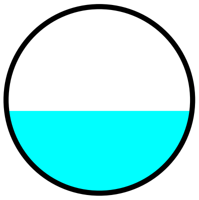
```
[52] Hint: Inlet/Outlet conditions not evaluated
[62] Hint: Exceeded Reach 15R OUTLET depth by 0.04' @ 0.29 hrs

Inflow Area =         0.470 ac,100.00% Impervious,  Inflow Depth >   1.13"    for  100-yr event
Inflow      =        0.64 cfs @     0.38 hrs,  Volume=            0.044 af
Outflow     =        0.64 cfs @     0.39 hrs,  Volume=            0.044 af,  Atten= 0%,  Lag= 0.6 min

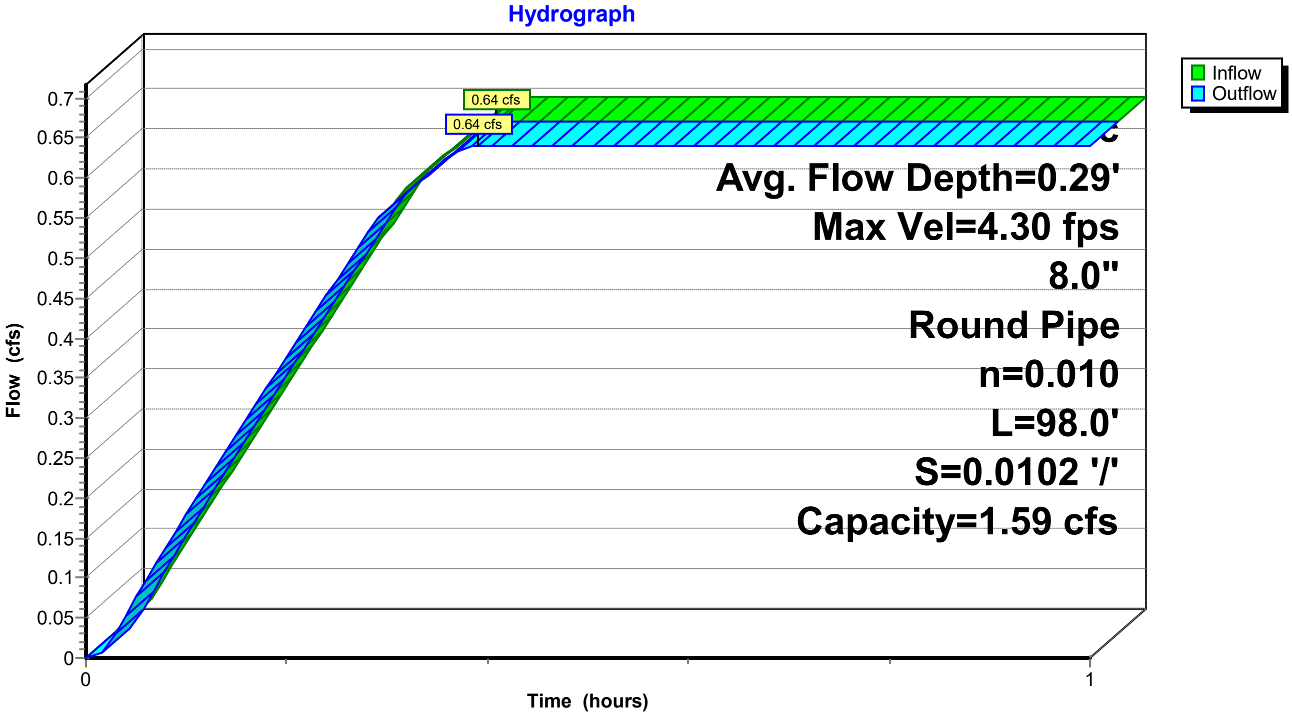
Routing by Dyn-Stor-Ind method, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 4.30 fps,  Min. Travel Time= 0.4 min
Avg. Velocity = 3.97 fps,  Avg. Travel Time= 0.4 min

Peak Storage= 15 cf @ 0.39 hrs
Average Depth at Peak Storage= 0.29'
Bank-Full Depth= 0.67'  Flow Area= 0.3 sf,  Capacity= 1.59 cfs

8.0"  Round Pipe
n= 0.010  PVC, smooth interior
Length= 98.0'   Slope= 0.0102 '/'
Inlet Invert= 18.00',  Outlet Invert= 17.00'
```



Reach 16R: Storm Drain



Summary for Reach 17R: Storm Drain

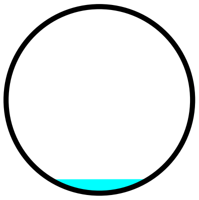
```
[52] Hint: Inlet/Outlet conditions not evaluated
[61] Hint: Exceeded Reach 16R outlet invert by 0.05' @ 0.39 hrs

Inflow Area =       0.470 ac,100.00% Impervious,  Inflow Depth >   1.12"    for  100-yr event
Inflow      =      0.64 cfs @    0.39 hrs,  Volume=          0.044 af
Outflow     =      0.64 cfs @    0.39 hrs,  Volume=          0.044 af,  Atten= 0%,  Lag= 0.0 min

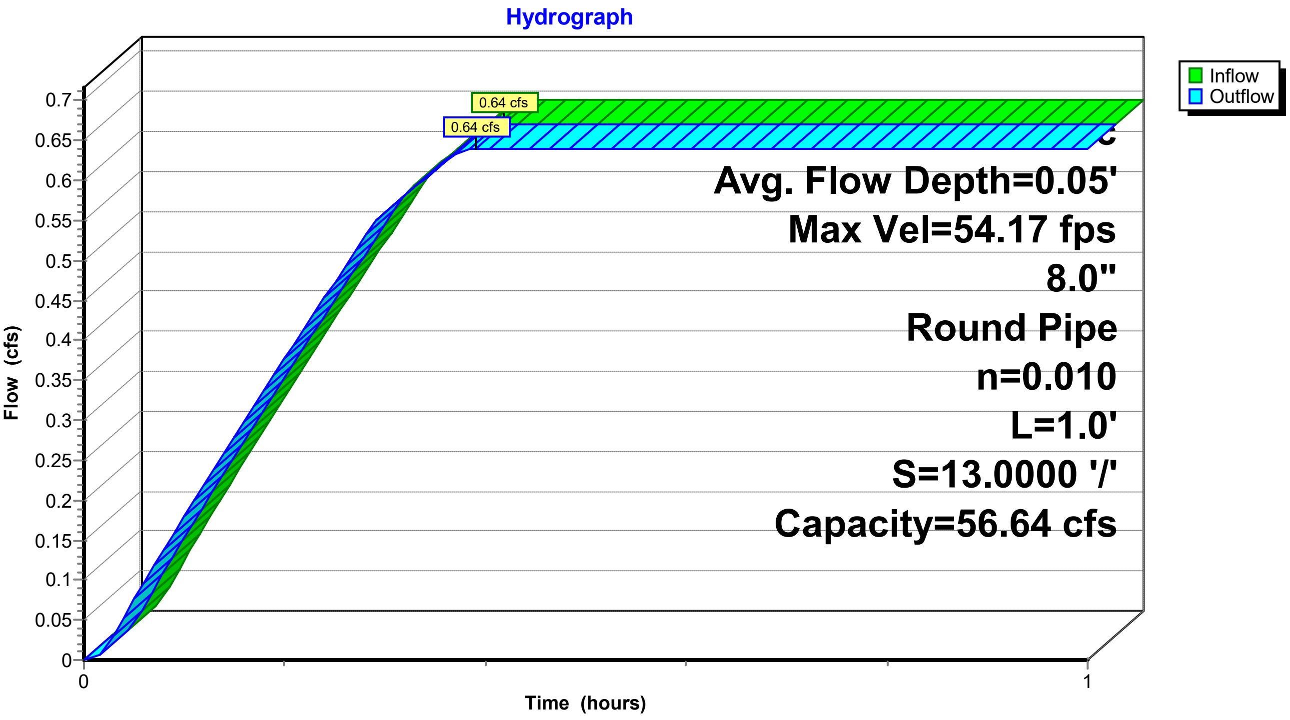
Routing by Dyn-Stor-Ind method, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 54.17 fps,  Min. Travel Time= 0.0 min
Avg. Velocity = 49.81 fps,  Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.39 hrs
Average Depth at Peak Storage= 0.05'
Bank-Full Depth= 0.67'  Flow Area= 0.3 sf,  Capacity= 56.64 cfs

8.0"  Round Pipe
n= 0.010  PVC, smooth interior
Length= 1.0'   Slope= 13.0000 '/'
Inlet Invert= 17.00',  Outlet Invert= 4.00'
```



Reach 17R: Storm Drain



Summary for Reach 18R: Storm Drain

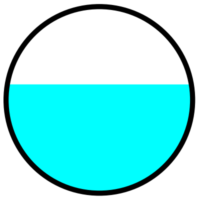
[52] Hint: Inlet/Outlet conditions not evaluated
[62] Hint: Exceeded Reach 17R OUTLET depth by 0.34' @ 0.39 hrs

```
Inflow Area =       0.680 ac,100.00% Impervious,  Inflow Depth >   1.15"    for  100-yr event
Inflow      =        0.93 cfs @    0.39 hrs,  Volume=          0.065 af
Outflow     =        0.93 cfs @    0.39 hrs,  Volume=          0.065 af,  Atten= 0%,  Lag= 0.0 min
```

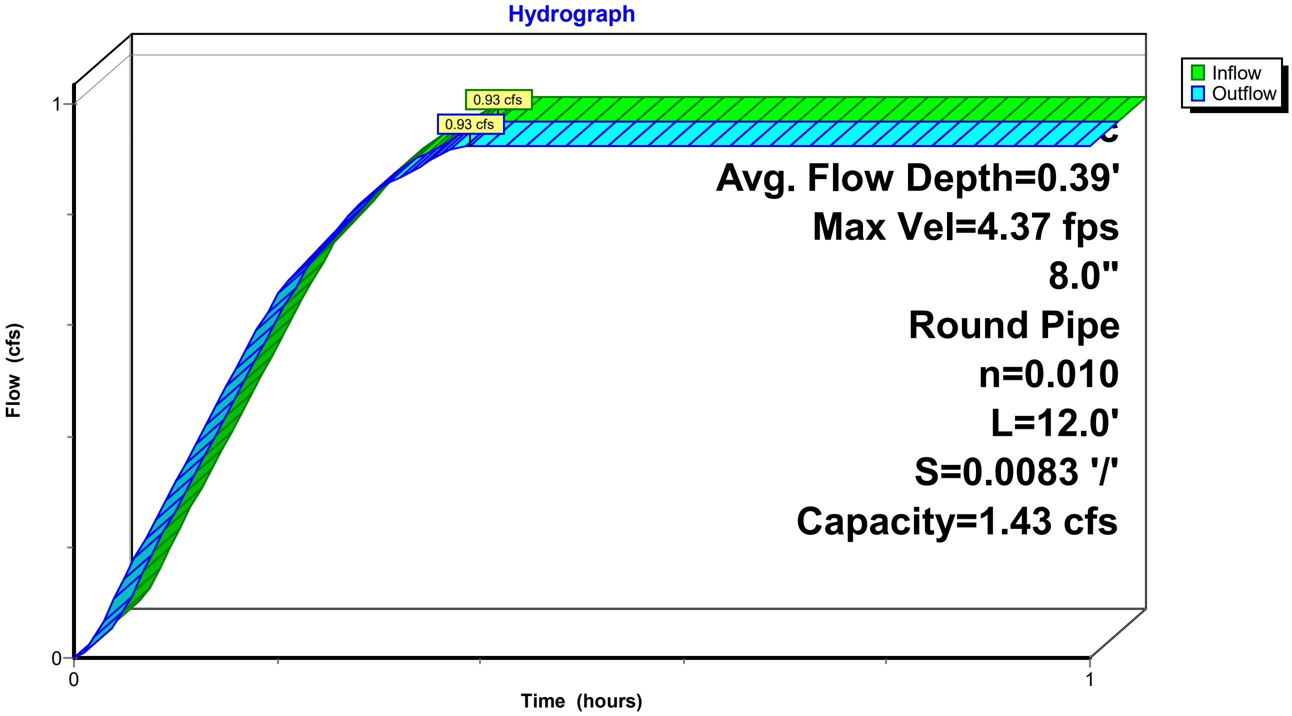
Routing by Dyn-Stor-Ind method, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 4.37 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 4.10 fps, Avg. Travel Time= 0.0 min

Peak Storage= 3 cf @ 0.39 hrs
Average Depth at Peak Storage= 0.39'
Bank-Full Depth= 0.67' Flow Area= 0.3 sf, Capacity= 1.43 cfs

8.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 12.0' Slope= 0.0083 '/'
Inlet Invert= 4.00', Outlet Invert= 3.90'



Reach 18R: Storm Drain



Summary for Reach 19R: Storm Drain

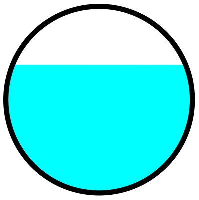
[52] Hint: Inlet/Outlet conditions not evaluated
[63] Warning: Exceeded Reach 18R INLET depth by 0.47' @ 0.42 hrs

```
Inflow Area =         0.680 ac,100.00% Impervious,  Inflow Depth >   1.15"    for  100-yr event
Inflow      =        0.93 cfs @     0.39 hrs,  Volume=            0.065 af
Outflow     =        0.92 cfs @     0.44 hrs,  Volume=            0.064 af,  Atten= 0%,  Lag= 3.2 min
```

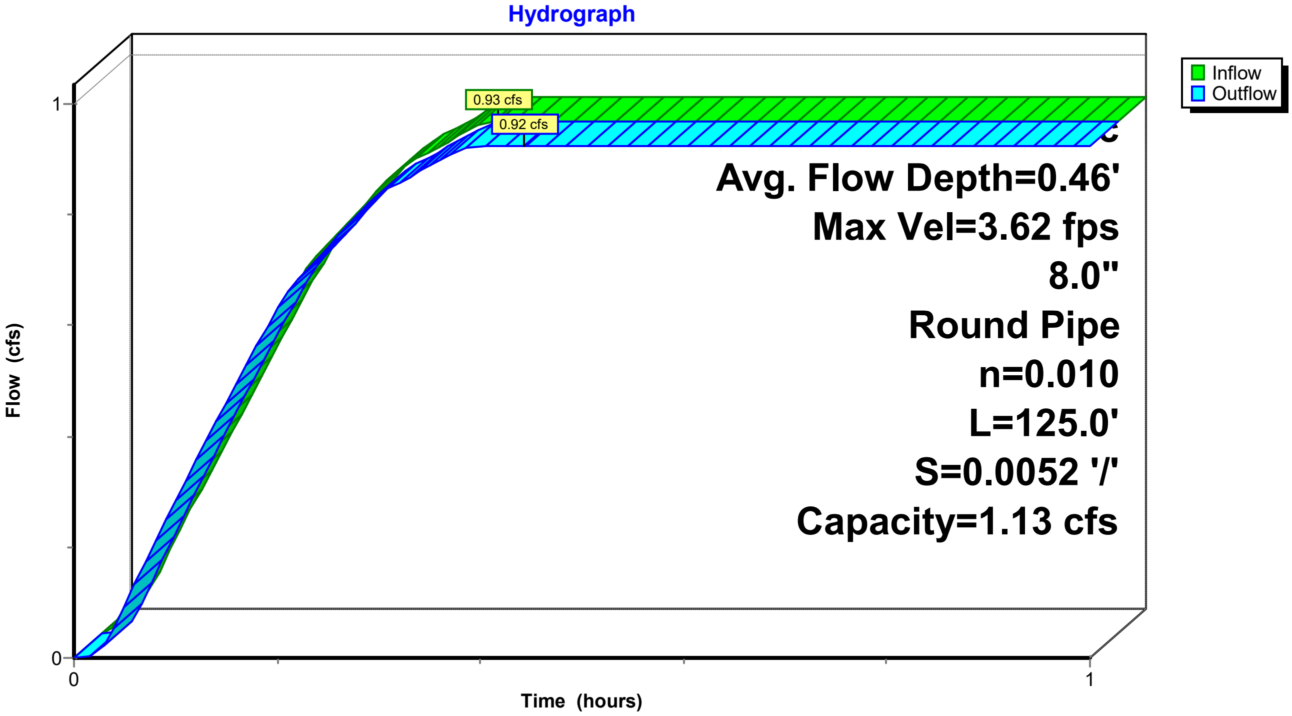
Routing by Dyn-Stor-Ind method, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 3.62 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 3.37 fps, Avg. Travel Time= 0.6 min

Peak Storage= 32 cf @ 0.44 hrs
Average Depth at Peak Storage= 0.46'
Bank-Full Depth= 0.67' Flow Area= 0.3 sf, Capacity= 1.13 cfs

8.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 125.0' Slope= 0.0052 '/'
Inlet Invert= 4.40', Outlet Invert= 3.75'



Reach 19R: Storm Drain



Summary for Reach 25R: Existing 15-inch

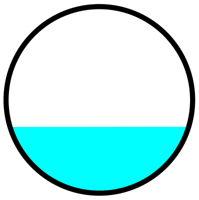
[52] Hint: Inlet/Outlet conditions not evaluated

```
Inflow Area =      1.970 ac,100.00% Impervious,  Inflow Depth >   0.54"    for  100-yr event
Inflow      =      1.97 cfs @    1.00 hrs,  Volume=          0.089 af
Outflow     =      1.95 cfs @    1.00 hrs,  Volume=          0.084 af,  Atten= 1%,  Lag= 0.0 min
```

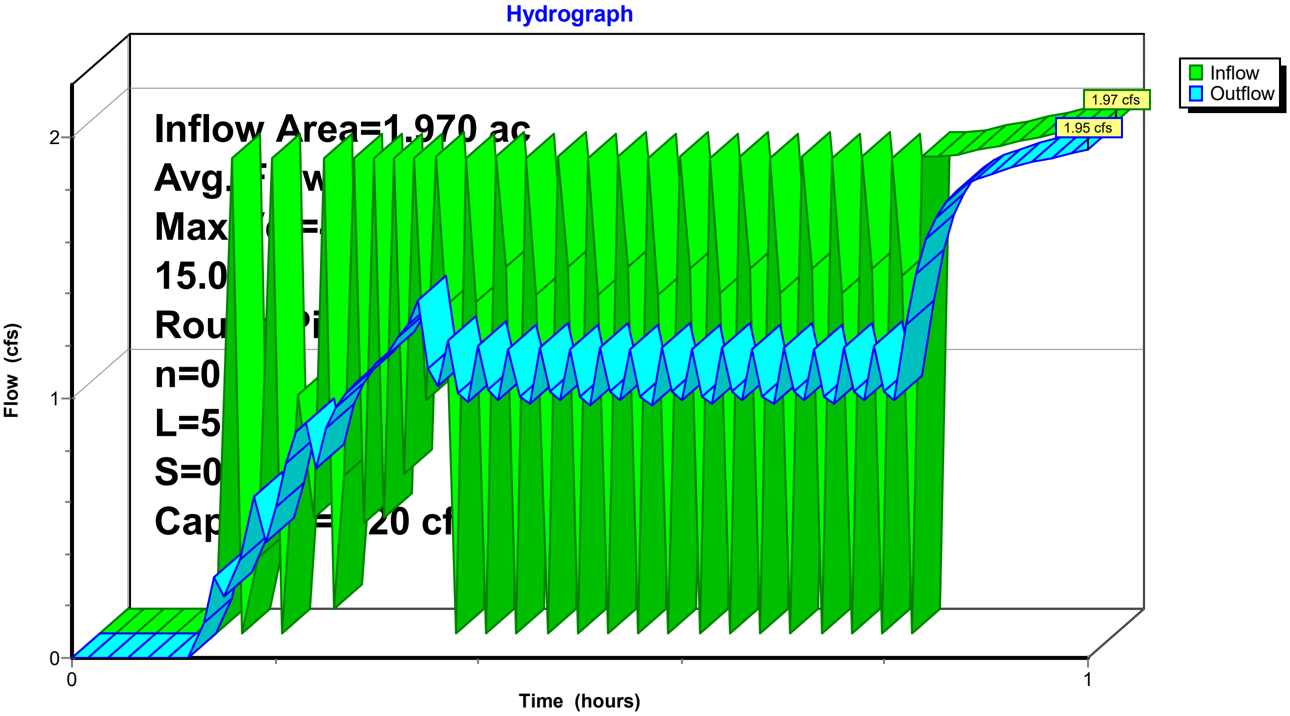
Routing by Dyn-Stor-Ind method, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 4.99 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 4.23 fps, Avg. Travel Time= 2.0 min

Peak Storage= 203 cf @ 1.00 hrs
Average Depth at Peak Storage= 0.44'
Bank-Full Depth= 1.25' Flow Area= 1.2 sf, Capacity= 7.20 cfs

15.0" Round Pipe
n= 0.013 Concrete pipe, bends & connections
Length= 520.0' Slope= 0.0124 '/'
Inlet Invert= 17.46', Outlet Invert= 11.00'



Reach 25R: Existing 15-inch



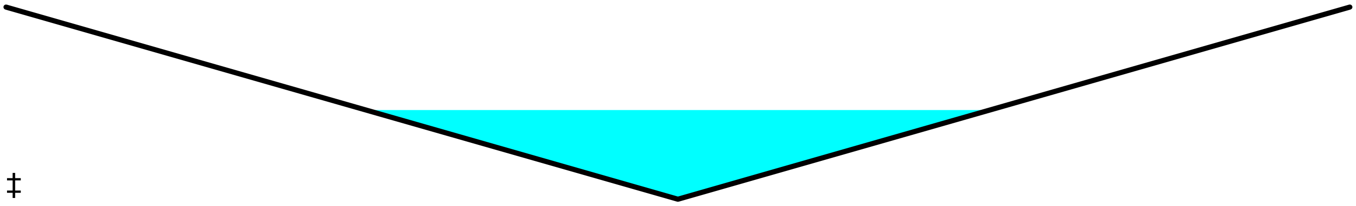
Summary for Reach 26R: Cross Gutter

Inflow Area = 0.530 ac, 0.00% Impervious, Inflow Depth > 0.37" for 100-yr event
Inflow = 0.27 cfs @ 1.00 hrs, Volume= 0.016 af
Outflow = 0.27 cfs @ 1.00 hrs, Volume= 0.016 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs / 3
Max. Velocity= 1.04 fps, Min. Travel Time= 1.6 min
Avg. Velocity = 0.89 fps, Avg. Travel Time= 1.9 min

Peak Storage= 25 cf @ 1.00 hrs
Average Depth at Peak Storage= 0.09'
Bank-Full Depth= 0.20' Flow Area= 1.2 sf, Capacity= 2.05 cfs

0.00' x 0.20' deep channel, n= 0.013
Side Slope Z-value= 29.4 '/' Top Width= 11.76'
Length= 100.0' Slope= 0.0050 '/'
Inlet Invert= 21.60', Outlet Invert= 21.10'



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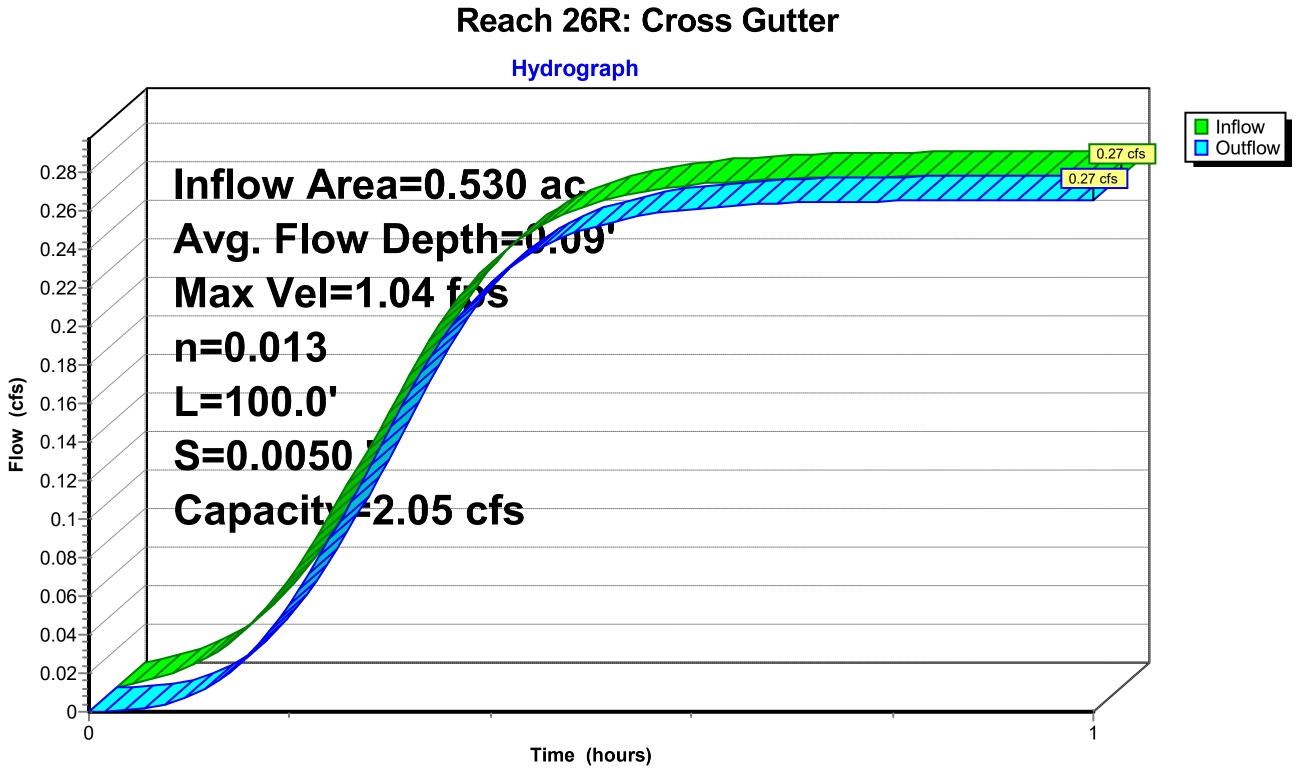


Summary for Pond 7P: Trench Drain

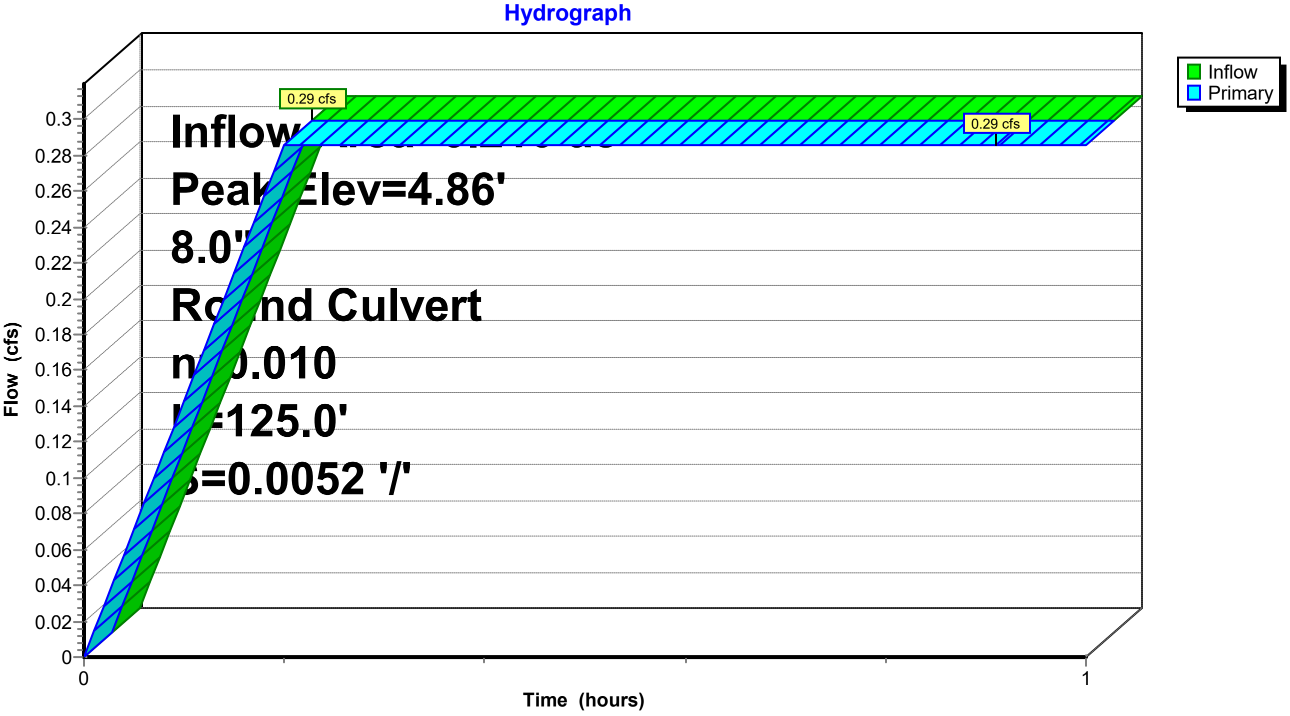
```
Inflow Area =      0.210 ac,100.00% Impervious,  Inflow Depth >   1.22"    for  100-yr event
Inflow      =     0.29 cfs @    0.20 hrs,  Volume=          0.021 af
Outflow     =     0.29 cfs @    0.91 hrs,  Volume=          0.021 af,  Atten= 0%,  Lag= 42.6 min
Primary     =     0.29 cfs @    0.91 hrs,  Volume=          0.021 af
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 4.86' @ 0.39 hrs
Flood Elev= 6.75'

Device	Routing	Invert	Outlet Devices
#1	Primary	4.50'	**8.0" Round Culvert** L= 125.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 4.50' / 3.85' S= 0.0052 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.29 cfs @ 0.91 hrs HW=4.86' TW=4.39' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 0.29 cfs @ 2.17 fps)

Pond 7P: Trench Drain



Summary for Pond 9P: Catch Basin

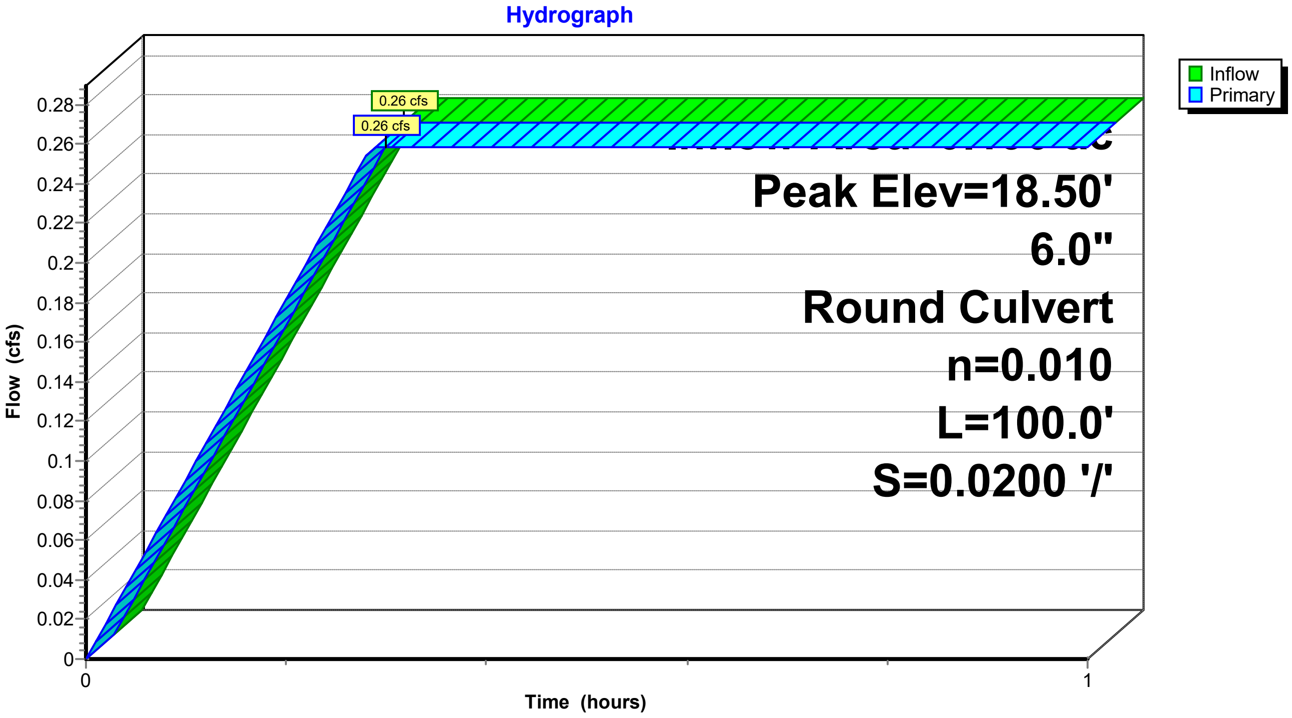
Inflow Area = 0.190 ac,100.00% Impervious, Inflow Depth > 1.16" for 100-yr event
Inflow = 0.26 cfs @ 0.29 hrs, Volume= 0.018 af
Outflow = 0.26 cfs @ 0.30 hrs, Volume= 0.018 af, Atten= 0%, Lag= 0.6 min
Primary = 0.26 cfs @ 0.30 hrs, Volume= 0.018 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 18.50' @ 0.39 hrs
Flood Elev= 23.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	18.00'	**6.0" Round Culvert** L= 100.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 18.00' / 16.00' S= 0.0200 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=0.26 cfs @ 0.30 hrs HW=18.49' TW=18.27' (Dynamic Tailwater)
↰**1=Culvert** (Outlet Controls 0.26 cfs @ 1.66 fps)

Pond 9P: Catch Basin



Summary for Pond 11P: Trench Drain

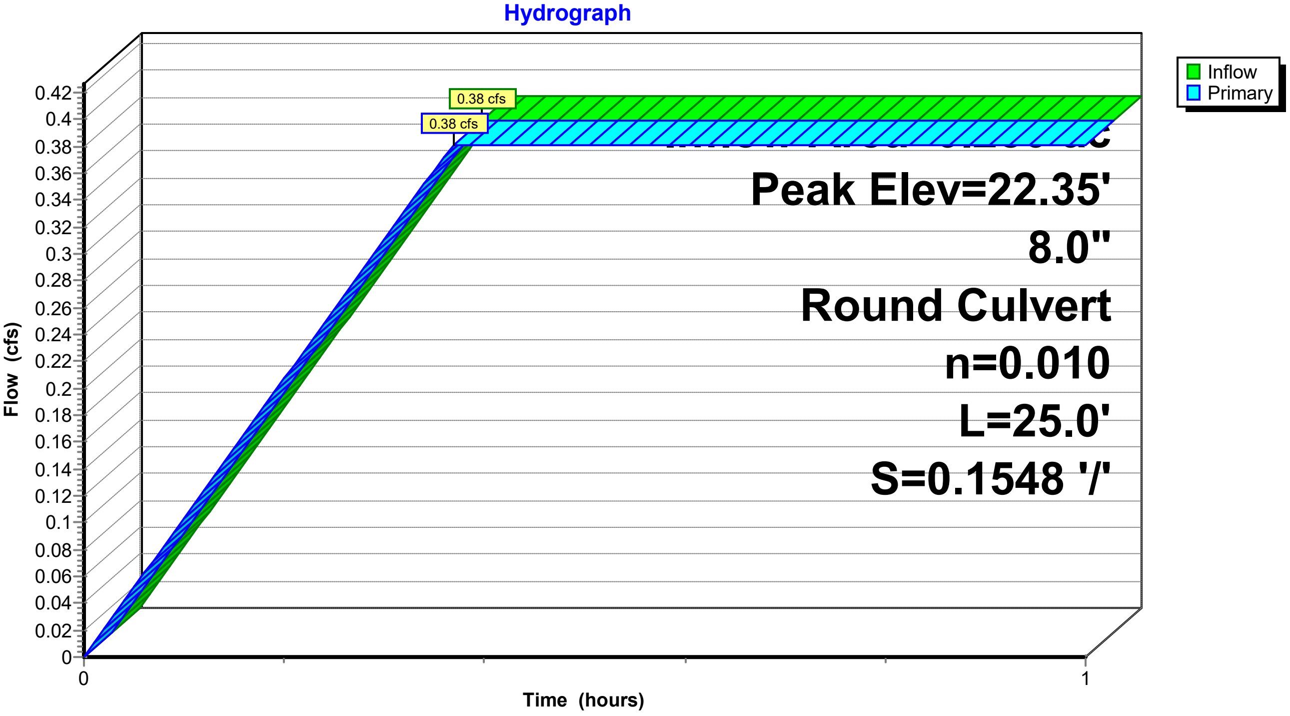
Inflow Area = 0.280 ac,100.00% Impervious, Inflow Depth > 1.11" for 100-yr event
Inflow = 0.38 cfs @ 0.37 hrs, Volume= 0.026 af
Outflow = 0.38 cfs @ 0.37 hrs, Volume= 0.026 af, Atten= 0%, Lag= 0.0 min
Primary = 0.38 cfs @ 0.37 hrs, Volume= 0.026 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 22.35' @ 0.37 hrs
Flood Elev= 23.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	22.00'	**8.0" Round Culvert** L= 25.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 22.00' / 18.13' S= 0.1548 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.38 cfs @ 0.37 hrs HW=22.35' TW=18.40' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 0.38 cfs @ 2.02 fps)

Pond 11P: Trench Drain



Summary for Pond 21P: Pump Vault

[63] Warning: Exceeded Reach 19R INLET depth by 0.46' @ 0.99 hrs

Inflow Area = 1.970 ac,100.00% Impervious, Inflow Depth > 0.61" for 100-yr event
Inflow = 3.36 cfs @ 0.85 hrs, Volume= 0.099 af
Outflow = 1.97 cfs @ 1.00 hrs, Volume= 0.086 af, Atten= 41%, Lag= 9.0 min
Primary = 1.97 cfs @ 1.00 hrs, Volume= 0.089 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 5.63' @ 1.00 hrs Surf.Area= 0.002 ac Storage= 0.013 af
Flood Elev= 6.88' Surf.Area= 0.002 ac Storage= 0.015 af

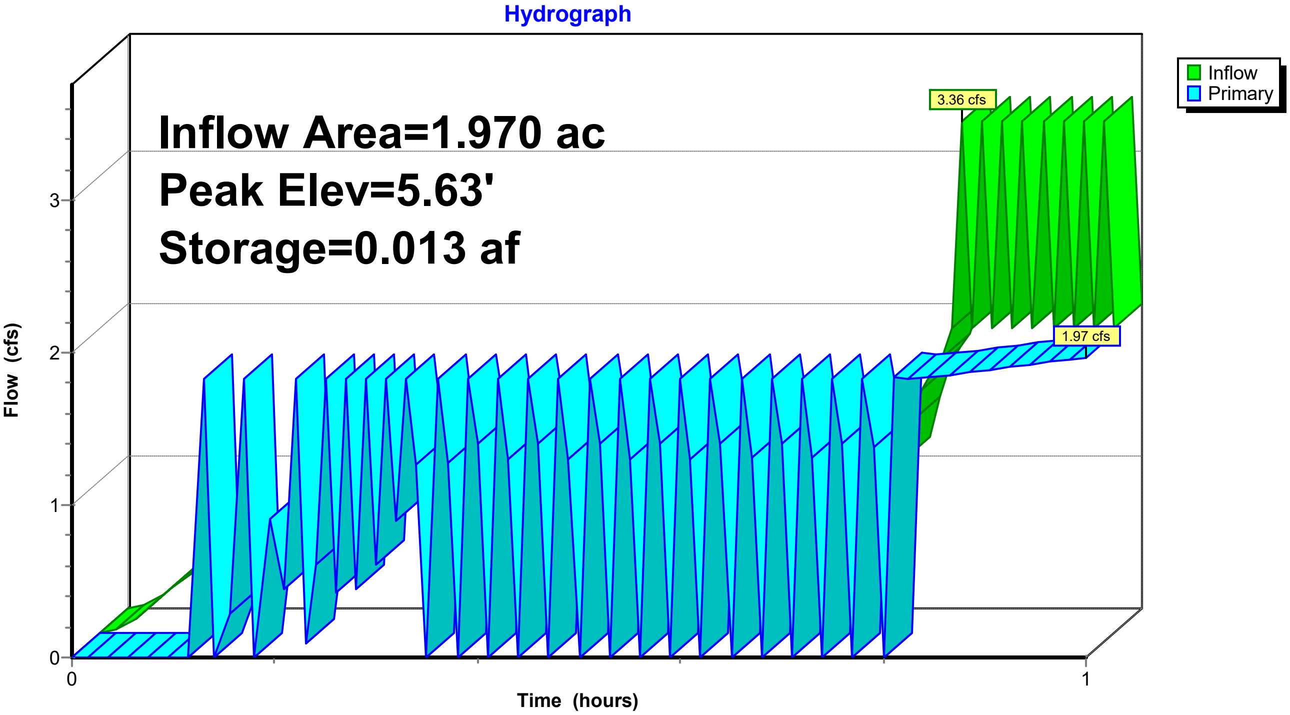
Plug-Flow detention time= 1.8 min calculated for 0.085 af (86% of inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	-1.12'	0.015 af	**6.00'W x 14.00'L x 8.00'H Prismatoid**

Device	Routing	Invert	Outlet Devices
#1	Primary	0.13'	**Sample Pump 101 X 3.00** Discharges@19.00' Turns Off@-0.12' 6.0" Diam. x 19.0' Long Discharge, Hazen-Williams C= 130 Flow (gpm)= 0.0 60.0 120.0 180.0 240.0 270.0 285.0 300.0 315.0 330.0 Head (feet)= 40.00 36.00 32.00 28.00 24.00 20.00 16.00 12.00 10.00 8.00 -Loss (feet)= 0.00 0.01 0.03 0.06 0.10 0.12 0.14 0.15 0.17 0.18 =Lift (feet)= 40.00 35.99 31.97 27.94 23.90 19.88 15.86 11.85 9.83 7.82

Primary OutFlow Max=1.97 cfs @ 1.00 hrs HW=5.63' TW=17.90' (Dynamic Tailwater)
↑—**1=Sample Pump 101** (Pump Controls 1.97 cfs)

Pond 21P: Pump Vault



Summary for Pond 23P: Trench Drain

[57] Hint: Peaked at 14.21' (Flood elevation advised)

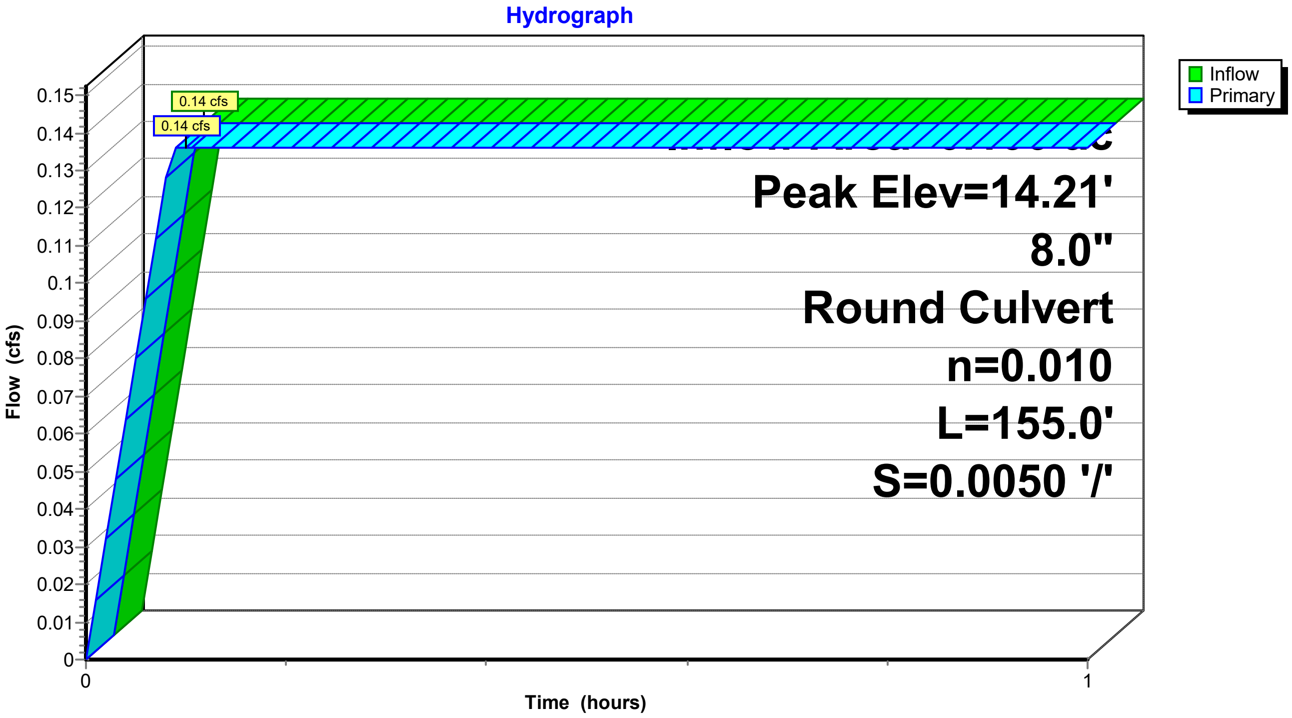
Inflow Area = 0.100 ac,100.00% Impervious, Inflow Depth > 1.30" for 100-yr event
Inflow = 0.14 cfs @ 0.09 hrs, Volume= 0.011 af
Outflow = 0.14 cfs @ 0.10 hrs, Volume= 0.011 af, Atten= 0%, Lag= 0.6 min
Primary = 0.14 cfs @ 0.10 hrs, Volume= 0.011 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 14.21' @ 0.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	14.00'	**8.0" Round Culvert** L= 155.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 14.00' / 13.22' S= 0.0050 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.14 cfs @ 0.10 hrs HW=14.21' TW=-0.32' (Dynamic Tailwater)
↑**—1=Culvert** (Barrel Controls 0.14 cfs @ 2.11 fps)

Pond 23P: Trench Drain



Summary for Pond 24P: Rainwater Harvest Tanks

[93] Warning: Storage range exceeded by 5.15'
[90] Warning: Qout>Qin may require smaller dt or Finer Routing
[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=6)
[62] Hint: Exceeded Reach 13R OUTLET depth by 11.82' @ 0.85 hrs

Inflow Area = 1.190 ac,100.00% Impervious, Inflow Depth > 1.29" for 100-yr event
Inflow = 1.62 cfs @ 0.10 hrs, Volume= 0.128 af
Outflow = 2.30 cfs @ 0.85 hrs, Volume= 0.024 af, Atten= 0%, Lag= 45.0 min
Primary = 2.30 cfs @ 0.85 hrs, Volume= 0.024 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-1.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 48.48' @ 0.85 hrs Surf.Area= 0.005 ac Storage= 0.104 af

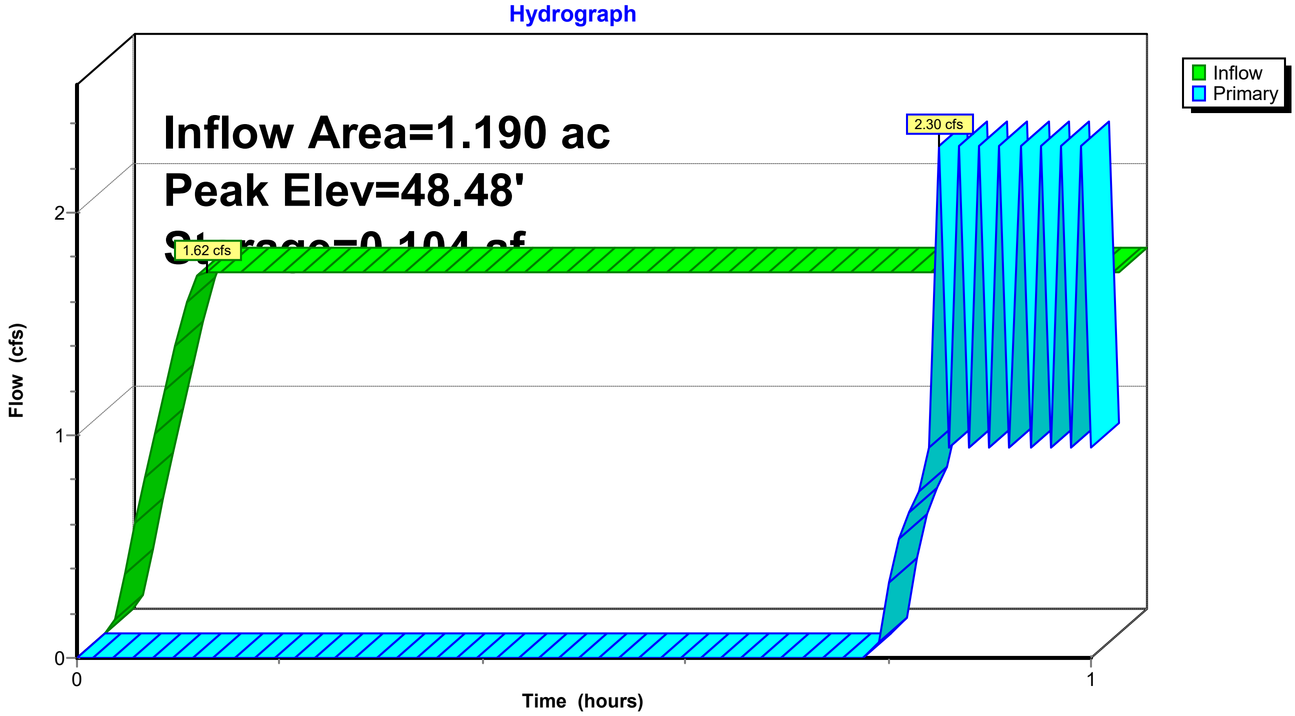
Plug-Flow detention time= 46.4 min calculated for 0.024 af (19% of inflow)
Center-of-Mass det. time= 23.2 min (54.7 - 31.5)

Volume	Invert	Avail.Storage	Storage Description
#1	23.33'	0.104 af	**12.00'D x 20.00'H Vertical Cone/Cylinder** x 2

Device	Routing	Invert	Outlet Devices
#1	Primary	42.33'	**6.0" Vert. Overflow** C= 0.600

Primary OutFlow Max=2.30 cfs @ 0.85 hrs HW=48.48' TW=0.66' (Dynamic Tailwater)
↑—**1=Overflow** (Orifice Controls 2.30 cfs @ 11.69 fps)

Pond 24P: Rainwater Harvest Tanks



Appendix E
Weighted “C-factor” Calculations

EDCO - DALBERGIA | C-FACTOR CALCULATIONS

E-8

0.12-ACRES IMPERVIOUS (0.95)
0.32-ACRES PERVIOUS (0.35)
0.44-ACRES TOTAL

$$C = \frac{0.12 \times 0.95 + 0.32 \times 0.35}{0.44} = 0.50$$

E-9

0.10-ACRES IMPERVIOUS (0.95)
0.23-ACRES PERVIOUS (0.35)
0.33-ACRES

$$C = \frac{0.10 \times .95 + 0.23 \times 0.35}{0.33} = 0.53 \text{ SAY } 0.50$$

Kimley»Horn

MEMORANDUM

To: City of San Diego
Development Services Department

From: Dave Sorenson, T.E.

Kimley-Horn and Associates, Inc.

Date: August 24, 2018

Subject: EDCO Proposed Expansion Parking and Trip Generation Study

DAVID K. SORENSON
No. 1548
Exp. 9/18
TRAFFIC

Executive Summary

The existing EDCO Recovery & Transfer center in San Diego is proposing an expansion of 31,830 additional square-feet to accommodate new solid waste diversion goals set by the State of California and the City of San Diego Climate Action Plan. With the extra machinery required on the site to provide the increased sorting and recycling, only four parking stalls are able to be provided on site. The driveway access to the existing site will be modified by removing the southern driveway on Dalbergia Street and increasing the widths of the northern driveway on Dalbergia Street and the driveway on Vesta Street. The modifications to the site driveways will add nine new parking stalls to the street; 11 new ones on Dalbergia Street and two less on Vesta Street.

The expansion is anticipated to increase the number of employees working at the center and increase employee parking demand. The parking demand will not be met by the four on-site parking spaces. To assess the parking impacts of the facility expansion on the adjacent streets, the existing parking utilization on street segments surrounding the center was recorded during select times on weekdays and weekends. Analysis of the existing parking and estimated increased demand expected to result from the project found that the surrounding on-street parking facilities have enough parking spaces available to accommodate the new parking demand generated by the expansion.

Based on the additional number of employees, the proposed expansion is expected to generate a total of 158 additional average daily trips, with 27 during the morning peak (15 inbound and 12 outbound) and 24 trips during the afternoon peak (12 inbound and 12 outbound). This volume of trips did not require a transportation impact analysis. The operation will not increase truck traffic; the truck traffic is regulated by the amount of tonnage sorted by the facility and will not be increased with the facility expansion.

Introduction

EDCO Recovery & Transfer is expanding their existing facility at 3660 Dalbergia Street in San Diego, CA to meet new mandated goals stated in the City of San Diego Climate Action Plan (CAP). In accordance with the State of California's solid waste diversion goals, the City of San Diego adopted a

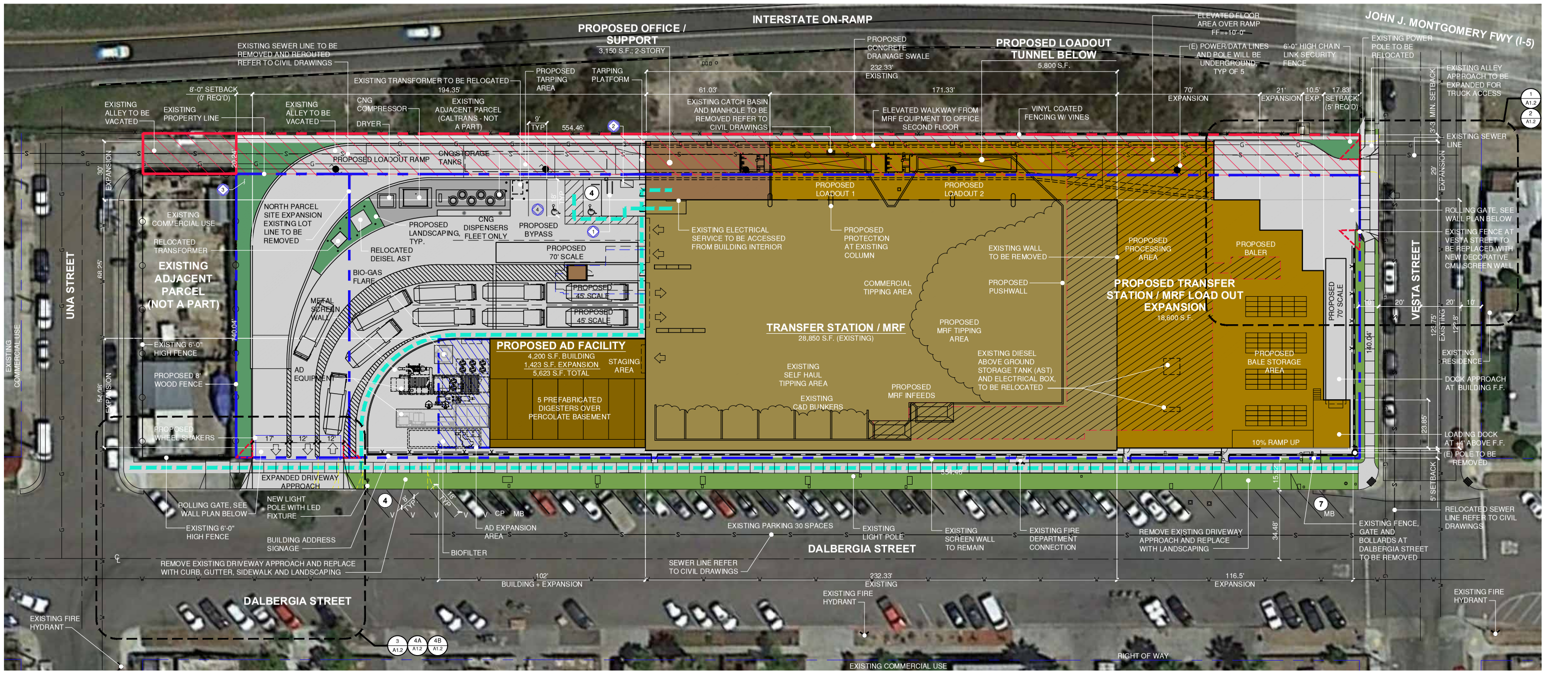
CAP and developed strategies to effectively deal with Greenhouse Gas Emission reduction targets. Included among the five strategies of the CAP is Zero Waste, a City Council approved plan to achieve 75% landfill diversion by 2020, 90% by 2035, and Zero Waste by 2040. As a result, the City of San Diego has amended its Non-Exclusive Collection Franchise Agreement to provide mandated diversion requirements to be met each year that essentially double the current diversion levels by 2020. In addition, corrective actions and liquidated damages will be incurred on collectors that do not comply with the diversion rate. This is documented in the City of San Diego Environmental Services Department 7th Amendment to Class II Non-Exclusive Franchise Agreement for Solid Waste Management Services document, dated July 1, 2015.

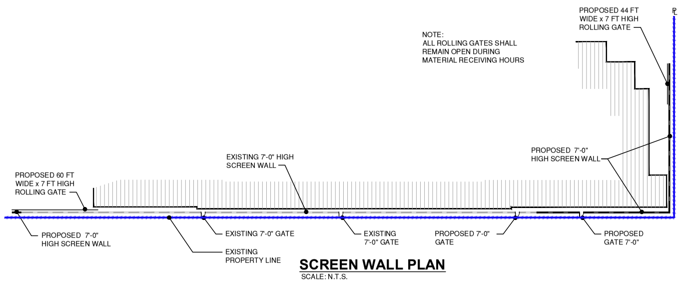
EDCO Recovery and Transfer will be required to install additional processing equipment at their facility on Dalbergia Street to comply with the City's goals. **Figure 1** shows the proposed site plan. Expansion of the site facilities and operations will result in additional employees for sorting services. The facility currently operates with truck transfer access Monday through Saturday from 6:00 am to 7:00 pm. The proposed hours of operation are Monday through Sunday from 5:00 am to 7:00 pm with no restriction on internal processing.

The Development Services Department has completed the Initial review of the project referenced above, and described as a Public Right-of-Way Vacation, Tentative Map (TM), Coastal Development Permit (CDP) and Amendment to CDP 8488 & Site Development Permit (SDP) No. 8489 to increase the square footage of an existing solid waste transfer station from 28,850 to 60,680 square feet. Work includes alley vacation and lot consolidation of 4-feet of Lot 2 and Lots 3-22 & Lots A-B of Map 220. The 1.61-acre site is located within the Coastal Overlay zone (Non-Appealable) at 3608-3698 Dalbergia Street in the BLPD-SUBD-B zone(s) within the Barrio Logan Community Plan area within Council District B. The proposed project will conform to the Council Policy 900-14 criteria by meeting LEED Silver Certification requirements as the project at a minimum will incorporate self-generation using renewable technologies to reduce environmental impacts associated with fossil fuel energy use.

The proposed expansion would maintain the same unique use, but with added employees and additional demand for parking spaces. However, the project will reduce the on-site parking from five spaces to four spaces in order for the expansion to take place. Additional parking demand is proposed to be satisfied by using available on-street parking in the area.

Figure 1: Project Site Plan





SCREEN WALL PLAN

SCALE: N.T.S.

LANDSCAPE SUMMARY

LANDSCAPING (SEE L-1 & L-2) TOTAL AREA	9,744 S.F.

TOTAL AS % OF SITE AREA: 3.9%

SCALE: 1"=20'-0"

BUILDING SUMMARY

NOTE: ALL BUILDINGS ON SITE ARE NO OLDER THAN 1999

TRANSFER STATION / MRF (EXISTING) (F-2)	28,850 S.F.
TRANSFER STATION / MRF (EXPANSION) (F-2)	18,600 S.F.
LOADOUT TUNNEL (F-2)	5,800 S.F.
OFFICE / SUPPORT (2-STORY) (B)	3,150 S.F.
AD FACILITY (F-2)	4,200 S.F.
SCALE HOUSE (B)	80 S.F.
TOTAL AREA	60,680 S.F.

GROSS FLOOR AREA:	
TRANSFER STATION	47,450 S.F.
LOADOUT TUNNEL	5,800 S.F.
AD FACILITY	4,200 S.F.
OFFICE (1ST FLOOR)	1,700 S.F.
OFFICE (2ND FLOOR)	1,450 S.F.
SCALE HOUSE	80 S.F.
TOTAL	60,680 S.F.

BUILDING WILL BE FULLY SPRINKLED

CONSTRUCTION TYPE: II-B

FAR (ALLOWED = 2.0)

$\frac{57{,}450}{92{,}000} + \frac{3{,}230}{69{,}000} = 0.68$

TOTAL GROSS FLOOR AREA (GFA) = 60,680 S.F.
TOTAL LOT AREA = 88,810 S.F.
(INCLUDING ALLEY VACATION)

OCCUPANCY SUMMARY

TRANSFER STATION / MRF (F-2 - FACTORY)	47,450 S.F.
LOADOUT TUNNEL (F-2 - FACTORY)	5,800 S.F.
AD FACILITY (F-2 - FACTORY)	4,200 S.F.
OFFICE / SUPPORT (2-STORY) (B-OFFICE)	3,150 S.F.
SCALE HOUSE (B-OFFICE)	80 S.F.

LEGAL DESCRIPTION

LOTS 21 & 22 IN BLOCK 262 NOEL'S SUBDIVISION MAP NO. 457, LOTS 3 THRU 22 & SE'LY 4' OF LOT 2 IN BLOCK 262, GUION'S ADDITION MAP NO. 220 AND LOTS A & B IN BLOCK 262 OF ARLINGTON MAP NO. 1638, ALL IN CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA.

GENERAL PLAN DESIGNATION: BLPD-SUBD-B

NO EASEMENTS ARE CURRENTLY KNOWN OR RECORDED FOR THIS PROPERTY

REFERENCE NORTH

TRUE NORTH

SITE SUMMARY

EXISTING SITE	69,890 S.F.
SITE EXPANSION (NORTH PARCEL)	7,834 S.F.
SITE EXPANSION (EAST ALLEY)	11,086 S.F.
TOTAL AREA	88,810 S.F.

LANDSCAPE

TOTAL LANDSCAPE AREA	9,784 S.F.

PARKING SUMMARY

PROVIDED	
ON-SITE PARKING	
ADA STALLS	2
CARPOOL	1
LOW VOC	1
TOTAL CAR PARKING:	4
OFF-SITE PARKING	
STANDARD	25
TOTAL PROVIDED:	29 *

BIKE PARKING: (BASED ON PROVIDED PARKING COUNT)

1 LOCKER, FOR 2 BIKES

2 RACKS, FOR 2 BIKES

MOTORCYCLE PARKING PROVIDED: 2

* BASED ON EMPLOYEE STAFF SHIFTS NEEDED DURING OPERATIONAL HOURS

REQUIRED		
OFFICE AREA	3,230 S.F./1000	4
INDUSTRIAL AREA (TUNNEL NOT INCLUDED)	37,240 S.F./1,000	38
PROPOSED PROCESS AREA	10,210 S.F./1,000	10
TOTAL PARKING REQUIRED	50,680 S.F.	52

PROJECT INFORMATION

JURISDICTION
CITY OF SAN DIEGO DEV SERVICES
1222 FIRST AVENUE, MS 301
SAN DIEGO, CA 92101

PROJECT ADDRESS
3660 DALBERGIA STREET
SAN DIEGO, CA

SITE INFORMATION
ASSESSORS PARCEL NO. : 550-620-02 THRU 10
SITE AREA:
CURRENT PROPERTY LINE SITE AREA...77,724 SQ. FT.
ALLEY VACATION SITE AREA....................11,086 SQ. FT.
TOTAL SITE AREA.......................................88,810 SQ. FT.
TOTAL ACRES...2.03

LEGEND

✓	FIRE HYDRANT (EXISTING)
🟫	EXISTING TRANSFER STATION
🟧	PROPOSED TRANSFER / MRF / LOADOUT EXPANSION
🟫	PROPOSED OFFICE / SUPPORT
🟫	PROPOSED AD FACILITY
▨	VACATED ALLEY AREA
▨	PROPOSED EQUIPMENT
🟩	PROPOSED LANDSCAPING (50% WATER REDUCTION)
🟩	EXISTING LANDSCAPING TO BE RENOVATED
⬜	CONCRETE PAVING (w/ SRI of 0.28)
⬜	GRAVEL
▨	AD FACILITY EXPANSION
- · -	EXISTING PROPERTY LINE / RIGHT OF WAY
- · -	PROPOSED PROPERTY LINE
- - -	ACCESSIBLE PATH OF TRAVEL
—	EXISTING STRUCTURE TO BE REMOVED
⑤ V	PARKING SYMBOL / COUNT "V" INDICATES VISITOR SPACE
△	INDICATES VISIBILITY TRIANGLE. NO OBSTRUCTION INCLUDING LANDSCAPING OR SOLID WALLS IN THE VISIBILITY AREA SHALL EXCEED 3 FEET IN HEIGHT
LEV/CP	CARPOOL SPACES W/SIGNAGE
MB	MOTORCYCLE SPACE W/SIGNAGE

SUSTAINABILITY NOTES

- ① BICYCLE RACKS (2 RACKS FOR 2 BICYCLES)
- ② BICYCLE LOCKERS (1 LOCKER FOR 2 BICYCLES)
- ③ SMOKING AREA
- ④ LOW EMITTING VEHICLE SPACE

Parking Demand

The project site is within the Barrio Logan Planned Subdistrict B and has the Land Use designation of Residential/Commercial/Industrial, as seen in **Figure 2** and **Figure 3**. Most of the uses in the vicinity seem to rely on street parking for both employee and visitor parking. The area is primarily industrial and commercial use, with a few residences along Vesta Street and on Dalbergia Street east of Vesta Street.

The San Diego Municipal Code states that the required automobile parking spaces for the Barrio Logan Subdistrict B is 1 space per 1,000 square feet of retail sales, commercial services, offices, and mixed-use development. For industrial spaces, facilities with a majority of floor area dedicated to large equipment, tanks, vessels, and automated machinery may use a minimum parking ratio of 1 parking space per 1,000 square feet of floor area. Applying these rates, a total of 52 parking spaces would be required per the San Diego Municipal Code, as summarized in **Table 1**.

Table 1 – Parking Space Requirements

Building Use	Area per Parking Space (sf)	Building Area (sf)	Spaces Required
Office[1]	1,000	3,230	4
Industrial[2]	1,000	47,450	48
Total			**52**

[1] Area per Parking Space rate found in San Diego Municipal Code, Chapter 14, Article 2, Table 142-05E

[2] Area per Parking Space rate found in San Diego Municipal Code, Chapter 14, Article 2, Table 142-05G, Footnote 6

Since the project site will have unique and specific operating methods, the expected future parking demand of the project site is based on the scheduled working shifts and the number of employees working during each shift rather than the Municipal Code requirements.

- There will be two shifts of 23 operational staff; one from 4:00 am to 1:00 pm and one from 2:00 pm to 11:00 pm. All operational staff end their shift at the same time, and a 60 minute window is planned between the two shifts to mitigate overlap in parking demand of the two shifts. The equipment will be shut down and there will be no sorting between shifts. This has been established to minimize parking overlap.
- Two additional management employees will work from 5:00 am to 3:00 pm.
- Three additional management employees will work from 7:00 am to 5:00 pm.
- One parking space has been assumed to accommodate deliveries and/or visitors.

Figure 2: Project Zoning

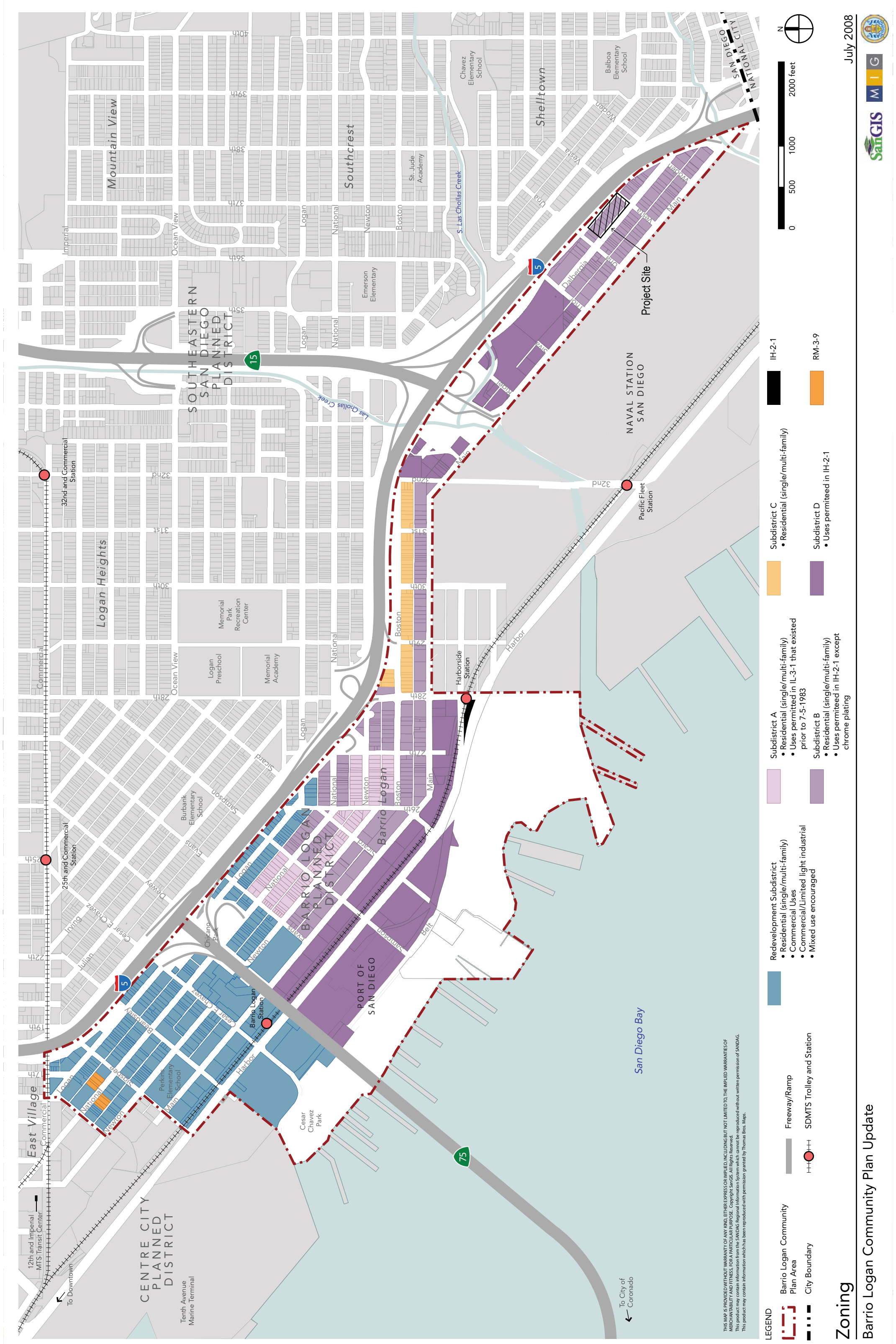
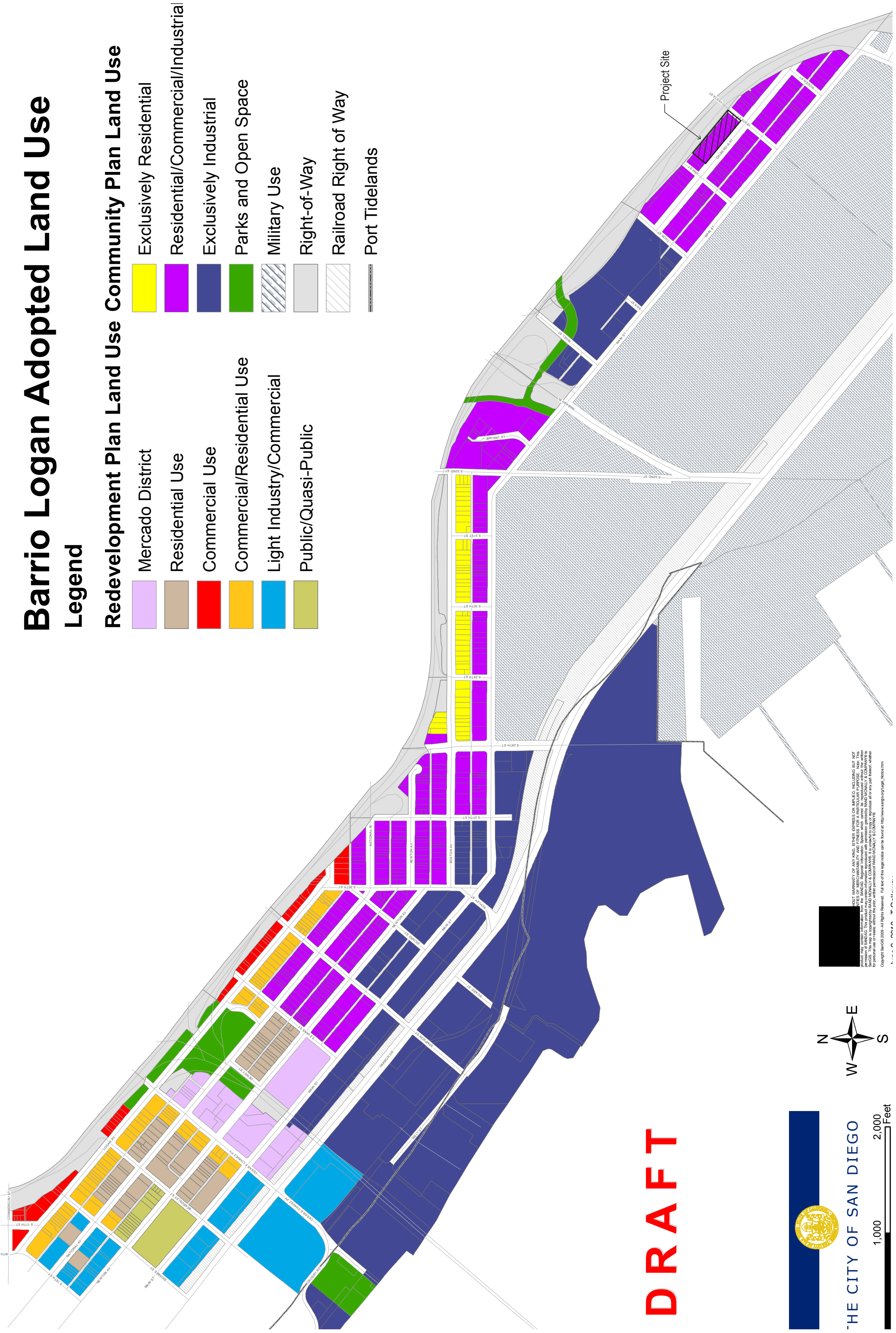


Figure 3: Project Land Use



Barrio Logan Adopted Land Use

Legend

Redevelopment Plan Land Use

- 🟪 Mercado District
- 🟫 Residential Use
- 🟥 Commercial Use
- 🟧 Commercial/Residential Use
- 🟦 Light Industry/Commercial
- 🟩 Public/Quasi-Public

Community Plan Land Use

- 🟨 Exclusively Residential
- 🟪 Residential/Commercial/Industrial
- 🟦 Exclusively Industrial
- 🟩 Parks and Open Space
- ▨ Military Use
- ⬜ Right-of-Way
- ▨ Railroad Right of Way
- │ Port Tidelands

With this schedule, the maximum parking demand of 29 parking spots would occur between 7:00 am and 2:00 pm. **Table 2** shows a summary of the parking demand throughout the day.

Table 2 – Project Site Parking Generation

	4:00 AM	**5:00 AM**	**6:00 AM**	**7:00 AM**	**1:00 PM**	**2:00 PM**	**3:00 PM**	**5:00 PM**	**6:00 PM**	**11:00 PM**
Operational Staff	23	23	23	23	23	23	23	23	23	23
Management	0	2	2	5	5	5	3	0	0	0
Visitor/ Other	0	0	0	1	1	1	1	1	0	0
Total	**23**	**25**	**25**	**29**	**29**	**29**	**27**	**24**	**23**	**23**

The expanded site will allow for a total of four parking spaces on site, including one standard space, one low-emission vehicle and/or carpool space, and two ADA accessible spaces. Since the project site is only able to supply four parking spaces on site, a deviation from the parking standards is requested to allow for 25 on-street parking spaces to be considered to meet the project's expected parking demand.

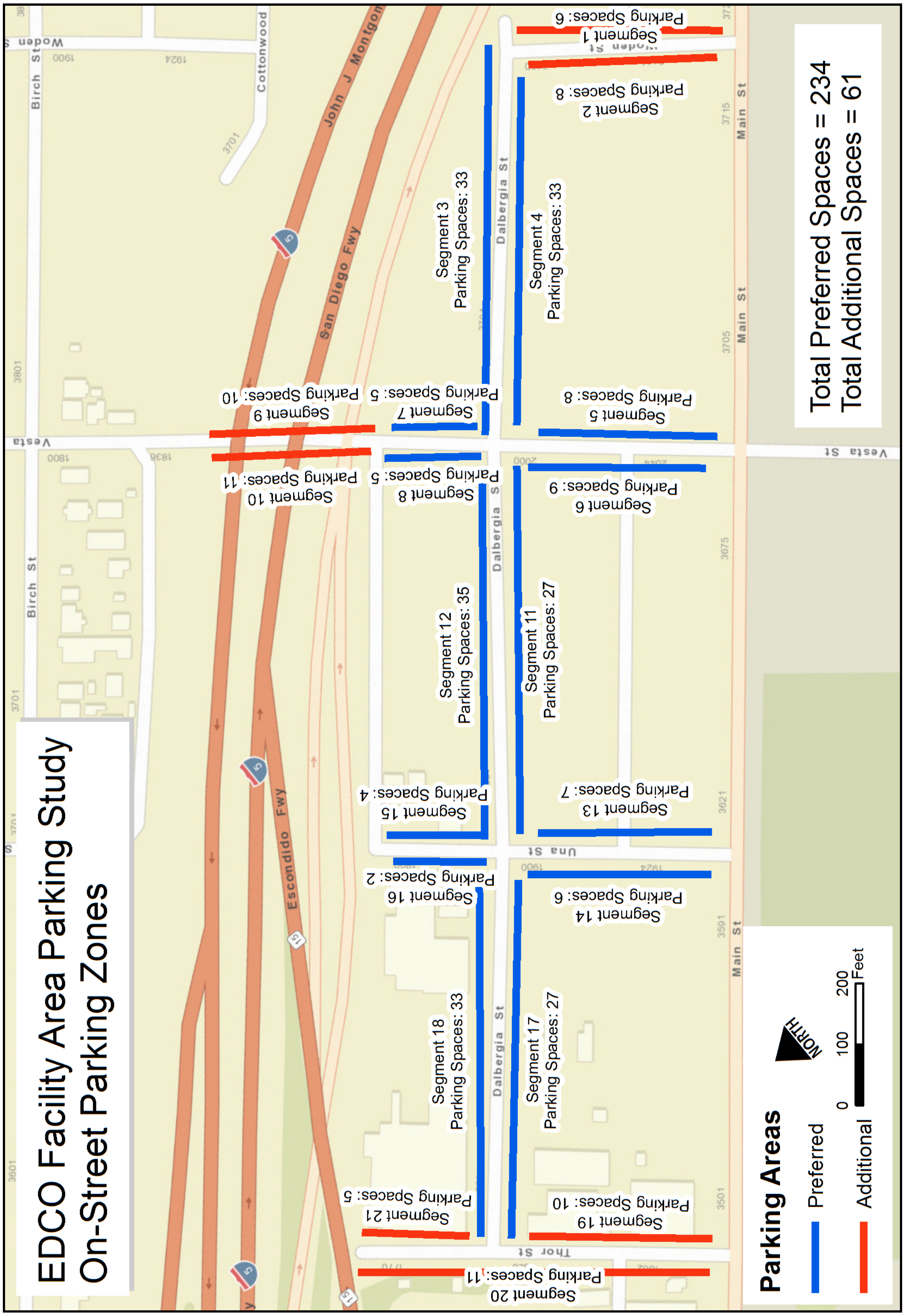
Parking Analysis

To evaluate the availability of on-street parking in the neighborhood, five street segments surrounding the project site and adjacent to industrial and commercial businesses were analyzed to determine the existing parking occupancy. Based on their proximity to the project site, the segments were designated as either "preferred parking supply areas" or "additional parking supply areas". All of the areas within both designations are within a quarter-mile of the site which is considered an acceptable walking distance for a pedestrian. Listed below and shown in **Figure 4** are the five segments, their designation, and the number of existing parking spaces in parenthesis:

- Una Street, east of Main Street until it terminates – Preferred (19)
- Vesta Street, between Main Street and the Interstate 5 overcrossing – Preferred (27)
- Dalbergia Street, between Thor Street and Woden Street – Preferred (188)
- Thor Street, east of Main Street until it terminates – Additional (26)
- Woden Street, east of Main Street until it terminates – Additional (14)
- Vesta Street, under the Interstate 5 overcrossing – Additional (21)

Currently there are 295 parking spaces within the study collection area, 234 of which are in preferred parking locations and 61 in additional parking locations. Parking spaces were calculated by counting the number of striped parking stalls and by estimating the number of curbside spaces within the available curb space. Since the land uses around the project site are industrial, a curbside parking space length of 25 feet per parking space was used to account for a mixture of vehicle sizes of standard vehicles and trucks.

Figure 4: Study Area



There are no metered parking spaces within the study area. In addition, there are two yellow-curbed 15-minute loading zone parking spaces on Dalbergia Street between Una Street and Vesta Street on the west side of the street, one 50-foot yellow-curbed 20 minute loading zone areas along Dalbergia Street between Thor Street and Una Street on the east side of the street, one 40-foot yellow-curbed 20 minute loading zone between Vesta Street and Woden Street on the west side of the street, one green-curbed 15-minute parking space on Dalbergia Street between Una Street and Vesta Street on the west side of the street, and two green-curbed 30 minute parking spaces on Dalbergia Street between Vesta Street and Woden Street on the west side of the street. These eight spaces were not included in the parking supply.

While collecting data, parking behaviors were observed and noted. A variety of activities that may impact the availability of public parking spaces included the long-term storage of vehicles in on-street spaces, storage of trailers in spaces, and over-night Recreational Vehicle parking. Weekend parking occupancy data was collected on Saturday, October 7th, at 12:00 pm, and weekday parking occupancy data was collected on Tuesday, October 10th, Thursday, October 12th, and Friday, October 13th at the times of 6:00 am, 2:00 pm, and 6:00 pm. Data was collected using a windshield survey that recorded the total number of vehicles parked at each segment. For this analysis, the peak parking demand period was used to evaluate the most significant parking demand scenario, as seen in **Table 3**. The peak parking occupancy was observed at 2:00 pm on Tuesday, October 10th, and Thursday, October 12th. Averaging those two data points, **Figure 5** shows the locations of average available spaces during the 2:00 pm peak period on a typical weekday. Sunday parking demand is expected to be less than or equal to Saturday data based upon the surrounding land uses. Weekend parking demand is roughly half of the observed weekday peak.

In some instances, the number of observed vehicles exceeded the estimated parking supply in a given segment. Where this situation occurred, occupancy was assumed to be 100% with no available spaces to accommodate projected demand. See **Appendix A** for the complete parking data collection results and calculations.

Table 3 – Parking Availability Summary

Parking Areas	Parking Spaces			Average Tues/Thurs Availability Without Project Parking		
	Existing	Change with Project	Proposed Total	6:00 AM	2:00 PM	6:00 PM
Preferred	234	+9	243	131	37	131
Additional	61	0	61	50	36	49
On-Site	5	-1	4	4	4	4

Observed available on-street spaces within the preferred parking areas for Tuesday and Thursday were averaged to determine if there would be enough available parking to accommodate the project. **Table 4** compares this availability with the project demand. The results show that during the peak mid-day afternoon period the parking demand of 29 spaces generated by the project can be accommodated with preferred parking supply area and on-site parking with 12 additional available parking spaces remaining.

Figure 5: Available Spaces Typical Weekday at 2:00 PM without Project

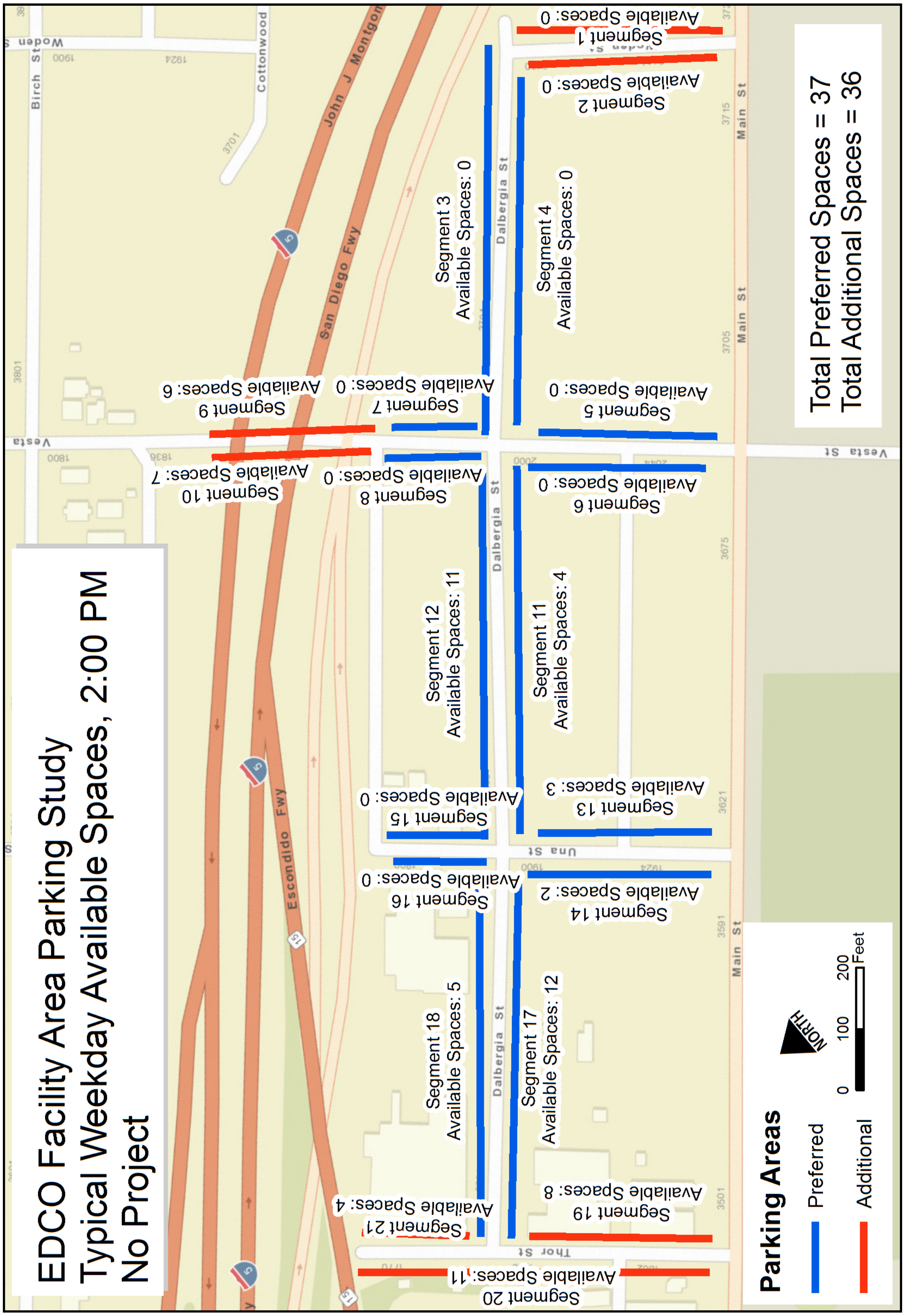


Table 4 – Parking Availability with Project during Peak Demand

	6:00 AM	2:00 PM	6:00 PM
Preferred Parking Areas Availability with 9 Additional Parking Spaces and without Project Parking Demand	131	37	131
Project Parking Demand	25	29	23
Preferred Parking Areas Availability with Project and 4 On-Site Parking Spaces	110	12	112
Preferred Parking Areas Percent Available with Project	**45%**	**5%**	**46%**
Additional Parking Areas Availability with Project	50	36	49
Additional Parking Areas Percent Available with Project	**82%**	**59%**	**80%**
All Areas Total Availability with Project	160	48	161
All Areas Remaining Percent Available with Project	**53%**	**16%**	**53%**

Trip Generation

The amount of trucks going to and from the site would not change with the expanded facility. The only change in traffic trips would be the increased employees associated with the enhanced on-site sorting and recycling processes.

Employee trip generation for the site was estimated based on the scheduled working shifts of the employees and management.

A detailed evaluation of the shift changes was used to estimate project trip generation. It was assumed that half of the employees would take a break and leave the site during the AM and PM peaks. **Table 6** summarizes the total trip generation.

Table 6 – EDCO Employee Trip Generation

	4:00 AM	5:00 AM	6:00 AM	7:00 AM	1:00 PM	2:00 PM	3:00 PM	5:00 PM	6:00 PM	11:00 PM	In-bound	Out-bound
Operational Staff Arrivals	23	0	0	0	0	23	0	0	0	0	**46**	**0**
Operational Staff Breaks	0	0	0	24	0	0	0	0	24	0	**24**	**24**
Operational Staff Departures	0	0	0	0	23	0	0	0	0	23	**0**	**46**
Management Staff Arrivals	0	2	0	3	0	0	0	0	0	0	**5**	**0**
Management Staff Breaks	0	0	0	0	4	4	0	0	0	0	**4**	**4**
Management Staff Departures	0	0	0	0	0	0	2	3	0	0	**0**	**5**
Daily Trip Total	**23**	**2**	**0**	**27**	**27**	**27**	**2**	**3**	**24**	**23**	**79**	**79**

A total of 158 new daily trips (79 inbound and 79 outbound) are estimated, with 27 trips potentially occurring during the morning peak (15 inbound and 12 outbound) and 24 trips potentially occurring during the afternoon peak (12 inbound and 12 outbound). Since the new employee trips do not generate more than 1,000 average daily trips or more than 100 trips during the peak hour, a Traffic Impact Study is not required based on the 1998 City of San Diego *Traffic Impact Study Manual*.

Transportation Demand Management

The foregoing analysis indicated that there is adequate parking available for employees assuming everyone drove in a single-occupancy vehicle. However, employees would also have options to commute to and from the facility using alternative transportation methods.

Transportation Demand Management

a. Measures required in Land Development code:

   The following methods are not currently being provided but will be provided to comply with Land Development code:

   - EDCO will dedicate one of the four on-site parking spaces to carpools/ low emitting vehicles which can be used to encourage carpooling among employees.
   - Bicycle parking stalls and racks will be provided on site near the office entry. Per Cal-Green requirements, the CAP Checklist, and provided parking quantity, one long-term bicycle locker will be provided to accommodate 2 bicycles and 2 bicycle rack hoops will be provided to accommodate 2 bicycles.

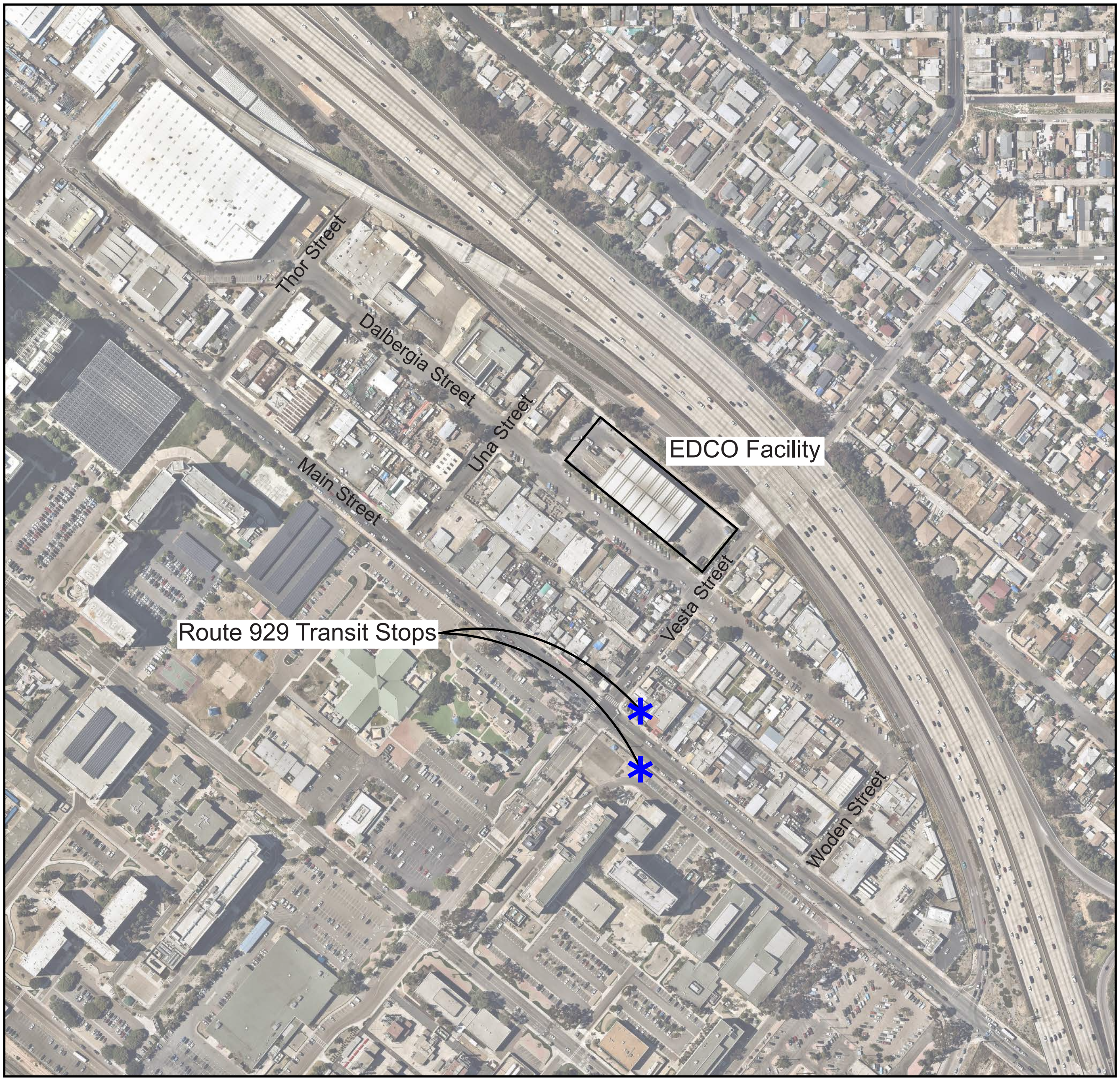
b. Additional TDM Measures:

   - EDCO will post information on transit and carpooling options for its employees to consider.
   - The MTS bus Route 929 has a transit stop at the intersection of Main Street and Vesta Street, which is about 800 feet from the site, as seen in **Figure 6**. Route 929 provides connection from Downtown and Otay Nestor.
   - The company does and will continue to encourage carpools to and from the facility.

Conclusions

There are more on-street parking spaces available in the near-by area during all times studied than the expected parking demand for the expanded EDCO facility. If projected demand were permitted to utilize on-street facilities in the area, parking operations would continue to operate at acceptable levels and no impacts to the commercial area the project is within, nor the residential neighborhood nearby would be anticipated.

Figure 6: Route 929 Bus Stop Location



Appendices

Appendix A – Parking Data Collection Results

Appendix A

Parking Occupancy Data Collection

Table 1A: Parking Data Collection Raw Results (Preferred Area)

Segment	Parking Spaces			Vehicles Observed										
				10/7/2017	10/10/2017			10/12/2017			10/13/2017			Zone
	Parallel	Angled	Total	12:00 PM	6:00 AM	2:00 PM	6:00 PM	6:00 AM	2:00 PM	6:00 PM	6:00 AM	2:00 PM	6:00 PM	
3	0	33	33	18	23	34	19	2	33	21	21	33	17	Preferred
4	0	33	33	23	29	38	30	30	34	28	33	30	26	Preferred
5	8	0	8	4	5	11	10	8	10	11	10	10	7	Preferred
6	9	0	9	2	8	11	8	8	9	9	10	10	6	Preferred
7	5	0	5	3	3	7	2	4	7	4	3	7	3	Preferred
8	5	0	5	4	3	7	2	1	7	3	3	7	5	Preferred
11	0	27	27	15	10	22	15	13	24	12	8	20	10	Preferred
12	0	35	35	18	10	33	16	12	34	12	12	32	14	Preferred
13	7	0	7	4	0	3	1	0	5	3	0	1	1	Preferred
14	6	0	6	2	2	6	4	2	3	6	3	3	2	Preferred
15	4	0	4	0	0	4	0	0	4	0	0	3	0	Preferred
16	2	0	2	0	0	2	1	0	2	0	0	1	0	Preferred
17	10	17	27	3	11	16	2	10	15	3	15	12	4	Preferred
18	0	33	33	4	20	32	6	17	25	7	30	30	5	Preferred
TOTAL	56	178	234	100	124	226	116	107	212	119	148	199	100	

Note: Occupied spaces may exceed the available parking spaces. Parking space supply was estimated based on a 25-foot long vehicle. A series of smaller cars may result in additional vehicles being able to fit along a curb front.

Table 1B: Parking Data Collection Raw Results (Additional Area)

Segment	Parking Spaces			Vehicles Observed										
				10/7/2017	10/10/2017			10/12/2017			10/13/2017			Zone
	Parallel	Angled	Total	12:00 PM	6:00 AM	2:00 PM	6:00 PM	6:00 AM	2:00 PM	6:00 PM	6:00 AM	2:00 PM	6:00 PM	
1	6	0	6	4	5	10	5	4	9	4	3	15	1	Additional
2	8	0	8	8	3	11	4	2	11	6	3	8	3	Additional
9	10	0	10	0	0	4	1	0	4	1	0	5	5	Additional
10	11	0	11	0	0	4	0	0	5	0	0	4	2	Additional
19	10	0	10	1	2	1	1	2	3	0	1	1	0	Additional
20	11	0	11	1	4	0	2	2	1	1	1	0	0	Additional
21	5	0	5	1	1	2	2	0	1	1	1	1	1	Additional
TOTAL	61	0	61	15	15	32	15	10	34	13	9	34	12	

Parking Occupancy Data Collection

Table 2A: Available Parking (Preferred Area)

Segment	Parking		Parking Availability									Zone
			10/7/2017	10/10/2017			10/12/2017			10/13/2017		
	Existing	Proposed	12:00 PM	6:00 AM	2:00 PM	6:00 PM	6:00 AM	2:00 PM	6:00 PM	6:00 AM	2:00 PM	
3	33	33	15	10	0	14	31	0	12	12	0	Preferred
4	33	33	10	4	0	3	3	0	5	0	3	Preferred
5	8	8	4	3	0	0	0	0	0	0	0	Preferred
6	9	9	7	1	0	1	1	0	0	0	0	Preferred
7	5	5	2	2	0	3	1	0	1	2	0	Preferred
8	5	3	1	2	0	3	4	0	2	2	0	Preferred
11	27	27	12	17	5	12	14	3	15	19	7	Preferred
12	35	46	17	25	2	19	23	1	23	23	3	Preferred
13	7	7	3	7	4	6	7	2	4	7	6	Preferred
14	6	6	4	4	0	2	4	3	0	3	3	Preferred
15	4	4	4	4	0	4	4	0	4	4	1	Preferred
16	2	2	2	2	0	1	2	0	2	2	1	Preferred
17	27	27	24	16	11	25	17	12	24	12	15	Preferred
18	33	33	29	13	1	27	16	8	26	3	3	Preferred
TOTAL	234	243	134	110	23	120	127	29	118	89	42	

Table 2B: Available Parking (Additional Area)

Segment	Parking		Parking Availability									Zone
			10/7/2017	10/10/2017			10/12/2017			10/13/2017		
	Existing	Propose	12:00 PM	6:00 AM	2:00 PM	6:00 PM	6:00 AM	2:00 PM	6:00 PM	6:00 AM	2:00 PM	
1	6	6	2	1	0	1	2	0	2	3	0	Additional
2	8	8	0	5	0	4	6	0	2	5	0	Additional
9	10	10	10	10	6	9	10	6	9	10	5	Additional
10	11	11	11	11	7	11	11	6	11	11	7	Additional
19	10	10	9	8	9	9	8	7	10	9	9	Additional
20	11	11	10	7	11	9	9	10	10	10	11	Additional
21	5	5	4	4	3	3	5	4	4	4	4	Additional
TOTAL	61	61	46	46	36	46	51	33	48	52	36	

Appendix A

Parking Occupancy Data Collection

Table 3A: Average Available Parking During Peak Parking Hour (2:00 PM) Preferred Area

Segment	Parking		Average Tues/ Thurs Availability			Zone
	Existing	Proposed	6:00 AM	2:00 PM	6:00 PM	
3	33	33	21	0	13	Preferred
4	33	33	4	0	4	Preferred
5	8	8	2	0	0	Preferred
6	9	9	1	0	1	Preferred
7	5	5	2	0	2	Preferred
8	5	3	3	0	3	Preferred
11	27	27	16	4	14	Preferred
12	35	46	33	11	30	Preferred
13	7	7	7	3	5	Preferred
14	6	6	4	2	1	Preferred
15	4	4	4	0	4	Preferred
16	2	2	2	0	2	Preferred
17	27	27	17	12	25	Preferred
18	33	33	15	5	27	Preferred
Total Preferred	234	243	131	37	131	

Table 3B: Average Available Parking During Peak Parking Hour (2:00 PM) Additional Area

Segment	Parking	Average Tues/ Thurs Availability				Zone
	Existing	Proposed	6:00 AM	12:00 AM	12:00 AM	
1	6	6	2	0	2	Additional
2	8	8	6	0	3	Additional
9	10	10	10	6	9	Additional
10	11	11	11	7	11	Additional
19	10	10	8	8	10	Additional
20	11	11	8	11	10	Additional
21	5	5	5	4	4	Additional
Total Additional	61	61	50	36	49	

Table 3C: Average Available Parking During Peak Parking Hour (2:00 PM) Preferred and Additional Area

Segment	Parking	Average Tues/ Thurs Availability				Zone
	Existing	Proposed	6:00 AM	12:00 AM	12:00 AM	
Total	295	304	181	73	180	