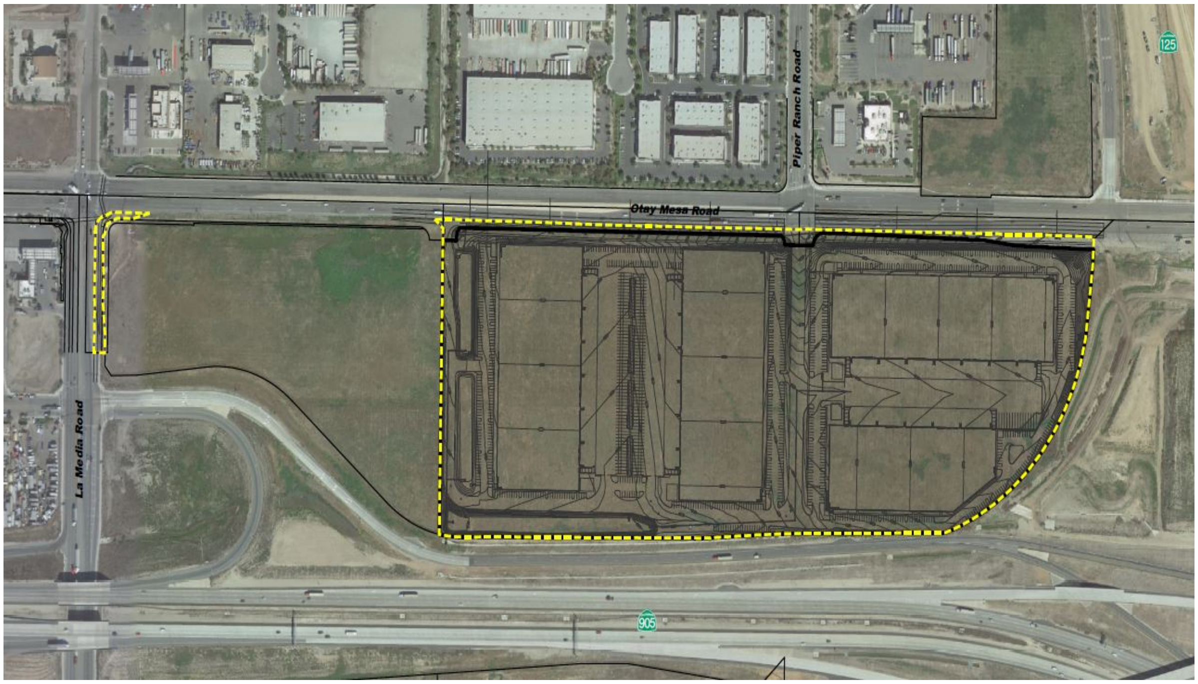

Air Quality Study

Sunroad Otay Plaza Project
Otay Mesa, San Diego, California

prepared for
KLR Planning
926 Camino De La Reina
San Diego, California 92108-2353

prepared by
Rincon Consultants
2215 Faraday Avenue, Suite A
Carlsbad, California 92008

April 2017

Rincon Consultants, Inc.
Environmental Scientists Planners Engineers
www.rinconconsultants.com

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Project Description

Introduction

This report presents the analysis of the potential air quality impacts of a proposed light industrial development north of State Route 905 (Otay Mesa Freeway), south of Otay Mesa Road, east of La Media Road, and west of State Route 125 (South Bay Expressway) in Otay Mesa, California. The report has been prepared by Rincon Consultants, Inc. under contract to and for use by KLR Planning, in support of the environmental documentation being prepared pursuant to the California Environmental Quality Act (CEQA). This study analyzes air quality impacts related to temporary construction activity and long-term operation of the proposed project.

Project Summary

The approximately 48-acre project site is located north of SR-905, south of Otay Mesa Road, east of the La Media Road, and west of SR-125 in Otay Mesa, California. The site consists of 11 parcels: Assessor's Parcel Numbers (APN) 646-290-17, 646-290-18, 646-290-19, 646-290-04, 646-290-08, 646-290-24, 646-290-25, 646-290-26, 646-290-27, 646-121-31 and 646-121-29. The site is currently vacant.

The project proposes a Vesting Tentative Map to consolidate the existing 11 parcels and then split the property into four lots. Lot 1 would be 11.97 acres and would include a 216,320-square-foot building; Lot 2 would be 9.09 acres and would include a 153,500-square-foot building; Lot 3 would be 11.90 acres and would include a 240,560-square-foot building; and Lot 4 would be 15.10 acres and would include a 234,670-square-foot building. The total building space would be 845,050 square feet for light industrial warehouse and office use, and landscaped area would total 465,538 square feet. The project would include 143 trailer parking spaces and 909 car parking spaces, of which 76 would be designated for clean air, vanpool, and EV parking. Forty-five bicycle parking spaces would also be provided in lockers. The project proposes bioretention areas in the center and western portions of the site, with a detention basin proposed for the southwest portion of the site. Primary access to the project would occur via two driveways from Otay Mesa Road on the north side of the project site. Figure 1 shows the project site location.

Proposed development would require grading of the entire site. Earthwork would be balanced on-site, with a total of 395,000 cubic yard of cut and fill. The maximum height of fill slopes would be eight feet; the maximum height of cut slopes would be 11 feet. The project proposes 890 linear feet of retaining/crib walls, ranging in heights of less than two feet to a maximum height of 17 feet. Construction is expected to begin in November 2017 with project opening scheduled for 2021.

Surrounding land uses include light industrial buildings on the north and west, vacant land and State Route 125 on the east and State Route 905 on the south.

Figure 1 Project Site Location

Imagery provided by ESRI and its licensors © 2017.

Project Location

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Fig Project Location

Air Quality

Background

Regulatory Setting

Air pollutants are regulated at the national, State, and air basin level; each agency has a different degree of control. The United States Environmental Protection Agency (EPA) regulates at the national level; the California Air Resources Control Board (CARB) regulates at the State level; and the San Diego Air Pollution Control District (SDAPCD) regulates air quality in San Diego County. The federal and state governments have been empowered by the federal and state Clean Air Acts to regulate the emission of airborne pollutants and have established ambient air quality standards for the protection of public health. Characteristics of ozone, carbon monoxide, nitrogen dioxide, and suspended particulates are described below.

Ozone. Ozone (O_3) is produced by a photochemical reaction (triggered by sunlight) between nitrogen oxides (NO_X) and reactive organic gases (ROG)[1]. NO_X is formed during the combustion of fuels, while reactive organic gases are formed during combustion and evaporation of organic solvents. Because ozone requires sunlight to form, it mostly occurs in substantial concentrations between the months of April and October. Ozone is a pungent, colorless, toxic gas with direct health effects on humans including respiratory and eye irritation and possible changes in lung functions. Groups most sensitive to ozone include children, the elderly, people with respiratory disorders, and people who exercise strenuously outdoors.

Carbon Monoxide. Carbon monoxide (CO) is a local pollutant that is found in high concentrations only near fuel combustion equipment and other sources of carbon monoxide. The primary source of CO, a colorless, odorless, poisonous gas, is automobile traffic. Elevated concentrations, therefore, are usually only found near areas of high traffic volumes. CO's health effects are related to its affinity for hemoglobin in the blood. At high concentrations, CO reduces the amount of oxygen in the blood, causing heart difficulty in people with chronic diseases, reduced lung capacity, and impaired mental abilities.

Nitrogen Dioxide. Nitrogen dioxide (NO_2) is a by-product of fuel combustion, with the primary source being motor vehicles and industrial boilers and furnaces. The principal form of nitrogen oxide produced by combustion is nitric oxide (NO), but NO reacts rapidly to form NO_2, creating the mixture of NO and NO_2 commonly called NO_X. Nitrogen dioxide is an acute irritant. A relationship between NO_2 and chronic pulmonary fibrosis may exist, and an increase in bronchitis in young children at concentrations below 0.3 parts per million (ppm) may occur. NO_2 absorbs blue light and causes a reddish brown cast to the atmosphere and reduced visibility. It can also contribute to the formation of PM_{10} and acid rain.

Suspended Particulates. Atmospheric particulate matter is comprised of finely divided solids and liquids such as dust, soot, aerosols, fumes, and mists. The particulates that are of particular concern are PM_{10} (which measures no more than 10 microns in diameter) and $PM_{2.5}$ (a fine particulate measuring no more

1 Organic compound precursors of ozone are routinely described by a number of variations of three terms: hydrocarbons (HC), organic gases (OG), and organic compounds (OC). These terms are often modified by adjectives such as total, reactive, or volatile, and result in a rather confusing array of acronyms: HC, THC (total hydrocarbons), RHC (reactive hydrocarbons), TOG (total organic gases), ROG (reactive organic gases), TOC (total organic compounds), ROC (reactive organic compounds), and VOC (volatile organic compounds). While most of these differ in some significant way from a chemical perspective, from an air quality perspective two groups are important: non-photochemically reactive in the lower atmosphere, or photochemically reactive in the lower atmosphere (HC, RHC, ROG, ROC, and VOC).

than 2.5 microns in diameter). The characteristics, sources, and potential health effects associated with the small particulates (those between 2.5 and 10 microns in diameter) and $PM_{2.5}$ can be different. Major man-made sources of PM_{10} are agricultural operations, industrial processes, construction, demolition operations, combustion of fossil fuels, and entrainment of road dust into the atmosphere. Natural sources include windblown dust, wildfire smoke, and sea spray salt. The finer, $PM_{2.5}$ particulates are generally associated with combustion processes as well as being formed in the atmosphere as a secondary pollutant through chemical reactions. $PM_{2.5}$ is more likely to penetrate deeply into the lungs and poses a serious health threat to all groups, but particularly to the elderly, children, and those with respiratory problems. More than half of the small and fine particulate matter that is inhaled into the lungs remains there, which can cause permanent lung damage. These materials can damage health by interfering with the body's mechanisms for clearing the respiratory tract or by acting as carriers of an absorbed toxic substance.

Federal Regulations

The EPA is the federal agency designated to administer national air quality regulations, while CARB is the state equivalent in the California Environmental Protection Agency. Local control over air quality management is provided by CARB through multi-county and county-level Air Pollution Control Districts (also referred to as Air Quality Management Districts). CARB establishes statewide air quality standards and is responsible for the control of mobile emission sources, while the local Air Pollution Control Districts are responsible for enforcing standards and regulating stationary sources. CARB has established 15 air basins statewide. The City of San Diego is located in the San Diego Air Basin (SDAB), which is under the jurisdiction of the SDAPCD.

State Regulations

California Air Resources Board. CARB, which became part of the California EPA (CalEPA) in 1991, is responsible for ensuring implementation of the California Clean Air Act (CCAA), meeting state requirements of the federal Clean Air Act and establishing California Ambient Air Quality Standards (CAAQSs). It is also responsible for setting emission standards for vehicles sold in California and for other emission sources such as consumer products and certain off-road equipment. CARB also established passenger vehicle fuel specifications and oversees the functions of local air pollution control districts and air quality management districts, which in turn administer air quality activities at the regional and county level. The CCAA is administered by CARB at the state level and by the Air Quality Management Districts at the regional level. Both state and federal standards are summarized in Table 1. The federal "primary" standards have been established to protect the public health. The federal "secondary" standards are intended to protect the nation's welfare and account for air pollutant effects on soil, water, visibility, materials, vegetation, and other aspects of the general welfare.

Table 1 Current Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	Federal Primary Standards	California Standard
Ozone	1-Hour	---	0.09 ppm
	8-Hour	0.070 μg/m^3	0.070 μg/m^3
Carbon Monoxide	8-Hour	9.0 ppm	9.0 ppm
	1-Hour	35.0 ppm	20.0 ppm
Nitrogen Dioxide	Annual	0.053 ppm	0.030 ppm
	1-Hour	0.100 ppm	0.18 ppm
Sulfur Dioxide	24-Hour	---	0.04 ppm
	3-Hour	0.5 ppm (secondary)	---
	1-Hour	0.075 ppm (primary)	0.25 ppm
PM_{10}	24-Hour	150 μg/m^3	50 μg/m^3
	Annual	---	20 μg/m^3
$PM_{2.5}$	24-Hour	35 μg/m^3	---
	Annual	12 μg/m^3	12 μg/m^3
Sulfates	24-Hour	---	25 μg/m^3
Lead	30-Day Average	---	1.5 μg/m^3
	3-Month Average	0.15 μg/m^3	---
Hydrogen Sulfide	1-Hour	0.03 ppm	---
Vinyl Chloride	24-Hour	0.010 ppm	---

ppm = parts per million

µg/m3 = micrograms per cubic meter

Source: California Air Resources Board, http://www.arb.ca.gov/research/aaqs/aaqs2.pdf. May 4, 2016. Accessed April 2017.

San Diego Air Pollution Control District. The SDAPCD was created to protect the public from the harmful effects of air pollution, achieve and maintain air quality standards, foster community involvement and develop and implement cost-effective programs that meet state and federal mandates while considering environmental and economic impacts.

Specifically, the SDAPCD is responsible for monitoring air quality and planning, implementing, and enforcing programs designed to attain and maintain state and federal ambient air quality standards in the district. Programs developed include air quality rules and regulations that regulate stationary source emissions, including area sources, point sources, and certain mobile source emissions. The SDAPCD is also responsible for establishing permitting requirements for stationary sources and ensuring that new, modified or relocated stationary sources do not create net emissions increases; and thus, are consistent with the region's air quality goals. The SDAPCD provides significance thresholds in Regulation II, Rule 20.2, Table 20-2-1 “AQIA Trigger Levels.” These trigger levels were established for stationary sources of air pollution. Though these levels were not established specifically for CEQA purposes or to assess mobile source emissions, they are commonly used for CEQA evaluations. The SDAPCD enforces air quality rules and regulations through a variety of means, including inspections, educational or training programs, or fines, when necessary.

The SDAPCD is required to monitor air pollutant levels to ensure that air quality standards are met and, if they are not met, to develop strategies to meet the standards. Depending on whether the standards are met or exceeded, the local air basin is classified as being in “attainment” or “non-attainment.” San Diego County is listed as a federal non-attainment area for ozone (eight hour), and a state non-attainment area for ozone (one hour and eight hour standards), PM_{10}, and $PM_{2.5}$. As shown in Table 2, the SDAB is in attainment for the state and federal standards for nitrogen dioxide, carbon monoxide, sulfur dioxide and lead.

Table 2 San Diego County Attainment Status

Criteria Pollutant	Federal Designation	State Designation
Ozone (one hour)	Attainment*	Non-Attainment
Ozone (eight hour)	Non-Attainment	Non-Attainment
Carbon Monoxide	Attainment	Attainment
PM10	Unclassified**	Non-Attainment
PM2.5	Attainment	Non-Attainment
Nitrogen Dioxide	Attainment	Attainment
Sulfur Dioxide	Attainment	Attainment
Lead	Attainment	Attainment
Sulfates	(no federal standard)	Attainment
Hydrogen Sulfide	(no federal standard)	Unclassified
Visibility	(no federal standard)	Unclassified

* The federal 1-hour standard of 12 ppm was in effect from 1979 through June 1, 2005. The revoked standard is referenced here because it was employed for such a long period and because this benchmark is addressed in SIPs.

** At the time of designation, if the available data does not support a designation of attainment or non-attainment, the area is designated as unclassifiable.

Source: San Diego Air Pollution Control District. http://www.sdapcd.org/content/sdc/apcd/en/air-quality-planning/attainment-status.html . Accessed April 2017

MONITORED AIR QUALITY

The SDAPCD monitors air quality conditions at locations throughout the SDAB. For the purpose of this analysis, data from the Chula Vista monitoring station in south San Diego County were used to characterize existing ozone and $PM_{2.5}$ conditions, as well as PM_{10} concentrations, in the vicinity of Otay Mesa. A summary of the data recorded at the Chula Vista monitoring station from 2013 through 2015 is presented in Table 3.

Table 3 Ambient Air Quality at the Nearest Monitoring Station

Pollutant	2013	2014	2015
Ozone (ppm), 8-Hour Average	0.063	0.072	0.067
Number of days of State exceedances (>0.09 ppm)	0	0	0
Number of days of Federal exceedances (>0.075 ppm)	0	0	0
Carbon Monoxide (ppm), Highest 8-Hour Average	*	*	*
Number of days of above State or Federal standard (>9.0 ppm)	*	*	*
Particulate Matter <10 microns, μg/m^3, Worst 24 Hours	40.0	39.0	45.0
Number of days above State standard (>50 μg/m^3)	0	0	0
Number of days above Federal standard (>150 μg/m^3)	0	0	0
Particulate Matter <2.5 microns, μg/m^3, Worst 24 Hours	21.9	26.5	33.5
Number of days above State standard (>50 μg/m^3)	*	*	*
Number of days above Federal standard (>35 μg/m^3)	0	0	0

ppm = parts per million; μg/m3 = micrograms per cubic meter

* There was insufficient (or no) data available to determine the value.

Notes: Data from Chula Vista monitoring station located at 80 E. J Street; located approximately 10 miles northwest of the project site.

Source: California Air Resources Board, 2013, 2014, 2015 Air Quality Data Summaries available at http://www.arb.ca.gov/adam/select8/SC8start.php. Access April 2017.

SAN DIEGO AIR QUALITY MANAGEMENT PLAN AND REGIONAL AIR QUALITY STRATEGY

The federal Clean Air Act Amendments (CAAA) mandates that states submit and implement a State Implementation Plan (SIP) for areas not meeting air quality standards. The SIP includes pollution control measures to demonstrate how the standards will be met through those measures. The SIP is established by incorporating measures established during the preparation of Air Quality Management Plans (AQMPs) and adopted rules and regulations by each local APCD and AQMD, which are submitted for approval to the CARB and the USEPA. The goal of an AQMP is to reduce pollutant concentrations below the National Ambient Air Quality Standards (NAAQS) through the implementation of air pollutant emissions controls.

The San Diego Regional Air Quality Strategy (RAQS) was developed pursuant to California Clean Air Act (CCAA) requirements. The RAQS was initially adopted in 1991 and was updated in 1995, 1998, 2001, 2004, 2009, and most recently in December 2016 (SDAPCD 2016). The RAQS identifies feasible emission control measures to provide progress in San Diego County toward attaining the State ozone standard. The pollutants addressed in the RAQS are volatile organic compounds (VOC) and oxides of nitrogen (NO_X), precursors to the photochemical formation of ozone (the primary component of smog). The RAQS was initially adopted by the SDAPCD Board on June 30, 1992, and amended on March 2, 1993, in response to CARB comments. At present, no attainment plan for PM_{10} or $PM_{2.5}$ is required by the state regulations. However, SDAPCD has also adopted measures to reduce particulate matter in San Diego County. These measures range from regulation against open burning to incentive programs that introduce cleaner technology. These measures can be found in a report titled "*Measures to Reduce Particulate Matter in San Diego County"* December 2005 found at the SDAPCD website (http://www.sdapcd.org).

The RAQS relies on information from CARB and San Diego Association of Governments (SANDAG), including mobile and area source emissions, as well as information regarding projected growth in the County, to project future emissions and then determine from that the strategies necessary for the reduction of emissions through regulatory controls. CARB mobile source emission projections and

SANDAG growth projections are based on population and vehicle trends and land use plans developed by the cities and the County as part of the development of the individual General Plans. As such, projects that propose development consistent with the growth anticipated by the general plans would be consistent with the RAQS. In the event that a project would propose development which is less dense than anticipated within the General Plan, the project would likewise be consistent with the RAQS. If a project proposes development that is greater than that anticipated in the General Plan and SANDAG's growth projections, the project might be in conflict with the RAQS and SIP and might have a potentially significant impact on air quality.

The SIP relies on the same information from SANDAG to develop emission inventories and emission reduction strategies that are included in the attainment demonstration for the air basin. The SIP also includes rules and regulations that have been adopted by the SDAPCD to control emissions from stationary sources. These SIP-approved rules may be used as a guideline to determine whether a project's emissions would have the potential to conflict with the SIP and thereby hinder attainment of the NAAQS for ozone.

Otay Mesa Community Plan

The Otay Mesa Community Plan Update ([CPU] City of San Diego 2014) contains a set of goals, policies, and recommendations that represent shared vision for the future of the area. It established a framework for ensuring that changes to the built environment, whether public or private, aid in maintaining or improving the fabric of the community and enhances its qualities as a place for living, recreating, and working. The CPU Conservation Element (Conservation Element) builds on the City of San Diego General Plan Conservation Element with policies tailored to conditions in Otay Mesa. The Conservation Element contains goals and policies related to the city's sustainable development goals in areas that have been identified as suitable for development. One of the goals of the CPU is to ensure safe and healthy air quality within Otay Mesa. Section 8.7, Air Quality, of the Conservation Element contains a policy related to Air Quality concerns, to encourage enforcement of air quality regulations by the SDAPCD (Policy 8.7-1).

Otay Mesa Community Plan Update Environmental Impact Report (EIR)

The CPU EIR found that air emissions due to construction would not exceed the applicable thresholds for individual projects. However, if several of these projects were to occur simultaneously, there would be the potential for multiple projects to exceed significance thresholds. While it was not anticipated that projects implemented under the CPU would result in significant air quality impacts, as air emissions from the future developments within the CPU area could not be adequately quantified at that time, and it was determined that future projects that would exceed emissions thresholds established by the City of San Diego would be required to adhere to the following mitigation measures:

- **Construction Emissions. AQ-1:** For future projects that would exceed daily construction emissions thresholds established by the City of San Diego, best available control measures/technology shall be incorporated to reduce construction emissions to below daily emission standards established by the City of San Diego.
- **Operational Emissions. AQ-2:** Development that would significantly impact air quality, either individually or cumulatively, shall receive entitlement only if it is conditioned with all reasonable mitigation to avoid, minimize, or offset the impact. As a part of this process, future projects shall be required to buffer sensitive receptors from air pollution sources through the use of landscaping, open space, and other separation techniques.

In addition, the EIR determined that any new facility proposed that would have the potential to emit toxic air contaminants would be required to evaluate toxic air problems resulting from their facility's emissions. Finally, it was recognized that the CPU would potentially place residential, commercial, and industrial uses in proximity to one another, which would have potential air quality impacts associated with the collocation of incompatible land uses. The following CPU EIR mitigation measures would apply in these instances.

- **Stationary Sources. AQ-3:** Prior to the issuance of building permits for any new facility that would have the potential to emit toxic air contaminants, in accordance with AB 2588, an emissions inventory and health risk assessment shall be prepared. If adverse health impacts exceeding public notification levels (cancer risk equal to or greater than 10 in 1,000,000; see Section 5.3.5.2 [b & c]) are identified, the facility shall provide public notice to residents located within the public notification area and submit a risk reduction audit and plan to the APCD that demonstrates how the facility would reduce health risks to less than significant levels within five years of the date the plan.
- **Collocation. AQ-4:** Prior to the issuance of building permits for any project containing a facility identified in Table 5.3-7[2], or locating air quality sensitive receptors closer than the recommended buffer distances, future projects implemented in accordance with the CPU shall be required to prepare a health risk assessment (HRA) with a Tier I analysis in accordance with APCD HRA Guidelines and the Office of Environmental Health Hazard Assessment (OEHHA) Air Toxics "Hot Spots" Program Risk Assessment Guidelines (APCD 2006; OEHHA 2003).

  All HRAs shall include:

  1. the estimated maximum 70-year lifetime cancer risk,
  2. the estimated maximum non-cancer chronic health hazard index (HHI), and
  3. the estimated maximum non-cancer acute health hazard index (HHI).

  Risk estimates shall each be made for the off-site point of maximum health impact (PMI), the maximally exposed individual resident (MEIR), and the maximally exposed individual worker (MEIW). The location of each of these receptors shall be specified. The lifetime cancer risk, non-cancer chronic and acute health hazard indexes for nearby sensitive receptors shall also be reported. Cancer and non-cancer chronic risk estimates shall be based on inhalation risks. HRAs shall include estimates of population exposure, including cancer burden, as well as cancer and non-cancer chronic and acute risk isopleths (contours). The HRA shall identify best available control technology (BACT) required to reduce risk to less than 10 in 1,000,000.

SENSITIVE RECEPTORS AND ODORS

Ambient air quality standards have been established to represent the levels of air quality considered sufficient, with an adequate margin of safety, to protect public health and welfare. They are designed to protect people most susceptible to respiratory distress, such as children under 14; persons over 65; persons engaged in strenuous work or exercise; and people with cardiovascular and chronic respiratory diseases. The majority of sensitive receptor locations are therefore residences, schools, and hospitals. There are no sensitive receptors within 3 miles of the project site and the project would not include any sensitive receptors, such as residences or schools.

Projects that involve offensive odors may be a nuisance to neighboring uses, including businesses, residences, sensitive receptors, and public areas. For example, heavy industrial projects and livestock

[2] Distribution Centers (that accommodate more than 100 trucks per day, more than 40 truck with operating transport refrigeration units per day, or where transport refrigeration unit operations exceed 300 hours per week); Chrome Platers; Dry Cleaners using Perchloroethylene (1 ormore machines); gas stations.

farming operations with the potential to expose sensitive receptors to objectionable odors could be deemed to have a significant impact.

Impact Analysis

Methodology and Significance Thresholds

METHODOLOGY

Air quality modeling was performed in general accordance with the statutory requirements outlined in the SDAPCD 2016 RAQS to identify both construction and operational emissions associated with the proposed project. All emissions were calculated using the California Emissions Estimator Model (CalEEMod) software version 2016.3.1, which incorporates current air emission data, planning methods and protocol.

Construction activities such as clearing, grading and excavation would generate diesel and dust emissions. The use of construction equipment would generate criteria air pollutant emissions. For modeling purposes, it was assumed that all construction equipment used would be diesel-powered. Construction emissions associated with development of the proposed project were quantified by estimating the types of equipment (including the number) that would be used on-site during each of the construction phases. Construction emissions are analyzed using the regional thresholds established by the SDAPCD and published under Rule 20.2 (SDAPCD Rules and Regulations).

Operational emissions include mobile source emissions, energy emissions and area source emissions. Mobile source emissions are generated by motor vehicle trips associated with operation of the project. Emissions attributed to energy use include electricity and natural gas consumption for space and water heating. Area source emissions are generated by landscape maintenance equipment, use of consumer products and painting. To determine whether a regional air quality impact would occur, the increase in emissions would be compared with the SDAPCD recommended regional thresholds for operational emissions.

CALIFORNIA ENVIRONMENTAL QUALITY ACT SIGNIFICANCE THRESHOLDS

To determine whether a project would have a significant impact to air quality, Appendix G of the CEQA Guidelines questions whether a project would:

1) Conflict with or obstruct implementation of the applicable air quality plan
2) 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 in non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)
4) Expose sensitive receptors to substantial pollutant concentrations
5) Create objectionable odors affecting a substantial number of people

SAN DIEGO AIR POLLUTION CONTROL DISTRICT SIGNIFICANCE THRESHOLDS

In addition, the SDAPCD has developed specific quantitative screening-level thresholds for determining when new or modified stationary sources must prepare an air quality impact analysis. These thresholds are also used by planning agencies and local jurisdictions for comparative purposes when evaluating projects under CEQA (City of San Diego 2011). The following thresholds are used to evaluate construction and operation activities:

- 137 pounds per day/15 tons per year of VOCs/ROG[3]
- 25 pounds per hour/250 pounds per day/40 tons per year of NO_X
- 25 pounds per hour/250 pounds per day/40 tons per year of SO_X[4]
- 100 pounds per hour/550 pounds per day/100 tons per year of CO
- 100 pounds per day/15 tons per year of PM_{10}
- 55 pounds per day/10 tons per year of $PM_{2.5}$
- 3.2 pounds per day/0.6 tons per year of Lead and Lead Compounds[5]

CITY OF SAN DIEGO CO EMISSIONS SIGNIFICANCE THRESHOLDS

Although CO is not an air quality concern in San Diego, elevated CO levels can occur at or near intersections that experience severe traffic congestion. A project's localized air quality impact is considered significant if the additional CO emissions resulting from the project create a "hot spot" where the California 1-hour standard of 20.0 ppm or the 8-hour standard of 9 ppm is exceeded. This can occur at severely congested intersections during cold winter temperatures. Screening for possible elevated CO levels should be conducted for severely congested intersections experiencing levels of service E or F with project traffic where a significant project traffic impact may occur. Pursuant to the City of San Diego's CEQA Significance Determination Thresholds, a site specific CO hotspot analysis should be performed to determine if health standards are potentially violated and to identify any affected sensitive receptor if a proposed development causes:

- a six-lane road to deteriorate to LOS E or worse
- a six-lane road to drop to LOS F
- a four-lane road to drop to LOS E or worse

Impact Analysis

CONSTRUCTION IMPACTS

Project construction would generate temporary air pollutant emissions. These impacts are associated with fugitive dust (PM_{10} and $PM_{2.5}$) from soil disturbance and exhaust emissions (NO_x and CO) from heavy construction vehicles. In addition, ROGs would be released during the drying phase after application of paint and other architectural coatings. Construction would generally consist of site preparation, grading, and construction of the proposed buildings, paving, and architectural coating.

The site preparation and grading phases would involve the greatest concentration of heavy equipment use and the highest potential for fugitive dust emissions. The project applicant estimates that 395,000 cubic yards of on-site soil would be excavated and used for fill; therefore, there would be no need for exporting or importing soil. On-site grading would be required to comply with SDAPCD Rules 52 and 54 , which identifies measures to reduce fugitive dust and is required to be implemented at all construction sites located within the SDAB. Therefore, the following conditions, which are required to reduce fugitive

3 VOC threshold based on SCAQMD levels per South Coast Air Quality Management District SDAPCD (9/01) and the Monterey Bay APCD (MBAPCD) which has similar federal and state attainment status as San Diego.

4 San Diego Air Basin has been in attainment of SOX standard due to sulfur-free natural gas for electricity generation and lack of heavy industrial/manufacturing uses in the region

5 Lead emissions have steadily declined due to catalytic converters and increased use of lead-free gasoline. San Diego is no longer required to monitor for lead.

dust in compliance with SDAPCD Rules 52 and 54, were included in CalEEMod for site preparation and grading phases of construction.

1. Minimization of Disturbance. Construction contractors should minimize the area disturbed by clearing, grading, earth moving, or excavation operations to prevent excessive amounts of dust.
2. Soil Treatment. Construction contractors should treat all graded and excavated material, exposed soil areas and active portions of the construction site, including unpaved on-site roadways to minimize fugitive dust. Treatment shall include, but not necessarily be limited to, periodic watering, application of environmentally safe soil stabilization materials, and/or roll compaction as appropriate. Watering shall be done as often as necessary, and at least twice daily, preferably in the late morning and after work is done for the day.
3. Soil Stabilization. Construction contractors should monitor all graded and/or excavated inactive areas of the construction site at least weekly for dust stabilization. Soil stabilization methods, such as water and roll compaction, and environmentally safe dust control materials shall be applied to portions of the construction site that are inactive for over four days. If no further grading or excavation operations are planned for the area, the area shall be seeded and watered until landscape growth is evident, or periodically treated with environmentally safe dust suppressants, to prevent excessive fugitive dust.
4. No Grading During High Winds. Construction contractors should stop all clearing, grading, earth moving, and excavation operations during periods of high winds (20 miles per hour or greater, as measured continuously over a one-hour period).
5. Street Sweeping. Construction contractors should sweep all on-site driveways and adjacent streets and roads at least once per day, preferably at the end of the day, if visible soil material is carried over to adjacent streets and roads.

Construction emissions modeling for site preparation, grading, building construction, paving and application of architectural coatings is based on the overall scope of the proposed development and construction phasing which is expected to begin November 2017 and extend through the middle of 2020. Table 4 summarizes the estimated maximum daily emissions of pollutants occurring during the construction period.

Table 4 Estimated Maximum Daily Construction Emissions

	Maximum Emissions (Maximum lbs/day)					
Construction Phase	**ROG**	**NO_X**	**SO_X**	**CO**	**PM_{10}**	**$PM_{2.5}$**
2017	5.8	68.0	< 0.1	39.6	7.1	4.5
2018	7.7	63.4	0.2	52.4	9.7	4.0
2019	7.0	58.6	0.2	48.8	9.5	3.6
2020	**306.6**	14.1	< 0.1	15.1	1.3	0.7
SDAPCD Regional Thresholds	137	250	250	550	100	55
Threshold Exceeded 2017	No	No	No	No	No	No
Threshold Exceeded 2018	No	No	No	No	No	No
Threshold Exceeded 2019	No	No	No	No	No	No
Threshold Exceeded 2020	**Yes**	No	No	No	No	No

See Appendix B for CalEEMod ver. 2016.3.1 computer model output for the construction of the proposed development.

Notes: Table includes emissions from the winter or summer report, whichever was greater.

As shown in Table 4, construction of the proposed project would exceed the SDAPCD regional construction emission thresholds for ROG emissions in the year 2020. The anticipated daily emissions of

ROGs are based on an assumption that architectural coatings would be applied over a period of 26 days. Further extending the duration of the architectural coating phase would distribute the associated ROG emissions over a greater number of days, resulting in lower daily emissions of ROG. A maximum area of 29,782.6 square feet of architectural coatings per day, which would require approximately 85 gallons of paint per day, was determined to result in maximum daily ROG emissions below the SDAPCD regional threshold of 137 pounds per day based on the following calculations:

1. 306.6 lbs ROG/day * 26 days = 7,971.6 lbs ROG
2. 7,971.6 lbs ROG / 1,715,248 square feet architectural coatings (total Project, interior and exterior) = 0.0046 lbs ROG/square feet
3. 137 lbs ROG/day (SDAPCD threshold)/0.0046 lbs ROG/square feet = 29,782.6 square feet/day
4. 29,782.6 square feet/day / 350 square feet/gallon (industry average) = 85 gallons/day
5. 85 gallons/day * 350 square feet/gallon = 29,750 square feet/day
6. 1,715,248 square feet (total Project) / 13,650 square feet/day = 58 days or, approximately, 2 months

Therefore, it is recommended that the following measures be applied to the project to reduce ROG emissions to below SDAPCD thresholds:

- Measure AQ-1: Low-VOC architectural coatings should be used for all buildings. In addition, no more than 85 gallons of paint should be used per day for architectural coatings, including both interior and exterior surfaces.

Implementation of this recommendation AQ-1 would reduce emissions to a level below SDAPCD daily thresholds for ROG. However, architectural coating and the associated ROG emissions would not create any substantial health risks. Extending the architectural coating phase by reducing the square footage that could be painted per day would extend the period of time in which the emissions would be introduced into the area but not reduce total emissions.

Hourly emissions for NO_X, SO_X and CO were determined by dividing the daily anticipated emission by a factor of eight (hours/day of construction activity). Table 5 summarizes the hourly emissions for these pollutants.

Table 5 Estimated Hourly Construction Emissions

	Maximum Emissions (Maximum lbs/hour)		
Construction Phase	**NO_X**	**SO_X**	**CO**
2017	8.5	0.01	5.0
2018	7.9	0.03	6.6
2019	7.3	0.03	6.1
2020	1.8	0.01	1.9
SDAPCD Hourly Thresholds	25	25	100
Threshold Exceeded 2017	No	No	No
Threshold Exceeded 2018	No	No	No
Threshold Exceeded 2019	No	No	No
Threshold Exceeded 2020	No	No	No

See Appendix B for CalEEMod ver. 2016.3.1 computer model output for the construction of the proposed development.

Annual emissions of pollutants were also estimated over the anticipated construction period to determine whether or not the project would exceed annual thresholds, as summarized in Table 6.

Table 6 Estimated Annual Construction Emissions

	Maximum Emissions (Maximum tons/yr)					
Construction Phase	**ROG**	**NOx**	**SOx**	**CO**	**PM10**	**PM2.5**
2017	0.1	1.5	< 0.1	0.9	0.4	0.2
2018	0.9	8.3	< 0.1	6.5	1.5	0.6
2019	0.8	7.0	< 0.1	5.7	1.1	0.4
2020	8.0	0.2	< 0.1	0.3	< 0.1	< 0.1
SDAPCD Annual Thresholds	15	40	40	100	15	10
Threshold Exceeded 2017	No	No	No	No	No	No
Threshold Exceeded 2018	No	No	No	No	No	No
Threshold Exceeded 2019	No	No	No	No	No	No
Threshold Exceeded 2020	No	No	No	No	No	No

See Appendix B for CalEEMod ver. 2016.3.1 computer model output for the construction of the proposed development.

Note: Table includes emissions from the winter or summer report, whichever was greater.

LONG-TERM OPERATIONAL IMPACTS

Operational Air Pollutant Emissions

Operational emissions include emissions from natural gas combustion (energy sources), vehicle trips (mobile sources), area sources, landscape equipment, and evaporative emissions as the structures are repainted over the life of the project. The majority of operational emissions are associated with vehicle trips to and from the project site. The default weekday trip generation rate for the proposed project was revised to reflect five trips per thousand square feet of building for industrial uses as specific in the draft Traffic Impact Analysis ([TIA] Kimley Horn February 2017). Table 7 summarizes emissions associated with operation of the proposed project.

Table 7 Estimated Operational Emissions

Category	Estimated Emissions (lbs/day)					
	ROG	**NO_X**	**CO**	**SO_X**	**PM_{10}**	**$PM_{2.5}$**
Area	20.5	<0.1	0.2	<0.1	<0.1	<0.1
Energy*	0.3	2.6	2.2	<0.1	0.2	0.2
Mobile	7.6	31.9	90.1	0.3	26.4	7.2
Maximum lbs/day	**23.7**	**31.9**	**90.1**	**0.3**	**26.4**	**7.2**
SDAPCD Thresholds	137	250	250	550	100	55
Threshold Exceeded?	No	No	No	No	No	No

See Appendix A for CalEEMod ver. 2016.3.1 computer model output for the demolition of existing development.

Notes:

Table includes emissions from the winter or summer report, whichever was greater.

*Energy emissions only include data for on-site use of natural gas

As shown in Table 7, the operational emissions would not exceed the SDAPCD thresholds for ROG, NO_X, CO, SO_X, PM_{10} or $PM_{2.5}$. Therefore, the project's regional air quality impacts (including impacts related to criteria pollutants, sensitive receptors and violations of air quality standards) would be less than significant.

Local Carbon Monoxide Emissions

As previously discussed, carbon monoxide is a colorless, odorless, poisonous gas that may be found in high concentrations near areas of high traffic volumes. CO emissions are a function of vehicle idling time, meteorological conditions, and traffic flow. The San Diego Air Basin is in attainment of state and federal CO standards. At the monitoring station located at San Diego – 1110 Beardsley Street in San Diego County, the station closest to project site that provides CO data, the maximum 8-hour average CO level recorded in 2012 was 1.81 parts per million (ppm), which is well below the 9 ppm state and federal 8-hour standard.

The CPU EIR reported that 28 intersections throughout Otay Mesa were found to operate at LOS E or worse. Based on the CO Protocol, the three worst intersections were selected for a detailed CO Hot Spot analysis. Those intersections were:

- Otay Mesa Road and Innovative Drive
- Old Otay Mesa Road and Beyer Boulevard
- Otay Valley Road and Heritage Road

These three intersections, under the adopted community plan and its update, were modeled in CALINE4 in order to determine if the CO emissions exceeded the thresholds (Recon 2013). The hot spot analysis concluded that the increases of CO due to implementation of the CPU would be below the federal and state 1-hour standard. Therefore, there would be no harmful concentrations of CO and localized air quality emission would not exceed applicable standards. The proposed project would not result in new CO hotspot impacts not previously studied, thus no new impacts related to CO hotspots.

TOXIC AIR CONTAMINANTS

There are no sensitive receptors in the vicinity of the project site. Nearby facilities where people would be working are the surrounding industrial buildings north and west of the project site. Operational emissions, as detailed in Table 7 above, are well below the local thresholds. Pursuant to the CPU land use designation of Heavy Commercial, the proposed project building could provide for retail sales, commercial services, office uses, and heavier commercial uses such as wholesale, distribution, storage, and vehicular sales and service, but residential land uses would be prohibited. Therefore, sensitive receptors would not be exposed to TAC emissions that would substantially impact human health. As such, the project would not trigger mitigation measures AQ-3 or AQ-4 of the CPU EIR, even if the building contained a land use as identified in Table 5.3-7 of the EIR.

ODORS

The project is not anticipated to include land uses that are typically associated with objectionable odors. The proposed project would involve the use of diesel powered construction equipment. Diesel exhaust may be noticeable temporarily at adjacent properties; however, construction activities would be temporary. Therefore, this impact would be less than significant and no mitigation would be necessary.

RAQS CONSISTENCY

The RAQS relies on information from CARB and SANDAG, including projected growth in the County, mobile, area and all other source emissions to project future emissions and determine from that the strategies necessary for the reduction of stationary source emissions through regulatory controls. Projects that propose development that is consistent with the growth anticipated by the general plan is consistent with the RAQS. The proposed project is consistent with the CPU, which was found to be consistent with the City's general plan. Therefore, the project is consistent with the RAQS.

With the implementation of the recommended use of low-VOC paint over a longer duration, emissions associated with the proposed project would not exceed the thresholds of significance. Further, the project is not residential; and thus, it would be consistent with the population projections as assumed by SANDAG in 2009, the year the RAQS was last updated.

Conclusions

Implementation of recommended Measure AQ-1 would reduce anticipated daily emissions to a level below SDAPCD daily thresholds for ROG. The project would then be consistent with Mitigation Measure AQ-1 of the CPU EIR.

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Air Quality Study Appendix A

CalEEMod Results

Sunroad 50

San Diego County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Light Industry	845.00	1000sqft	15.77	845,000.00	0
Parking Lot	1,052.00	Space	21.60	420,800.00	0
City Park	10.70	Acre	10.70	466,092.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	40
Climate Zone	13			**Operational Year**	2021
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

Project Characteristics -

Land Use - City Park: Open Space/Landscaping

Project proponent indicated that: parking/driving paved area would be 21.6 acres; And if total is 48.07, and 10.7 acres is landscaping then 15.77 for buildings.

Construction Phase - Project Proponent chose phase dates

Grading -

Vehicle Trips - 5/ksf comes from the traffic impact analysis
Recreation area is passive landscaping/open space, no trips

Landscape Equipment -

Construction Off-road Equipment Mitigation - Assumed compliance with SDAPCD Rules 52 and 54 for soil stabilizers, street sweeping, and watering watering 2x per day;

Area Mitigation - Low VOC paint, nonflat coating, assumed per Rule 67.0.1 (effective Jan 2016)

Water Mitigation -

Waste Mitigation - AB 939 and AB 341 increase waste diversion to 75 percent by 2020. CalEEMod already accounts for a 50 percent diversion rate associated with AB 939, an additional 25 percent was modeled to achieve the 75 percent diversion rate

Architectural Coating - Assumed compliance with SDAPCD Rule 67.0.1

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	250.00	100.00
tblArchitecturalCoating	EF_Nonresidential_Exterior	250.00	100.00
tblArchitecturalCoating	EF_Nonresidential_Interior	250.00	100.00
tblArchitecturalCoating	EF_Nonresidential_Interior	250.00	100.00
tblArchitecturalCoating	EF_Parking	250.00	100.00
tblArchitecturalCoating	EF_Parking	250.00	100.00
tblArchitecturalCoating	EF_Residential_Exterior	250.00	100.00
tblArchitecturalCoating	EF_Residential_Exterior	250.00	100.00
tblArchitecturalCoating	EF_Residential_Interior	250.00	100.00
tblArchitecturalCoating	EF_Residential_Interior	250.00	100.00
tblAreaMitigation	UseLowVOCPaintNonresidentialExteriorValue	250	100
tblAreaMitigation	UseLowVOCPaintNonresidentialInteriorValue	250	100

tblAreaMitigation	UseLowVOCPaintParkingCheck	False	True
tblAreaMitigation	UseLowVOCPaintParkingValue	250	100
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	25
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	40	0
tblConstructionPhase	NumDays	55.00	26.00
tblConstructionPhase	NumDays	55.00	26.00
tblConstructionPhase	NumDays	740.00	456.00
tblConstructionPhase	NumDays	55.00	26.00
tblConstructionPhase	NumDays	55.00	26.00
tblLandUse	LotAcreage	19.40	15.77
tblLandUse	LotAcreage	9.47	21.60
tblProjectCharacteristics	OperationalYear	2018	2021
tblVehicleTrips	ST_TR	22.75	0.00
tblVehicleTrips	ST_TR	1.32	5.00
tblVehicleTrips	SU_TR	16.74	0.00
tblVehicleTrips	SU_TR	0.68	5.00
tblVehicleTrips	WD_TR	1.89	0.00
tblVehicleTrips	WD_TR	6.97	5.00

2.0 Emissions Summary

2.1 Overall Construction

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	tons/yr										MT/yr					
2017	0.1256	1.4624	0.8496	1.3700e-003	0.3287	0.0661	0.3948	0.1358	0.0608	0.1966	0.0000	127.1683	127.1683	0.0381	0.0000	128.1195
2018	0.9160	8.2541	6.4806	0.0202	1.2112	0.2526	1.4637	0.3753	0.2370	0.6123	0.0000	1,878.1610	1,878.1610	0.1889	0.0000	1,882.8834
2019	0.8070	6.9479	5.7061	0.0191	0.8777	0.1933	1.0710	0.2382	0.1818	0.4200	0.0000	1,777.5643	1,777.5643	0.1647	0.0000	1,781.6809
2020	8.0027	0.1810	0.2840	6.0000e-004	0.0313	9.8800e-003	0.0412	8.3200e-003	9.3200e-003	0.0177	0.0000	52.9703	52.9703	7.1900e-003	0.0000	53.1501
Maximum	**8.0027**	**8.2541**	**6.4806**	**0.0202**	**1.2112**	**0.2526**	**1.4637**	**0.3753**	**0.2370**	**0.6123**	**0.0000**	**1,878.1610**	**1,878.1610**	**0.1889**	**0.0000**	**1,882.8834**

2.1 Overall Construction

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	tons/yr										MT/yr					
2017	0.1256	1.4624	0.8496	1.3700e-003	0.1498	0.0661	0.2159	0.0616	0.0608	0.1224	0.0000	127.1682	127.1682	0.0381	0.0000	128.1193
2018	0.9160	8.2541	6.4806	0.0202	1.0323	0.2526	1.2849	0.3011	0.2370	0.5381	0.0000	1,878.1605	1,878.1605	0.1889	0.0000	1,882.8830
2019	0.8070	6.9479	5.7061	0.0191	0.8777	0.1933	1.0710	0.2382	0.1818	0.4200	0.0000	1,777.5639	1,777.5639	0.1647	0.0000	1,781.6806
2020	8.0027	0.1810	0.2840	6.0000e-004	0.0313	9.8800e-003	0.0412	8.3200e-003	9.3200e-003	0.0177	0.0000	52.9702	52.9702	7.1900e-003	0.0000	53.1501
Maximum	**8.0027**	**8.2541**	**6.4806**	**0.0202**	**1.0323**	**0.2526**	**1.2849**	**0.3011**	**0.2370**	**0.5381**	**0.0000**	**1,878.1605**	**1,878.1605**	**0.1889**	**0.0000**	**1,882.8830**

	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**	**14.61**	**0.00**	**12.04**	**19.59**	**0.00**	**11.90**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**11-1-2017**	**1-31-2018**	2.3265	2.3265
2	**2-1-2018**	**4-30-2018**	2.2214	2.2214
3	**5-1-2018**	**7-31-2018**	2.3090	2.3090
4	**8-1-2018**	**10-31-2018**	2.3179	2.3179
5	**11-1-2018**	**1-31-2019**	2.2737	2.2737
6	**2-1-2019**	**4-30-2019**	2.0747	2.0747
7	**5-1-2019**	**7-31-2019**	2.1293	2.1293
8	**8-1-2019**	**10-31-2019**	2.1371	2.1371

9	**11-1-2019**	**1-31-2020**	2.5691	2.5691
10	**2-1-2020**	**4-30-2020**	10.8045	10.8045
		Highest	10.8045	10.8045

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	tons/yr										MT/yr					
Area	4.3272	1.6000e-004	0.0176	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0341	0.0341	9.0000e-005	0.0000	0.0364
Energy	0.0528	0.4801	0.4033	2.8800e-003		0.0365	0.0365		0.0365	0.0365	0.0000	2,977.1360	2,977.1360	0.1088	0.0300	2,988.8028
Mobile	1.3024	5.8209	15.9037	0.0541	4.6486	0.0460	4.6946	1.2449	0.0430	1.2879	0.0000	4,988.4040	4,988.4040	0.2639	0.0000	4,995.0014
Waste						0.0000	0.0000		0.0000	0.0000	212.8807	0.0000	212.8807	12.5809	0.0000	527.4029
Water						0.0000	0.0000		0.0000	0.0000	61.9934	877.8164	939.8098	6.4027	0.1577	1,146.8575
Total	**5.6823**	**6.3012**	**16.3245**	**0.0570**	**4.6486**	**0.0825**	**4.7312**	**1.2449**	**0.0796**	**1.3244**	**274.8741**	**8,843.3904**	**9,118.2645**	**19.3563**	**0.1877**	**9,658.1009**

2.2 Overall Operational

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	tons/yr										MT/yr					
Area	3.7309	1.6000e-004	0.0176	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0341	0.0341	9.0000e-005	0.0000	0.0364
Energy	0.0528	0.4801	0.4033	2.8800e-003		0.0365	0.0365		0.0365	0.0365	0.0000	2,977.1360	2,977.1360	0.1088	0.0300	2,988.8028
Mobile	1.3024	5.8209	15.9037	0.0541	4.6486	0.0460	4.6946	1.2449	0.0430	1.2879	0.0000	4,988.4040	4,988.4040	0.2639	0.0000	4,995.0014
Waste						0.0000	0.0000		0.0000	0.0000	159.6605	0.0000	159.6605	9.4357	0.0000	395.5522
Water						0.0000	0.0000		0.0000	0.0000	61.9934	877.8164	939.8098	6.4027	0.1577	1,146.8575
Total	**5.0861**	**6.3012**	**16.3245**	**0.0570**	**4.6486**	**0.0825**	**4.7312**	**1.2449**	**0.0796**	**1.3244**	**221.6539**	**8,843.3904**	**9,065.0443**	**16.2111**	**0.1877**	**9,526.2502**

	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	**10.49**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**19.36**	**0.00**	**0.58**	**16.25**	**0.00**	**1.37**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Excavation/Grading	Grading	11/1/2017	2/13/2018	5	75	Phase I
2	Building Construction	Building Construction	2/14/2018	11/13/2019	5	456	Phase I/II
3	Paving	Paving	11/14/2019	12/19/2019	5	26	Phase I
4	Paving Phase II	Paving	12/20/2019	1/24/2020	5	26	Phase II
5	Architectural Coating	Architectural Coating	1/25/2020	3/2/2020	5	26	Phase I
6	Architectural Coating Phase II	Architectural Coating	3/3/2020	4/7/2020	5	26	Phase II

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 21.6

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 1,267,500; Non-Residential Outdoor: 422,500; Striped Parking Area: 25,248 (Architectural Coating – sqft)

<u>OffRoad Equipment</u>

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Excavation/Grading	Excavators	2	8.00	158	0.38
Excavation/Grading	Graders	1	8.00	187	0.41
Excavation/Grading	Rubber Tired Dozers	1	8.00	247	0.40
Excavation/Grading	Scrapers	2	8.00	367	0.48
Excavation/Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Paving Phase II	Pavers	2	8.00	130	0.42
Paving Phase II	Paving Equipment	2	8.00	132	0.36
Paving Phase II	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48
Architectural Coating Phase II	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
Excavation/Grading	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	727.00	284.00	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
Paving Phase II	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	145.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating Phase II	1	145.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Soil Stabilizer

Water Exposed Area

3.2 Excavation/Grading - 2017

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	tons/yr										MT/yr					
Fugitive Dust					0.3253	0.0000	0.3253	0.1349	0.0000	0.1349	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1236	1.4607	0.8338	1.3300e-003		0.0661	0.0661		0.0608	0.0608	0.0000	123.7537	123.7537	0.0379	0.0000	124.7016
Total	**0.1236**	**1.4607**	**0.8338**	**1.3300e-003**	**0.3253**	**0.0661**	**0.3913**	**0.1349**	**0.0608**	**0.1957**	**0.0000**	**123.7537**	**123.7537**	**0.0379**	**0.0000**	**124.7016**

3.2 Excavation/Grading - 2017

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	tons/yr										MT/yr					
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	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	0.0000	0.0000
Worker	2.0300e-003	1.6500e-003	0.0158	4.0000e-005	3.4500e-003	3.0000e-005	3.4700e-003	9.2000e-004	2.0000e-005	9.4000e-004	0.0000	3.4147	3.4147	1.3000e-004	0.0000	3.4179
Total	**2.0300e-003**	**1.6500e-003**	**0.0158**	**4.0000e-005**	**3.4500e-003**	**3.0000e-005**	**3.4700e-003**	**9.2000e-004**	**2.0000e-005**	**9.4000e-004**	**0.0000**	**3.4147**	**3.4147**	**1.3000e-004**	**0.0000**	**3.4179**

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	tons/yr										MT/yr					
Fugitive Dust					0.1464	0.0000	0.1464	0.0607	0.0000	0.0607	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1236	1.4607	0.8338	1.3300e-003		0.0661	0.0661		0.0608	0.0608	0.0000	123.7535	123.7535	0.0379	0.0000	124.7015
Total	**0.1236**	**1.4607**	**0.8338**	**1.3300e-003**	**0.1464**	**0.0661**	**0.2124**	**0.0607**	**0.0608**	**0.1215**	**0.0000**	**123.7535**	**123.7535**	**0.0379**	**0.0000**	**124.7015**

3.2 Excavation/Grading - 2017

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	tons/yr										MT/yr					
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	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	0.0000	0.0000
Worker	2.0300e-003	1.6500e-003	0.0158	4.0000e-005	3.4500e-003	3.0000e-005	3.4700e-003	9.2000e-004	2.0000e-005	9.4000e-004	0.0000	3.4147	3.4147	1.3000e-004	0.0000	3.4179
Total	**2.0300e-003**	**1.6500e-003**	**0.0158**	**4.0000e-005**	**3.4500e-003**	**3.0000e-005**	**3.4700e-003**	**9.2000e-004**	**2.0000e-005**	**9.4000e-004**	**0.0000**	**3.4147**	**3.4147**	**1.3000e-004**	**0.0000**	**3.4179**

3.2 Excavation/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	tons/yr										MT/yr					
Fugitive Dust					0.3253	0.0000	0.3253	0.1349	0.0000	0.1349	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0814	0.9524	0.5614	9.9000e-004		0.0421	0.0421		0.0388	0.0388	0.0000	90.6376	90.6376	0.0282	0.0000	91.3430
Total	**0.0814**	**0.9524**	**0.5614**	**9.9000e-004**	**0.3253**	**0.0421**	**0.3674**	**0.1349**	**0.0388**	**0.1736**	**0.0000**	**90.6376**	**90.6376**	**0.0282**	**0.0000**	**91.3430**

3.2 Excavation/Grading - 2018

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	tons/yr										MT/yr					
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	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	0.0000	0.0000
Worker	1.3700e-003	1.0800e-003	0.0104	3.0000e-005	2.5700e-003	2.0000e-005	2.5900e-003	6.8000e-004	2.0000e-005	7.0000e-004	0.0000	2.4697	2.4697	9.0000e-005	0.0000	2.4718
Total	**1.3700e-003**	**1.0800e-003**	**0.0104**	**3.0000e-005**	**2.5700e-003**	**2.0000e-005**	**2.5900e-003**	**6.8000e-004**	**2.0000e-005**	**7.0000e-004**	**0.0000**	**2.4697**	**2.4697**	**9.0000e-005**	**0.0000**	**2.4718**

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	tons/yr										MT/yr					
Fugitive Dust					0.1464	0.0000	0.1464	0.0607	0.0000	0.0607	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0814	0.9524	0.5614	9.9000e-004		0.0421	0.0421		0.0388	0.0388	0.0000	90.6375	90.6375	0.0282	0.0000	91.3429
Total	**0.0814**	**0.9524**	**0.5614**	**9.9000e-004**	**0.1464**	**0.0421**	**0.1885**	**0.0607**	**0.0388**	**0.0995**	**0.0000**	**90.6375**	**90.6375**	**0.0282**	**0.0000**	**91.3429**

3.2 Excavation/Grading - 2018

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	tons/yr										MT/yr					
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	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	0.0000	0.0000
Worker	1.3700e-003	1.0800e-003	0.0104	3.0000e-005	2.5700e-003	2.0000e-005	2.5900e-003	6.8000e-004	2.0000e-005	7.0000e-004	0.0000	2.4697	2.4697	9.0000e-005	0.0000	2.4718
Total	**1.3700e-003**	**1.0800e-003**	**0.0104**	**3.0000e-005**	**2.5700e-003**	**2.0000e-005**	**2.5900e-003**	**6.8000e-004**	**2.0000e-005**	**7.0000e-004**	**0.0000**	**2.4697**	**2.4697**	**9.0000e-005**	**0.0000**	**2.4718**

3.3 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	tons/yr										MT/yr					
Off-Road	0.3068	2.6782	2.0130	3.0800e-003		0.1717	0.1717		0.1614	0.1614	0.0000	272.2435	272.2435	0.0667	0.0000	273.9110
Total	**0.3068**	**2.6782**	**2.0130**	**3.0800e-003**		**0.1717**	**0.1717**		**0.1614**	**0.1614**	**0.0000**	**272.2435**	**272.2435**	**0.0667**	**0.0000**	**273.9110**

3.3 Building Construction - 2018

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	tons/yr										MT/yr					
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	0.0000	0.0000
Vendor	0.1706	4.3408	1.1939	8.9700e-003	0.2158	0.0337	0.2496	0.0623	0.0323	0.0946	0.0000	870.3729	870.3729	0.0717	0.0000	872.1661
Worker	0.3558	0.2817	2.7019	7.1100e-003	0.6675	4.9200e-003	0.6725	0.1774	4.5400e-003	0.1819	0.0000	642.4373	642.4373	0.0222	0.0000	642.9916
Total	**0.5264**	**4.6225**	**3.8958**	**0.0161**	**0.8834**	**0.0387**	**0.9220**	**0.2397**	**0.0368**	**0.2765**	**0.0000**	**1,512.8102**	**1,512.8102**	**0.0939**	**0.0000**	**1,515.1576**

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	tons/yr										MT/yr					
Off-Road	0.3068	2.6782	2.0130	3.0800e-003		0.1717	0.1717		0.1614	0.1614	0.0000	272.2432	272.2432	0.0667	0.0000	273.9106
Total	**0.3068**	**2.6782**	**2.0130**	**3.0800e-003**		**0.1717**	**0.1717**		**0.1614**	**0.1614**	**0.0000**	**272.2432**	**272.2432**	**0.0667**	**0.0000**	**273.9106**

3.3 Building Construction - 2018

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	tons/yr										MT/yr					
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	0.0000	0.0000
Vendor	0.1706	4.3408	1.1939	8.9700e-003	0.2158	0.0337	0.2496	0.0623	0.0323	0.0946	0.0000	870.3729	870.3729	0.0717	0.0000	872.1661
Worker	0.3558	0.2817	2.7019	7.1100e-003	0.6675	4.9200e-003	0.6725	0.1774	4.5400e-003	0.1819	0.0000	642.4373	642.4373	0.0222	0.0000	642.9916
Total	**0.5264**	**4.6225**	**3.8958**	**0.0161**	**0.8834**	**0.0387**	**0.9220**	**0.2397**	**0.0368**	**0.2765**	**0.0000**	**1,512.8102**	**1,512.8102**	**0.0939**	**0.0000**	**1,515.1576**

3.3 Building Construction - 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	tons/yr										MT/yr					
Off-Road	0.2680	2.3924	1.9481	3.0500e-003		0.1464	0.1464		0.1376	0.1376	0.0000	266.8433	266.8433	0.0650	0.0000	268.4684
Total	**0.2680**	**2.3924**	**1.9481**	**3.0500e-003**		**0.1464**	**0.1464**		**0.1376**	**0.1376**	**0.0000**	**266.8433**	**266.8433**	**0.0650**	**0.0000**	**268.4684**

3.3 Building Construction - 2019

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	tons/yr										MT/yr					
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	0.0000	0.0000
Vendor	0.1510	4.0459	1.0870	8.8100e-003	0.2140	0.0280	0.2420	0.0618	0.0268	0.0886	0.0000	856.3863	856.3863	0.0687	0.0000	858.1045
Worker	0.3253	0.2496	2.4143	6.8400e-003	0.6617	4.8300e-003	0.6665	0.1758	4.4500e-003	0.1803	0.0000	617.6182	617.6182	0.0199	0.0000	618.1147
Total	**0.4763**	**4.2955**	**3.5013**	**0.0157**	**0.8757**	**0.0328**	**0.9085**	**0.2376**	**0.0313**	**0.2689**	**0.0000**	**1,474.0045**	**1,474.0045**	**0.0886**	**0.0000**	**1,476.2192**

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	tons/yr										MT/yr					
Off-Road	0.2680	2.3924	1.9481	3.0500e-003		0.1464	0.1464		0.1376	0.1376	0.0000	266.8430	266.8430	0.0650	0.0000	268.4681
Total	**0.2680**	**2.3924**	**1.9481**	**3.0500e-003**		**0.1464**	**0.1464**		**0.1376**	**0.1376**	**0.0000**	**266.8430**	**266.8430**	**0.0650**	**0.0000**	**268.4681**

3.3 Building Construction - 2019

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	tons/yr										MT/yr					
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	0.0000	0.0000
Vendor	0.1510	4.0459	1.0870	8.8100e-003	0.2140	0.0280	0.2420	0.0618	0.0268	0.0886	0.0000	856.3863	856.3863	0.0687	0.0000	858.1045
Worker	0.3253	0.2496	2.4143	6.8400e-003	0.6617	4.8300e-003	0.6665	0.1758	4.4500e-003	0.1803	0.0000	617.6182	617.6182	0.0199	0.0000	618.1147
Total	**0.4763**	**4.2955**	**3.5013**	**0.0157**	**0.8757**	**0.0328**	**0.9085**	**0.2376**	**0.0313**	**0.2689**	**0.0000**	**1,474.0045**	**1,474.0045**	**0.0886**	**0.0000**	**1,476.2192**

3.4 Paving - 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	tons/yr										MT/yr					
Off-Road	0.0189	0.1982	0.1906	3.0000e-004		0.0107	0.0107		9.8600e-003	9.8600e-003	0.0000	26.6177	26.6177	8.4200e-003	0.0000	26.8283
Paving	0.0283					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0472**	**0.1982**	**0.1906**	**3.0000e-004**		**0.0107**	**0.0107**		**9.8600e-003**	**9.8600e-003**	**0.0000**	**26.6177**	**26.6177**	**8.4200e-003**	**0.0000**	**26.8283**

3.4 Paving - 2019

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	tons/yr										MT/yr					
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	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	0.0000	0.0000
Worker	7.7000e-004	5.9000e-004	5.7100e-003	2.0000e-005	1.5600e-003	1.0000e-005	1.5800e-003	4.2000e-004	1.0000e-005	4.3000e-004	0.0000	1.4596	1.4596	5.0000e-005	0.0000	1.4607
Total	**7.7000e-004**	**5.9000e-004**	**5.7100e-003**	**2.0000e-005**	**1.5600e-003**	**1.0000e-005**	**1.5800e-003**	**4.2000e-004**	**1.0000e-005**	**4.3000e-004**	**0.0000**	**1.4596**	**1.4596**	**5.0000e-005**	**0.0000**	**1.4607**

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	tons/yr										MT/yr					
Off-Road	0.0189	0.1982	0.1906	3.0000e-004		0.0107	0.0107		9.8600e-003	9.8600e-003	0.0000	26.6177	26.6177	8.4200e-003	0.0000	26.8282
Paving	0.0283					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0472**	**0.1982**	**0.1906**	**3.0000e-004**		**0.0107**	**0.0107**		**9.8600e-003**	**9.8600e-003**	**0.0000**	**26.6177**	**26.6177**	**8.4200e-003**	**0.0000**	**26.8282**

3.4 Paving - 2019

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	tons/yr										MT/yr					
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	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	0.0000	0.0000
Worker	7.7000e-004	5.9000e-004	5.7100e-003	2.0000e-005	1.5600e-003	1.0000e-005	1.5800e-003	4.2000e-004	1.0000e-005	4.3000e-004	0.0000	1.4596	1.4596	5.0000e-005	0.0000	1.4607
Total	**7.7000e-004**	**5.9000e-004**	**5.7100e-003**	**2.0000e-005**	**1.5600e-003**	**1.0000e-005**	**1.5800e-003**	**4.2000e-004**	**1.0000e-005**	**4.3000e-004**	**0.0000**	**1.4596**	**1.4596**	**5.0000e-005**	**0.0000**	**1.4607**

3.5 Paving Phase II - 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	tons/yr										MT/yr					
Off-Road	5.8200e-003	0.0610	0.0587	9.0000e-005		3.3000e-003	3.3000e-003		3.0300e-003	3.0300e-003	0.0000	8.1901	8.1901	2.5900e-003	0.0000	8.2549
Paving	8.7100e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0145**	**0.0610**	**0.0587**	**9.0000e-005**		**3.3000e-003**	**3.3000e-003**		**3.0300e-003**	**3.0300e-003**	**0.0000**	**8.1901**	**8.1901**	**2.5900e-003**	**0.0000**	**8.2549**

3.5 Paving Phase II - 2019

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	tons/yr										MT/yr					
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	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	0.0000	0.0000
Worker	2.4000e-004	1.8000e-004	1.7600e-003	0.0000	4.8000e-004	0.0000	4.8000e-004	1.3000e-004	0.0000	1.3000e-004	0.0000	0.4491	0.4491	1.0000e-005	0.0000	0.4495
Total	**2.4000e-004**	**1.8000e-004**	**1.7600e-003**	**0.0000**	**4.8000e-004**	**0.0000**	**4.8000e-004**	**1.3000e-004**	**0.0000**	**1.3000e-004**	**0.0000**	**0.4491**	**0.4491**	**1.0000e-005**	**0.0000**	**0.4495**

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	tons/yr										MT/yr					
Off-Road	5.8200e-003	0.0610	0.0587	9.0000e-005		3.3000e-003	3.3000e-003		3.0300e-003	3.0300e-003	0.0000	8.1901	8.1901	2.5900e-003	0.0000	8.2548
Paving	8.7100e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0145**	**0.0610**	**0.0587**	**9.0000e-005**		**3.3000e-003**	**3.3000e-003**		**3.0300e-003**	**3.0300e-003**	**0.0000**	**8.1901**	**8.1901**	**2.5900e-003**	**0.0000**	**8.2548**

3.5 Paving Phase II - 2019

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	tons/yr										MT/yr					
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	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	0.0000	0.0000
Worker	2.4000e-004	1.8000e-004	1.7600e-003	0.0000	4.8000e-004	0.0000	4.8000e-004	1.3000e-004	0.0000	1.3000e-004	0.0000	0.4491	0.4491	1.0000e-005	0.0000	0.4495
Total	**2.4000e-004**	**1.8000e-004**	**1.7600e-003**	**0.0000**	**4.8000e-004**	**0.0000**	**4.8000e-004**	**1.3000e-004**	**0.0000**	**1.3000e-004**	**0.0000**	**0.4491**	**0.4491**	**1.0000e-005**	**0.0000**	**0.4495**

3.5 Paving Phase II - 2020

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	tons/yr										MT/yr					
Off-Road	0.0122	0.1266	0.1319	2.1000e-004		6.7800e-003	6.7800e-003		6.2300e-003	6.2300e-003	0.0000	18.0254	18.0254	5.8300e-003	0.0000	18.1711
Paving	0.0196					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0318**	**0.1266**	**0.1319**	**2.1000e-004**		**6.7800e-003**	**6.7800e-003**		**6.2300e-003**	**6.2300e-003**	**0.0000**	**18.0254**	**18.0254**	**5.8300e-003**	**0.0000**	**18.1711**

3.5 Paving Phase II - 2020

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	tons/yr										MT/yr					
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	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	0.0000	0.0000
Worker	5.0000e-004	3.7000e-004	3.6100e-003	1.0000e-005	1.0800e-003	1.0000e-005	1.0900e-003	2.9000e-004	1.0000e-005	2.9000e-004	0.0000	0.9786	0.9786	3.0000e-005	0.0000	0.9793
Total	**5.0000e-004**	**3.7000e-004**	**3.6100e-003**	**1.0000e-005**	**1.0800e-003**	**1.0000e-005**	**1.0900e-003**	**2.9000e-004**	**1.0000e-005**	**2.9000e-004**	**0.0000**	**0.9786**	**0.9786**	**3.0000e-005**	**0.0000**	**0.9793**

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	tons/yr										MT/yr					
Off-Road	0.0122	0.1266	0.1319	2.1000e-004		6.7800e-003	6.7800e-003		6.2300e-003	6.2300e-003	0.0000	18.0254	18.0254	5.8300e-003	0.0000	18.1711
Paving	0.0196					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0318**	**0.1266**	**0.1319**	**2.1000e-004**		**6.7800e-003**	**6.7800e-003**		**6.2300e-003**	**6.2300e-003**	**0.0000**	**18.0254**	**18.0254**	**5.8300e-003**	**0.0000**	**18.1711**

3.5 Paving Phase II - 2020

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	tons/yr										MT/yr					
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	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	0.0000	0.0000
Worker	5.0000e-004	3.7000e-004	3.6100e-003	1.0000e-005	1.0800e-003	1.0000e-005	1.0900e-003	2.9000e-004	1.0000e-005	2.9000e-004	0.0000	0.9786	0.9786	3.0000e-005	0.0000	0.9793
Total	**5.0000e-004**	**3.7000e-004**	**3.6100e-003**	**1.0000e-005**	**1.0800e-003**	**1.0000e-005**	**1.0900e-003**	**2.9000e-004**	**1.0000e-005**	**2.9000e-004**	**0.0000**	**0.9786**	**0.9786**	**3.0000e-005**	**0.0000**	**0.9793**

3.6 Architectural Coating - 2020

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	tons/yr										MT/yr					
Archit. Coating	3.9751					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.1500e-003	0.0219	0.0238	4.0000e-005		1.4400e-003	1.4400e-003		1.4400e-003	1.4400e-003	0.0000	3.3192	3.3192	2.6000e-004	0.0000	3.3257
Total	**3.9782**	**0.0219**	**0.0238**	**4.0000e-005**		**1.4400e-003**	**1.4400e-003**		**1.4400e-003**	**1.4400e-003**	**0.0000**	**3.3192**	**3.3192**	**2.6000e-004**	**0.0000**	**3.3257**

3.6 Architectural Coating - 2020

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	tons/yr										MT/yr					
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	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	0.0000	0.0000
Worker	6.9500e-003	5.1400e-003	0.0504	1.5000e-004	0.0151	1.1000e-004	0.0152	4.0200e-003	1.0000e-004	4.1200e-003	0.0000	13.6639	13.6639	4.1000e-004	0.0000	13.6742
Total	**6.9500e-003**	**5.1400e-003**	**0.0504**	**1.5000e-004**	**0.0151**	**1.1000e-004**	**0.0152**	**4.0200e-003**	**1.0000e-004**	**4.1200e-003**	**0.0000**	**13.6639**	**13.6639**	**4.1000e-004**	**0.0000**	**13.6742**

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	tons/yr										MT/yr					
Archit. Coating	3.9751					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.1500e-003	0.0219	0.0238	4.0000e-005		1.4400e-003	1.4400e-003		1.4400e-003	1.4400e-003	0.0000	3.3192	3.3192	2.6000e-004	0.0000	3.3257
Total	**3.9782**	**0.0219**	**0.0238**	**4.0000e-005**		**1.4400e-003**	**1.4400e-003**		**1.4400e-003**	**1.4400e-003**	**0.0000**	**3.3192**	**3.3192**	**2.6000e-004**	**0.0000**	**3.3257**

3.6 Architectural Coating - 2020

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	tons/yr										MT/yr					
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	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	0.0000	0.0000
Worker	6.9500e-003	5.1400e-003	0.0504	1.5000e-004	0.0151	1.1000e-004	0.0152	4.0200e-003	1.0000e-004	4.1200e-003	0.0000	13.6639	13.6639	4.1000e-004	0.0000	13.6742
Total	**6.9500e-003**	**5.1400e-003**	**0.0504**	**1.5000e-004**	**0.0151**	**1.1000e-004**	**0.0152**	**4.0200e-003**	**1.0000e-004**	**4.1200e-003**	**0.0000**	**13.6639**	**13.6639**	**4.1000e-004**	**0.0000**	**13.6742**

3.7 Architectural Coating Phase II - 2020

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	tons/yr										MT/yr					
Archit. Coating	3.9751					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.1500e-003	0.0219	0.0238	4.0000e-005		1.4400e-003	1.4400e-003		1.4400e-003	1.4400e-003	0.0000	3.3192	3.3192	2.6000e-004	0.0000	3.3257
Total	**3.9782**	**0.0219**	**0.0238**	**4.0000e-005**		**1.4400e-003**	**1.4400e-003**		**1.4400e-003**	**1.4400e-003**	**0.0000**	**3.3192**	**3.3192**	**2.6000e-004**	**0.0000**	**3.3257**

3.7 Architectural Coating Phase II - 2020

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	tons/yr										MT/yr					
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	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	0.0000	0.0000
Worker	6.9500e-003	5.1400e-003	0.0504	1.5000e-004	0.0151	1.1000e-004	0.0152	4.0200e-003	1.0000e-004	4.1200e-003	0.0000	13.6639	13.6639	4.1000e-004	0.0000	13.6742
Total	**6.9500e-003**	**5.1400e-003**	**0.0504**	**1.5000e-004**	**0.0151**	**1.1000e-004**	**0.0152**	**4.0200e-003**	**1.0000e-004**	**4.1200e-003**	**0.0000**	**13.6639**	**13.6639**	**4.1000e-004**	**0.0000**	**13.6742**

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	tons/yr										MT/yr					
Archit. Coating	3.9751					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.1500e-003	0.0219	0.0238	4.0000e-005		1.4400e-003	1.4400e-003		1.4400e-003	1.4400e-003	0.0000	3.3192	3.3192	2.6000e-004	0.0000	3.3257
Total	**3.9782**	**0.0219**	**0.0238**	**4.0000e-005**		**1.4400e-003**	**1.4400e-003**		**1.4400e-003**	**1.4400e-003**	**0.0000**	**3.3192**	**3.3192**	**2.6000e-004**	**0.0000**	**3.3257**

3.7 Architectural Coating Phase II - 2020

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	tons/yr										MT/yr					
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	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	0.0000	0.0000
Worker	6.9500e-003	5.1400e-003	0.0504	1.5000e-004	0.0151	1.1000e-004	0.0152	4.0200e-003	1.0000e-004	4.1200e-003	0.0000	13.6639	13.6639	4.1000e-004	0.0000	13.6742
Total	**6.9500e-003**	**5.1400e-003**	**0.0504**	**1.5000e-004**	**0.0151**	**1.1000e-004**	**0.0152**	**4.0200e-003**	**1.0000e-004**	**4.1200e-003**	**0.0000**	**13.6639**	**13.6639**	**4.1000e-004**	**0.0000**	**13.6742**

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	tons/yr										MT/yr					
Mitigated	1.3024	5.8209	15.9037	0.0541	4.6486	0.0460	4.6946	1.2449	0.0430	1.2879	0.0000	4,988.4040	4,988.4040	0.2639	0.0000	4,995.0014
Unmitigated	1.3024	5.8209	15.9037	0.0541	4.6486	0.0460	4.6946	1.2449	0.0430	1.2879	0.0000	4,988.4040	4,988.4040	0.2639	0.0000	4,995.0014

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	0.00	0.00	0.00		
General Light Industry	4,225.00	4,225.00	4225.00	12,334,935	12,334,935
Parking Lot	0.00	0.00	0.00		
Total	4,225.00	4,225.00	4,225.00	12,334,935	12,334,935

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
City Park	9.50	7.30	7.30	33.00	48.00	19.00	66	28	6
General Light Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
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 Light Industry	0.593936	0.041843	0.182569	0.108325	0.016436	0.005513	0.015940	0.023523	0.001912	0.001972	0.006090	0.000748	0.001193
Parking Lot	0.593936	0.041843	0.182569	0.108325	0.016436	0.005513	0.015940	0.023523	0.001912	0.001972	0.006090	0.000748	0.001193
City Park	0.593936	0.041843	0.182569	0.108325	0.016436	0.005513	0.015940	0.023523	0.001912	0.001972	0.006090	0.000748	0.001193

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	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	2,454.5149	2,454.5149	0.0988	0.0204	2,463.0760
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	2,454.5149	2,454.5149	0.0988	0.0204	2,463.0760
NaturalGas Mitigated	0.0528	0.4801	0.4033	2.8800e-003		0.0365	0.0365		0.0365	0.0365	0.0000	522.6211	522.6211	0.0100	9.5800e-003	525.7268
NaturalGas Unmitigated	0.0528	0.4801	0.4033	2.8800e-003		0.0365	0.0365		0.0365	0.0365	0.0000	522.6211	522.6211	0.0100	9.5800e-003	525.7268

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	tons/yr										MT/yr					
City Park	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	0.0000
General Light Industry	9.79355e+006	0.0528	0.4801	0.4033	2.8800e-003		0.0365	0.0365		0.0365	0.0365	0.0000	522.6211	522.6211	0.0100	9.5800e-003	525.7268
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	0.0000
Total		**0.0528**	**0.4801**	**0.4033**	**2.8800e-003**		**0.0365**	**0.0365**		**0.0365**	**0.0365**	**0.0000**	**522.6211**	**522.6211**	**0.0100**	**9.5800e-003**	**525.7268**

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	tons/yr										MT/yr					
City Park	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	0.0000
General Light Industry	9.79355e+006	0.0528	0.4801	0.4033	2.8800e-003		0.0365	0.0365		0.0365	0.0365	0.0000	522.6211	522.6211	0.0100	9.5800e-003	525.7268
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	0.0000
Total		**0.0528**	**0.4801**	**0.4033**	**2.8800e-003**		**0.0365**	**0.0365**		**0.0365**	**0.0365**	**0.0000**	**522.6211**	**522.6211**	**0.0100**	**9.5800e-003**	**525.7268**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
General Light Industry	7.14025e+006	2,333.4963	0.0939	0.0194	2,341.6353
Parking Lot	370304	121.0186	4.8700e-003	1.0100e-003	121.4407
Total		**2,454.5149**	**0.0988**	**0.0204**	**2,463.0760**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
General Light Industry	7.14025e+006	2,333.4963	0.0939	0.0194	2,341.6353
Parking Lot	370304	121.0186	4.8700e-003	1.0100e-003	121.4407
Total		**2,454.5149**	**0.0988**	**0.0204**	**2,463.0760**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

	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	tons/yr										MT/yr					
Mitigated	3.7309	1.6000e-004	0.0176	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0341	0.0341	9.0000e-005	0.0000	0.0364
Unmitigated	4.3272	1.6000e-004	0.0176	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0341	0.0341	9.0000e-005	0.0000	0.0364

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	tons/yr										MT/yr					
Architectural Coating	0.9938					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	3.3317					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.6400e-003	1.6000e-004	0.0176	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0341	0.0341	9.0000e-005	0.0000	0.0364
Total	**4.3271**	**1.6000e-004**	**0.0176**	**0.0000**		**6.0000e-005**	**6.0000e-005**		**6.0000e-005**	**6.0000e-005**	**0.0000**	**0.0341**	**0.0341**	**9.0000e-005**	**0.0000**	**0.0364**

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	tons/yr										MT/yr					
Architectural Coating	0.3975					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	3.3317					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.6400e-003	1.6000e-004	0.0176	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0341	0.0341	9.0000e-005	0.0000	0.0364
Total	**3.7309**	**1.6000e-004**	**0.0176**	**0.0000**		**6.0000e-005**	**6.0000e-005**		**6.0000e-005**	**6.0000e-005**	**0.0000**	**0.0341**	**0.0341**	**9.0000e-005**	**0.0000**	**0.0364**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	939.8098	6.4027	0.1577	1,146.857 5
Unmitigated	939.8098	6.4027	0.1577	1,146.857 5

7.2 Water by Land Use

Unmitigated

	Indoor/Out door Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 12.7489	46.2891	1.8600e-003	3.9000e-004	46.4506
General Light Industry	195.406 / 0	893.5206	6.4008	0.1573	1,100.407 0
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**939.8097**	**6.4026**	**0.1577**	**1,146.857 5**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 12.7489	46.2891	1.8600e-003	3.9000e-004	46.4506
General Light Industry	195.406 / 0	893.5206	6.4008	0.1573	1,100.4070
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**939.8097**	**6.4026**	**0.1577**	**1,146.8575**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	159.6605	9.4357	0.0000	395.5522
Unmitigated	212.8807	12.5809	0.0000	527.4029

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	0.92	0.1868	0.0110	0.0000	0.4627
General Light Industry	1047.8	212.6939	12.5699	0.0000	526.9402
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**212.8807**	**12.5809**	**0.0000**	**527.4029**

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	0.69	0.1401	8.2800e-003	0.0000	0.3470
General Light Industry	785.85	159.5205	9.4274	0.0000	395.2052
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**159.6605**	**9.4357**	**0.0000**	**395.5522**

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

Sunroad 50

San Diego County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Light Industry	845.00	1000sqft	15.77	845,000.00	0
Parking Lot	1,052.00	Space	21.60	420,800.00	0
City Park	10.70	Acre	10.70	466,092.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	40
Climate Zone	13			**Operational Year**	2021
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

Project Characteristics -

Land Use - City Park: Open Space/Landscaping

Project proponent indicated that: parking/driving paved area would be 21.6 acres; And if total is 48.07, and 10.7 acres is landscaping then 15.77 for buildings.

Construction Phase - Project Proponent chose phase dates

Grading -

Vehicle Trips - 5/ksf comes from the traffic impact analysis
Recreation area is passive landscaping/open space, no trips

Landscape Equipment -

Construction Off-road Equipment Mitigation - Assumed compliance with SDAPCD Rules 52 and 54 for soil stabilizers, street sweeping, and watering watering 2x per day;

Area Mitigation - Low VOC paint, nonflat coating, assumed per Rule 67.0.1 (effective Jan 2016)

Water Mitigation -

Waste Mitigation - AB 939 and AB 341 increase waste diversion to 75 percent by 2020. CalEEMod already accounts for a 50 percent diversion rate associated with AB 939, an additional 25 percent was modeled to achieve the 75 percent diversion rate

Architectural Coating - Assumed compliance with SDAPCD Rule 67.0.1

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	250.00	100.00
tblArchitecturalCoating	EF_Nonresidential_Exterior	250.00	100.00
tblArchitecturalCoating	EF_Nonresidential_Interior	250.00	100.00
tblArchitecturalCoating	EF_Nonresidential_Interior	250.00	100.00
tblArchitecturalCoating	EF_Parking	250.00	100.00
tblArchitecturalCoating	EF_Parking	250.00	100.00
tblArchitecturalCoating	EF_Residential_Exterior	250.00	100.00
tblArchitecturalCoating	EF_Residential_Exterior	250.00	100.00
tblArchitecturalCoating	EF_Residential_Interior	250.00	100.00
tblArchitecturalCoating	EF_Residential_Interior	250.00	100.00
tblAreaMitigation	UseLowVOCPaintNonresidentialExteriorValue	250	100
tblAreaMitigation	UseLowVOCPaintNonresidentialInteriorValue	250	100

tblAreaMitigation	UseLowVOCPaintParkingCheck	False	True
tblAreaMitigation	UseLowVOCPaintParkingValue	250	100
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	25
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	40	0
tblConstructionPhase	NumDays	55.00	26.00
tblConstructionPhase	NumDays	55.00	26.00
tblConstructionPhase	NumDays	740.00	456.00
tblConstructionPhase	NumDays	55.00	26.00
tblConstructionPhase	NumDays	55.00	26.00
tblLandUse	LotAcreage	19.40	15.77
tblLandUse	LotAcreage	9.47	21.60
tblProjectCharacteristics	OperationalYear	2018	2021
tblVehicleTrips	ST_TR	22.75	0.00
tblVehicleTrips	ST_TR	1.32	5.00
tblVehicleTrips	SU_TR	16.74	0.00
tblVehicleTrips	SU_TR	0.68	5.00
tblVehicleTrips	WD_TR	1.89	0.00
tblVehicleTrips	WD_TR	6.97	5.00

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					
2017	5.8423	68.0090	39.5546	0.0639	8.8376	3.0739	11.9116	3.6401	2.8280	6.4681	0.0000	6,529.5088	6,529.5088	1.9509	0.0000	6,578.2816
2018	7.2386	63.0367	52.3761	0.1716	8.8376	2.6349	11.4726	3.6401	2.4241	6.0642	0.0000	17,612.3499	17,612.3499	1.9501	0.0000	17,650.7628
2019	6.5229	58.2834	48.7488	0.1688	7.8947	1.5774	9.4721	2.1375	1.4863	3.6238	0.0000	17,324.8039	17,324.8039	1.4824	0.0000	17,361.8641
2020	306.5502	14.1027	15.0773	0.0241	1.1911	0.7537	1.3104	0.3160	0.6934	0.7261	0.0000	2,334.1455	2,334.1455	0.7178	0.0000	2,352.0905
Maximum	**306.5502**	**68.0090**	**52.3761**	**0.1716**	**8.8376**	**3.0739**	**11.9116**	**3.6401**	**2.8280**	**6.4681**	**0.0000**	**17,612.3499**	**17,612.3499**	**1.9509**	**0.0000**	**17,650.7628**

2.1 Overall Construction (Maximum Daily Emission)

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					
2017	5.8423	68.0090	39.5546	0.0639	4.0673	3.0739	7.1412	1.6620	2.8280	4.4900	0.0000	6,529.508 8	6,529.508 8	1.9509	0.0000	6,578.281 6
2018	7.2386	63.0367	52.3761	0.1716	7.8947	2.6349	9.7302	2.1376	2.4241	4.0861	0.0000	17,612.34 99	17,612.34 99	1.9501	0.0000	17,650.76 28
2019	6.5229	58.2834	48.7488	0.1688	7.8947	1.5774	9.4721	2.1375	1.4863	3.6238	0.0000	17,324.80 39	17,324.80 39	1.4824	0.0000	17,361.86 41
2020	306.5502	14.1027	15.0773	0.0241	1.1911	0.7537	1.3104	0.3160	0.6934	0.7261	0.0000	2,334.145 5	2,334.145 5	0.7178	0.0000	2,352.090 5
Maximum	**306.5502**	**68.0090**	**52.3761**	**0.1716**	**7.8947**	**3.0739**	**9.7302**	**2.1376**	**2.8280**	**4.4900**	**0.0000**	**17,612.34 99**	**17,612.34 99**	**1.9509**	**0.0000**	**17,650.76 28**

	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**	**21.35**	**0.00**	**19.06**	**35.76**	**0.00**	**23.43**	**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	23.7197	1.7900e-003	0.1955	1.0000e-005		7.0000e-004	7.0000e-004		7.0000e-004	7.0000e-004		0.4175	0.4175	1.1100e-003		0.4452
Energy	0.2894	2.6306	2.2097	0.0158		0.1999	0.1999		0.1999	0.1999		3,156.6640	3,156.6640	0.0605	0.0579	3,175.4225
Mobile	7.5467	30.9724	90.0815	0.3108	26.1555	0.2523	26.4078	6.9906	0.2358	7.2265		31,562.1735	31,562.1735	1.6107		31,602.4400
Total	**31.5557**	**33.6048**	**92.4867**	**0.3266**	**26.1555**	**0.4529**	**26.6084**	**6.9906**	**0.4365**	**7.4271**		**34,719.2550**	**34,719.2550**	**1.6723**	**0.0579**	**34,778.3077**

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	20.4525	1.7900e-003	0.1955	1.0000e-005		7.0000e-004	7.0000e-004		7.0000e-004	7.0000e-004		0.4175	0.4175	1.1100e-003		0.4452
Energy	0.2894	2.6306	2.2097	0.0158		0.1999	0.1999		0.1999	0.1999		3,156.6640	3,156.6640	0.0605	0.0579	3,175.4225
Mobile	7.5467	30.9724	90.0815	0.3108	26.1555	0.2523	26.4078	6.9906	0.2358	7.2265		31,562.1735	31,562.1735	1.6107		31,602.4400
Total	**28.2885**	**33.6048**	**92.4867**	**0.3266**	**26.1555**	**0.4529**	**26.6084**	**6.9906**	**0.4365**	**7.4271**		**34,719.2550**	**34,719.2550**	**1.6723**	**0.0579**	**34,778.3077**

	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	10.35	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	Excavation/Grading	Grading	11/1/2017	2/13/2018	5	75	Phase I
2	Building Construction	Building Construction	2/14/2018	11/13/2019	5	456	Phase I/II
3	Paving	Paving	11/14/2019	12/19/2019	5	26	Phase I
4	Paving Phase II	Paving	12/20/2019	1/24/2020	5	26	Phase II
5	Architectural Coating	Architectural Coating	1/25/2020	3/2/2020	5	26	Phase I
6	Architectural Coating Phase II	Architectural Coating	3/3/2020	4/7/2020	5	26	Phase II

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 21.6

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 1,267,500; Non-Residential Outdoor: 422,500; Striped Parking Area: 25,248 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Excavation/Grading	Excavators	2	8.00	158	0.38
Excavation/Grading	Graders	1	8.00	187	0.41
Excavation/Grading	Rubber Tired Dozers	1	8.00	247	0.40
Excavation/Grading	Scrapers	2	8.00	367	0.48
Excavation/Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Paving Phase II	Pavers	2	8.00	130	0.42
Paving Phase II	Paving Equipment	2	8.00	132	0.36
Paving Phase II	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48
Architectural Coating Phase II	Air Compressors	1	6.00	78	0.48

Trips and VMT

Sunroad 50 - San Diego County, Summer

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
Excavation/Grading	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	727.00	284.00	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
Paving Phase II	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	145.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating Phase II	1	145.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Soil Stabilizer

Water Exposed Area

3.2 Excavation/Grading - 2017

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					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	5.7483	67.9396	38.7826	0.0620		3.0727	3.0727		2.8269	2.8269		6,344.8863	6,344.8863	1.9441		6,393.4879
Total	**5.7483**	**67.9396**	**38.7826**	**0.0620**	**8.6733**	**3.0727**	**11.7460**	**3.5965**	**2.8269**	**6.4234**		**6,344.8863**	**6,344.8863**	**1.9441**		**6,393.4879**

3.2 Excavation/Grading - 2017

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	0.0940	0.0693	0.7720	1.8600e-003	0.1643	1.2100e-003	0.1655	0.0436	1.1200e-003	0.0447		184.6225	184.6225	6.8500e-003		184.7937
Total	**0.0940**	**0.0693**	**0.7720**	**1.8600e-003**	**0.1643**	**1.2100e-003**	**0.1655**	**0.0436**	**1.1200e-003**	**0.0447**		**184.6225**	**184.6225**	**6.8500e-003**		**184.7937**

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					3.9030	0.0000	3.9030	1.6184	0.0000	1.6184			0.0000			0.0000
Off-Road	5.7483	67.9396	38.7826	0.0620		3.0727	3.0727		2.8269	2.8269	0.0000	6,344.8863	6,344.8863	1.9441		6,393.4878
Total	**5.7483**	**67.9396**	**38.7826**	**0.0620**	**3.9030**	**3.0727**	**6.9757**	**1.6184**	**2.8269**	**4.4453**	**0.0000**	**6,344.8863**	**6,344.8863**	**1.9441**		**6,393.4878**

3.2 Excavation/Grading - 2017

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	0.0940	0.0693	0.7720	1.8600e-003	0.1643	1.2100e-003	0.1655	0.0436	1.1200e-003	0.0447		184.6225	184.6225	6.8500e-003		184.7937
Total	**0.0940**	**0.0693**	**0.7720**	**1.8600e-003**	**0.1643**	**1.2100e-003**	**0.1655**	**0.0436**	**1.1200e-003**	**0.0447**		**184.6225**	**184.6225**	**6.8500e-003**		**184.7937**

3.2 Excavation/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					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	5.0901	59.5218	35.0894	0.0620		2.6337	2.6337		2.4230	2.4230		6,244.4284	6,244.4284	1.9440		6,293.0278
Total	**5.0901**	**59.5218**	**35.0894**	**0.0620**	**8.6733**	**2.6337**	**11.3071**	**3.5965**	**2.4230**	**6.0195**		**6,244.4284**	**6,244.4284**	**1.9440**		**6,293.0278**

3.2 Excavation/Grading - 2018

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	0.0851	0.0613	0.6847	1.8000e-003	0.1643	1.1800e-003	0.1655	0.0436	1.0900e-003	0.0447		179.4449	179.4449	6.1400e-003		179.5984
Total	**0.0851**	**0.0613**	**0.6847**	**1.8000e-003**	**0.1643**	**1.1800e-003**	**0.1655**	**0.0436**	**1.0900e-003**	**0.0447**		**179.4449**	**179.4449**	**6.1400e-003**		**179.5984**

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					3.9030	0.0000	3.9030	1.6184	0.0000	1.6184			0.0000			0.0000
Off-Road	5.0901	59.5218	35.0894	0.0620		2.6337	2.6337		2.4230	2.4230	0.0000	6,244.4284	6,244.4284	1.9440		6,293.0278
Total	**5.0901**	**59.5218**	**35.0894**	**0.0620**	**3.9030**	**2.6337**	**6.5367**	**1.6184**	**2.4230**	**4.0415**	**0.0000**	**6,244.4284**	**6,244.4284**	**1.9440**		**6,293.0278**

3.2 Excavation/Grading - 2018

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	0.0851	0.0613	0.6847	1.8000e-003	0.1643	1.1800e-003	0.1655	0.0436	1.0900e-003	0.0447		179.4449	179.4449	6.1400e-003		179.5984
Total	**0.0851**	**0.0613**	**0.6847**	**1.8000e-003**	**0.1643**	**1.1800e-003**	**0.1655**	**0.0436**	**1.0900e-003**	**0.0447**		**179.4449**	**179.4449**	**6.1400e-003**		**179.5984**

3.3 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	2.6795	23.3900	17.5804	0.0269		1.4999	1.4999		1.4099	1.4099		2,620.9351	2,620.9351	0.6421		2,636.9883
Total	**2.6795**	**23.3900**	**17.5804**	**0.0269**		**1.4999**	**1.4999**		**1.4099**	**1.4099**		**2,620.9351**	**2,620.9351**	**0.6421**		**2,636.9883**

3.3 Building Construction - 2018

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	1.4646	37.4181	9.9085	0.0791	1.9226	0.2927	2.2152	0.5535	0.2800	0.8334		8,468.592 2	8,468.592 2	0.6712		8,485.372 1
Worker	3.0945	2.2285	24.8871	0.0655	5.9721	0.0430	6.0151	1.5841	0.0397	1.6237		6,522.822 6	6,522.822 6	0.2232		6,528.402 5
Total	**4.5591**	**39.6466**	**34.7957**	**0.1447**	**7.8947**	**0.3357**	**8.2304**	**2.1376**	**0.3196**	**2.4572**		**14,991.41 47**	**14,991.41 47**	**0.8944**		**15,013.77 45**

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	2.6795	23.3900	17.5804	0.0269		1.4999	1.4999		1.4099	1.4099	0.0000	2,620.935 1	2,620.935 1	0.6421		2,636.988 3
Total	**2.6795**	**23.3900**	**17.5804**	**0.0269**		**1.4999**	**1.4999**		**1.4099**	**1.4099**	**0.0000**	**2,620.935 1**	**2,620.935 1**	**0.6421**		**2,636.988 3**

3.3 Building Construction - 2018

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	1.4646	37.4181	9.9085	0.0791	1.9226	0.2927	2.2152	0.5535	0.2800	0.8334		8,468.592 2	8,468.592 2	0.6712		8,485.372 1
Worker	3.0945	2.2285	24.8871	0.0655	5.9721	0.0430	6.0151	1.5841	0.0397	1.6237		6,522.822 6	6,522.822 6	0.2232		6,528.402 5
Total	**4.5591**	**39.6466**	**34.7957**	**0.1447**	**7.8947**	**0.3357**	**8.2304**	**2.1376**	**0.3196**	**2.4572**		**14,991.41 47**	**14,991.41 47**	**0.8944**		**15,013.77 45**

3.3 Building Construction - 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					
Off-Road	2.3612	21.0788	17.1638	0.0269		1.2899	1.2899		1.2127	1.2127		2,591.580 2	2,591.580 2	0.6313		2,607.363 5
Total	**2.3612**	**21.0788**	**17.1638**	**0.0269**		**1.2899**	**1.2899**		**1.2127**	**1.2127**		**2,591.580 2**	**2,591.580 2**	**0.6313**		**2,607.363 5**

3.3 Building Construction - 2019

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	1.3071	35.2125	9.0908	0.0784	1.9226	0.2450	2.1676	0.5535	0.2343	0.7878		8,406.872 4	8,406.872 4	0.6491		8,423.098 8
Worker	2.8546	1.9921	22.4943	0.0635	5.9721	0.0426	6.0147	1.5841	0.0392	1.6233		6,326.351 4	6,326.351 4	0.2020		6,331.401 7
Total	**4.1617**	**37.2046**	**31.5850**	**0.1419**	**7.8947**	**0.2875**	**8.1823**	**2.1375**	**0.2736**	**2.4111**		**14,733.22 37**	**14,733.22 37**	**0.8511**		**14,754.50 06**

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	2.3612	21.0788	17.1638	0.0269		1.2899	1.2899		1.2127	1.2127	0.0000	2,591.580 2	2,591.580 2	0.6313		2,607.363 5
Total	**2.3612**	**21.0788**	**17.1638**	**0.0269**		**1.2899**	**1.2899**		**1.2127**	**1.2127**	**0.0000**	**2,591.580 2**	**2,591.580 2**	**0.6313**		**2,607.363 5**

3.3 Building Construction - 2019

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	1.3071	35.2125	9.0908	0.0784	1.9226	0.2450	2.1676	0.5535	0.2343	0.7878		8,406.8724	8,406.8724	0.6491		8,423.0988
Worker	2.8546	1.9921	22.4943	0.0635	5.9721	0.0426	6.0147	1.5841	0.0392	1.6233		6,326.3514	6,326.3514	0.2020		6,331.4017
Total	**4.1617**	**37.2046**	**31.5850**	**0.1419**	**7.8947**	**0.2875**	**8.1823**	**2.1375**	**0.2736**	**2.4111**		**14,733.2237**	**14,733.2237**	**0.8511**		**14,754.5006**

3.4 Paving - 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					
Off-Road	1.4544	15.2441	14.6648	0.0228		0.8246	0.8246		0.7586	0.7586		2,257.0025	2,257.0025	0.7141		2,274.8548
Paving	2.1766					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**3.6311**	**15.2441**	**14.6648**	**0.0228**		**0.8246**	**0.8246**		**0.7586**	**0.7586**		**2,257.0025**	**2,257.0025**	**0.7141**		**2,274.8548**

3.4 Paving - 2019

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	0.0589	0.0411	0.4641	1.3100e-003	0.1232	8.8000e-004	0.1241	0.0327	8.1000e-004	0.0335		130.5300	130.5300	4.1700e-003		130.6342
Total	**0.0589**	**0.0411**	**0.4641**	**1.3100e-003**	**0.1232**	**8.8000e-004**	**0.1241**	**0.0327**	**8.1000e-004**	**0.0335**		**130.5300**	**130.5300**	**4.1700e-003**		**130.6342**

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	1.4544	15.2441	14.6648	0.0228		0.8246	0.8246		0.7586	0.7586	0.0000	2,257.0025	2,257.0025	0.7141		2,274.8548
Paving	2.1766					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**3.6311**	**15.2441**	**14.6648**	**0.0228**		**0.8246**	**0.8246**		**0.7586**	**0.7586**	**0.0000**	**2,257.0025**	**2,257.0025**	**0.7141**		**2,274.8548**

3.4 Paving - 2019

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	0.0589	0.0411	0.4641	1.3100e-003	0.1232	8.8000e-004	0.1241	0.0327	8.1000e-004	0.0335		130.5300	130.5300	4.1700e-003		130.6342
Total	**0.0589**	**0.0411**	**0.4641**	**1.3100e-003**	**0.1232**	**8.8000e-004**	**0.1241**	**0.0327**	**8.1000e-004**	**0.0335**		**130.5300**	**130.5300**	**4.1700e-003**		**130.6342**

3.5 Paving Phase II - 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					
Off-Road	1.4544	15.2441	14.6648	0.0228		0.8246	0.8246		0.7586	0.7586		2,257.0025	2,257.0025	0.7141		2,274.8548
Paving	2.1766					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**3.6311**	**15.2441**	**14.6648**	**0.0228**		**0.8246**	**0.8246**		**0.7586**	**0.7586**		**2,257.0025**	**2,257.0025**	**0.7141**		**2,274.8548**

3.5 Paving Phase II - 2019

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	0.0589	0.0411	0.4641	1.3100e-003	0.1232	8.8000e-004	0.1241	0.0327	8.1000e-004	0.0335		130.5300	130.5300	4.1700e-003		130.6342
Total	**0.0589**	**0.0411**	**0.4641**	**1.3100e-003**	**0.1232**	**8.8000e-004**	**0.1241**	**0.0327**	**8.1000e-004**	**0.0335**		**130.5300**	**130.5300**	**4.1700e-003**		**130.6342**

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	1.4544	15.2441	14.6648	0.0228		0.8246	0.8246		0.7586	0.7586	0.0000	2,257.0025	2,257.0025	0.7141		2,274.8548
Paving	2.1766					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**3.6311**	**15.2441**	**14.6648**	**0.0228**		**0.8246**	**0.8246**		**0.7586**	**0.7586**	**0.0000**	**2,257.0025**	**2,257.0025**	**0.7141**		**2,274.8548**

3.5 Paving Phase II - 2019

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	0.0589	0.0411	0.4641	1.3100e-003	0.1232	8.8000e-004	0.1241	0.0327	8.1000e-004	0.0335		130.5300	130.5300	4.1700e-003		130.6342
Total	**0.0589**	**0.0411**	**0.4641**	**1.3100e-003**	**0.1232**	**8.8000e-004**	**0.1241**	**0.0327**	**8.1000e-004**	**0.0335**		**130.5300**	**130.5300**	**4.1700e-003**		**130.6342**

3.5 Paving Phase II - 2020

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	1.3566	14.0656	14.6521	0.0228		0.7528	0.7528		0.6926	0.6926		2,207.7334	2,207.7334	0.7140		2,225.5841
Paving	2.1766					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**3.5332**	**14.0656**	**14.6521**	**0.0228**		**0.7528**	**0.7528**		**0.6926**	**0.6926**		**2,207.7334**	**2,207.7334**	**0.7140**		**2,225.5841**

3.5 Paving Phase II - 2020

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	0.0550	0.0371	0.4252	1.2700e-003	0.1232	8.6000e-004	0.1241	0.0327	8.0000e-004	0.0335		126.4121	126.4121	3.7700e-003		126.5064
Total	**0.0550**	**0.0371**	**0.4252**	**1.2700e-003**	**0.1232**	**8.6000e-004**	**0.1241**	**0.0327**	**8.0000e-004**	**0.0335**		**126.4121**	**126.4121**	**3.7700e-003**		**126.5064**

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	1.3566	14.0656	14.6521	0.0228		0.7528	0.7528		0.6926	0.6926	0.0000	2,207.7334	2,207.7334	0.7140		2,225.5841
Paving	2.1766					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**3.5332**	**14.0656**	**14.6521**	**0.0228**		**0.7528**	**0.7528**		**0.6926**	**0.6926**	**0.0000**	**2,207.7334**	**2,207.7334**	**0.7140**		**2,225.5841**

3.5 Paving Phase II - 2020

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	0.0550	0.0371	0.4252	1.2700e-003	0.1232	8.6000e-004	0.1241	0.0327	8.0000e-004	0.0335		126.4121	126.4121	3.7700e-003		126.5064
Total	**0.0550**	**0.0371**	**0.4252**	**1.2700e-003**	**0.1232**	**8.6000e-004**	**0.1241**	**0.0327**	**8.0000e-004**	**0.0335**		**126.4121**	**126.4121**	**3.7700e-003**		**126.5064**

3.6 Architectural Coating - 2020

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	305.7759					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2422	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109		281.4481	281.4481	0.0218		281.9928
Total	**306.0181**	**1.6838**	**1.8314**	**2.9700e-003**		**0.1109**	**0.1109**		**0.1109**	**0.1109**		**281.4481**	**281.4481**	**0.0218**		**281.9928**

3.6 Architectural Coating - 2020

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	0.5321	0.3585	4.1102	0.0123	1.1911	8.3600e-003	1.1995	0.3160	7.7000e-003	0.3237		1,221.983 2	1,221.983 2	0.0365		1,222.895 4
Total	**0.5321**	**0.3585**	**4.1102**	**0.0123**	**1.1911**	**8.3600e-003**	**1.1995**	**0.3160**	**7.7000e-003**	**0.3237**		**1,221.983 2**	**1,221.983 2**	**0.0365**		**1,222.895 4**

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	305.7759					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2422	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109	0.0000	281.4481	281.4481	0.0218		281.9928
Total	**306.0181**	**1.6838**	**1.8314**	**2.9700e-003**		**0.1109**	**0.1109**		**0.1109**	**0.1109**	**0.0000**	**281.4481**	**281.4481**	**0.0218**		**281.9928**

3.6 Architectural Coating - 2020

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	0.5321	0.3585	4.1102	0.0123	1.1911	8.3600e-003	1.1995	0.3160	7.7000e-003	0.3237		1,221.983 2	1,221.983 2	0.0365		1,222.895 4
Total	**0.5321**	**0.3585**	**4.1102**	**0.0123**	**1.1911**	**8.3600e-003**	**1.1995**	**0.3160**	**7.7000e-003**	**0.3237**		**1,221.983 2**	**1,221.983 2**	**0.0365**		**1,222.895 4**

3.7 Architectural Coating Phase II - 2020

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	305.7759					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2422	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109		281.4481	281.4481	0.0218		281.9928
Total	**306.0181**	**1.6838**	**1.8314**	**2.9700e-003**		**0.1109**	**0.1109**		**0.1109**	**0.1109**		**281.4481**	**281.4481**	**0.0218**		**281.9928**

3.7 Architectural Coating Phase II - 2020

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	0.5321	0.3585	4.1102	0.0123	1.1911	8.3600e-003	1.1995	0.3160	7.7000e-003	0.3237		1,221.9832	1,221.9832	0.0365		1,222.8954
Total	**0.5321**	**0.3585**	**4.1102**	**0.0123**	**1.1911**	**8.3600e-003**	**1.1995**	**0.3160**	**7.7000e-003**	**0.3237**		**1,221.9832**	**1,221.9832**	**0.0365**		**1,222.8954**

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	305.7759					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2422	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109	0.0000	281.4481	281.4481	0.0218		281.9928
Total	**306.0181**	**1.6838**	**1.8314**	**2.9700e-003**		**0.1109**	**0.1109**		**0.1109**	**0.1109**	**0.0000**	**281.4481**	**281.4481**	**0.0218**		**281.9928**

3.7 Architectural Coating Phase II - 2020

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	0.5321	0.3585	4.1102	0.0123	1.1911	8.3600e-003	1.1995	0.3160	7.7000e-003	0.3237		1,221.983 2	1,221.983 2	0.0365		1,222.895 4
Total	**0.5321**	**0.3585**	**4.1102**	**0.0123**	**1.1911**	**8.3600e-003**	**1.1995**	**0.3160**	**7.7000e-003**	**0.3237**		**1,221.983 2**	**1,221.983 2**	**0.0365**		**1,222.895 4**

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	7.5467	30.9724	90.0815	0.3108	26.1555	0.2523	26.4078	6.9906	0.2358	7.2265		31,562.1735	31,562.1735	1.6107		31,602.4400
Unmitigated	7.5467	30.9724	90.0815	0.3108	26.1555	0.2523	26.4078	6.9906	0.2358	7.2265		31,562.1735	31,562.1735	1.6107		31,602.4400

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	0.00	0.00	0.00		
General Light Industry	4,225.00	4,225.00	4225.00	12,334,935	12,334,935
Parking Lot	0.00	0.00	0.00		
Total	4,225.00	4,225.00	4,225.00	12,334,935	12,334,935

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
City Park	9.50	7.30	7.30	33.00	48.00	19.00	66	28	6
General Light Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
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 Light Industry	0.593936	0.041843	0.182569	0.108325	0.016436	0.005513	0.015940	0.023523	0.001912	0.001972	0.006090	0.000748	0.001193
Parking Lot	0.593936	0.041843	0.182569	0.108325	0.016436	0.005513	0.015940	0.023523	0.001912	0.001972	0.006090	0.000748	0.001193
City Park	0.593936	0.041843	0.182569	0.108325	0.016436	0.005513	0.015940	0.023523	0.001912	0.001972	0.006090	0.000748	0.001193

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	0.2894	2.6306	2.2097	0.0158		0.1999	0.1999		0.1999	0.1999		3,156.664 0	3,156.664 0	0.0605	0.0579	3,175.422 5
NaturalGas Unmitigated	0.2894	2.6306	2.2097	0.0158		0.1999	0.1999		0.1999	0.1999		3,156.664 0	3,156.664 0	0.0605	0.0579	3,175.422 5

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					
City Park	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
General Light Industry	26831.6	0.2894	2.6306	2.2097	0.0158		0.1999	0.1999		0.1999	0.1999		3,156.664 0	3,156.664 0	0.0605	0.0579	3,175.422 5
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		**0.2894**	**2.6306**	**2.2097**	**0.0158**		**0.1999**	**0.1999**		**0.1999**	**0.1999**		**3,156.664 0**	**3,156.664 0**	**0.0605**	**0.0579**	**3,175.422 5**

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					
City Park	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
General Light Industry	26.8316	0.2894	2.6306	2.2097	0.0158		0.1999	0.1999		0.1999	0.1999		3,156.664 0	3,156.664 0	0.0605	0.0579	3,175.422 5
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		**0.2894**	**2.6306**	**2.2097**	**0.0158**		**0.1999**	**0.1999**		**0.1999**	**0.1999**		**3,156.664 0**	**3,156.664 0**	**0.0605**	**0.0579**	**3,175.422 5**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

	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	20.4525	1.7900e-003	0.1955	1.0000e-005		7.0000e-004	7.0000e-004		7.0000e-004	7.0000e-004		0.4175	0.4175	1.1100e-003		0.4452
Unmitigated	23.7197	1.7900e-003	0.1955	1.0000e-005		7.0000e-004	7.0000e-004		7.0000e-004	7.0000e-004		0.4175	0.4175	1.1100e-003		0.4452

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	5.4453					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	18.2561					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0183	1.7900e-003	0.1955	1.0000e-005		7.0000e-004	7.0000e-004		7.0000e-004	7.0000e-004		0.4175	0.4175	1.1100e-003		0.4452
Total	**23.7196**	**1.7900e-003**	**0.1955**	**1.0000e-005**		**7.0000e-004**	**7.0000e-004**		**7.0000e-004**	**7.0000e-004**		**0.4175**	**0.4175**	**1.1100e-003**		**0.4452**

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	2.1781					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	18.2561					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0183	1.7900e-003	0.1955	1.0000e-005		7.0000e-004	7.0000e-004		7.0000e-004	7.0000e-004		0.4175	0.4175	1.1100e-003		0.4452
Total	**20.4525**	**1.7900e-003**	**0.1955**	**1.0000e-005**		**7.0000e-004**	**7.0000e-004**		**7.0000e-004**	**7.0000e-004**		**0.4175**	**0.4175**	**1.1100e-003**		**0.4452**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

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

Sunroad 50

San Diego, Summary Report

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Light Industry	845.00	1000sqft	15.77	845,000.00	0
Parking Lot	1,052.00	Space	21.60	420,800.00	0
City Park	10.70	Acre	10.70	466,092.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	40
Climate Zone	13			**Operational Year**	2021
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

Only CalEEMod defaults were used.

Project Characteristics -

Land Use - City Park: Open Space/Landscaping

Project proponent indicated that: parking/driving paved area would be 21.6 acres; And if total is 48.07, and 10.7 acres is landscaping then 15.77 for buildings.

Construction Phase - Project Proponent chose phase dates

Grading -

Vehicle Trips - 5/ksf comes from the traffic impact analysis
Recreation area is passive landscaping/open space, no trips

Landscape Equipment -

Construction Off-road Equipment Mitigation - Assumed compliance with SDAPCD Rules 52 and 54 for soil stabilizers, street sweeping, and watering watering 2x per day;

Area Mitigation - Low VOC paint, nonflat coating, assumed per Rule 67.0.1 (effective Jan 2016)

Water Mitigation -

Waste Mitigation - AB 939 and AB 341 increase waste diversion to 75 percent by 2020. CalEEMod already accounts for a 50 percent diversion rate associated with AB 939, an additional 25 percent was modeled to achieve the 75 percent diversion rate

Architectural Coating - Assumed compliance with SDAPCD Rule 67.0.1

2.0 Peak Daily Emissions

Peak Daily Construction Emissions

Peak Daily Construction Emissions

Sunroad 50 - San Diego County, Summary Report

		Unmitigated						Mitigated					
		ROG	NOX	CO	SO2	PM10	PM2.5	ROG	NOX	CO	SO2	PM10	PM2.5
Year	Phase	lb/day											
2017	Grading	5.8545 W	68.0175 W	39.5546 S	0.0639 S	11.9116 S	6.4681 S	5.8545 W	68.0175 W	39.5546 S	0.0639 S	7.1412 S	4.4900 S
2018	Grading	5.1863 W	59.5906 W	35.7740 S	0.0638 S	11.4726 S	6.0642 S	5.1863 W	59.5906 W	35.7740 S	0.0638 S	6.7022 S	4.0861 S
2018	Building Construction	7.7016 W	63.3746 W	52.3761 S	0.1716 S	9.7351 W	3.8717 W	7.7016 W	63.3746 W	52.3761 S	0.1716 S	9.7351 W	3.8717 W
2019	Building Construction	6.9530 W	58.5571 W	48.7488 S	0.1688 S	9.4765 W	3.6280 W	6.9530 W	58.5571 W	48.7488 S	0.1688 S	9.4765 W	3.6280 W
2019	Paving	11.0930 W	45.8706 W	45.3869 S	0.0723 S	2.8460 S	2.3763 S	11.0930 W	45.8706 W	45.3869 S	0.0723 S	2.8460 S	2.3763 S
2020	Paving	7.1910 W	28.2144 W	30.1545 S	0.0481 S	1.7538 S	1.4521 S	7.1910 W	28.2144 W	30.1545 S	0.0481 S	1.7538 S	1.4521 S
2020	Architectural Coating	919.8623 W	6.2591 W	17.8247 S	0.0457 S	3.9313 S	1.3038 S	919.8623 W	6.2591 W	17.8247 S	0.0457 S	3.9313 S	1.3038 S
	Peak Daily Total	919.8623 W	68.0175 W	52.3761 S	0.1716 S	11.9116 S	6.4681 S	919.8623 W	68.0175 W	52.3761 S	0.1716 S	9.7351 W	4.4900 S
	Air District Threshold												
	Exceed Significance?												

Peak Daily Operational Emissions

Peak Daily Operational Emissions

		Unmitigated						Mitigated					
		ROG	NOX	CO	SO2	PM10	PM2.5	ROG	NOX	CO	SO2	PM10	PM2.5
	Operational Activity	lb/day											
On-Site	Area	23.7197 S	1.7900e-003 S	0.1955 S	1.0000e-005 S	7.0000e-004 S	7.0000e-004 S	20.4525 S	1.7900e-003 S	0.1955 S	1.0000e-005 S	7.0000e-004 S	7.0000e-004 S
On-Site	Energy	0.2894 S	2.6306 S	2.2097 S	0.0158 S	0.1999 S	0.1999 S	0.2894 S	2.6306 S	2.2097 S	0.0158 S	0.1999 S	0.1999 S
Off-Site	Mobile	7.5467 S	31.8950 W	90.0815 S	0.3108 S	26.4095 W	7.2281 W	7.5467 S	31.8950 W	90.0815 S	0.3108 S	26.4095 W	7.2281 W
	Peak Daily Total	31.5557 S	34.5274 W	92.4867 S	0.3266 S	26.6101 W	7.4287 W	28.2885 S	34.5274 W	92.4867 S	0.3266 S	26.6101 W	7.4287 W
	Air District Threshold												
	Exceed Significance?												

3.0 Annual GHG Emissions

Annual GHG

Annual GHG

		Unmitigated				Mitigated			
		CO2	CH4	N2O	CO2e	CO2	CH4	N2O	CO2e
GHG Activity	Year	MT/yr							
Construction	2017	127.1683	0.0380	0.0000	128.1195	127.1682	0.0380	0.0000	128.1194
Construction	2018	1,878.1610	0.1889	0.0000	1,882.8835	1,878.1605	0.1889	0.0000	1,882.8829
Construction	2019	1,777.5643	0.1647	0.0000	1,781.6808	1,777.5639	0.1647	0.0000	1,781.6805
Construction	2020	52.9702	7.1940e-003	0.0000	53.1501	52.9702	7.1940e-003	0.0000	53.1501
Operational	2021	9,118.2645	19.3563	0.1877	9,658.1011	9,065.0443	16.2111	0.1877	9,526.2502
	Total								
	Significance Threshold								
	Exceed Significance?								

Sunroad 50

San Diego County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Light Industry	845.00	1000sqft	15.77	845,000.00	0
Parking Lot	1,052.00	Space	21.60	420,800.00	0
City Park	10.70	Acre	10.70	466,092.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	40
Climate Zone	13			**Operational Year**	2021
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

Sunroad 50 - San Diego County, Winter

Project Characteristics -

Land Use - City Park: Open Space/Landscaping

Project proponent indicated that: parking/driving paved area would be 21.6 acres; And if total is 48.07, and 10.7 acres is landscaping then 15.77 for buildings.

Construction Phase - Project Proponent chose phase dates

Grading -

Vehicle Trips - 5/ksf comes from the traffic impact analysis
Recreation area is passive landscaping/open space, no trips

Landscape Equipment -

Construction Off-road Equipment Mitigation - Assumed compliance with SDAPCD Rules 52 and 54 for soil stabilizers, street sweeping, and watering watering 2x per day;

Area Mitigation - Low VOC paint, nonflat coating, assumed per Rule 67.0.1 (effective Jan 2016)

Water Mitigation -

Waste Mitigation - AB 939 and AB 341 increase waste diversion to 75 percent by 2020. CalEEMod already accounts for a 50 percent diversion rate associated with AB 939, an additional 25 percent was modeled to achieve the 75 percent diversion rate

Architectural Coating - Assumed compliance with SDAPCD Rule 67.0.1

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	250.00	100.00
tblArchitecturalCoating	EF_Nonresidential_Exterior	250.00	100.00
tblArchitecturalCoating	EF_Nonresidential_Interior	250.00	100.00
tblArchitecturalCoating	EF_Nonresidential_Interior	250.00	100.00
tblArchitecturalCoating	EF_Parking	250.00	100.00
tblArchitecturalCoating	EF_Parking	250.00	100.00
tblArchitecturalCoating	EF_Residential_Exterior	250.00	100.00
tblArchitecturalCoating	EF_Residential_Exterior	250.00	100.00
tblArchitecturalCoating	EF_Residential_Interior	250.00	100.00
tblArchitecturalCoating	EF_Residential_Interior	250.00	100.00
tblAreaMitigation	UseLowVOCPaintNonresidentialExteriorValue	250	100
tblAreaMitigation	UseLowVOCPaintNonresidentialInteriorValue	250	100

tblAreaMitigation	UseLowVOCPaintParkingCheck	False	True
tblAreaMitigation	UseLowVOCPaintParkingValue	250	100
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	25
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	40	0
tblConstructionPhase	NumDays	55.00	26.00
tblConstructionPhase	NumDays	55.00	26.00
tblConstructionPhase	NumDays	740.00	456.00
tblConstructionPhase	NumDays	55.00	26.00
tblConstructionPhase	NumDays	55.00	26.00
tblLandUse	LotAcreage	19.40	15.77
tblLandUse	LotAcreage	9.47	21.60
tblProjectCharacteristics	OperationalYear	2018	2021
tblVehicleTrips	ST_TR	22.75	0.00
tblVehicleTrips	ST_TR	1.32	5.00
tblVehicleTrips	SU_TR	16.74	0.00
tblVehicleTrips	SU_TR	0.68	5.00
tblVehicleTrips	WD_TR	1.89	0.00
tblVehicleTrips	WD_TR	6.97	5.00

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					
2017	5.8545	68.0175	39.5192	0.0638	8.8376	3.0739	11.9116	3.6401	2.8280	6.4681	0.0000	6,518.2300	6,518.2300	1.9506	0.0000	6,566.9950
2018	7.7016	63.3746	52.1507	0.1656	8.8376	2.6349	11.4726	3.6401	2.4241	6.0642	0.0000	17,000.4760	17,000.4760	1.9498	0.0000	17,039.6942
2019	6.9530	58.5571	48.5000	0.1630	7.8947	1.5817	9.4765	2.1375	1.4904	3.6280	0.0000	16,723.9503	16,723.9503	1.5134	0.0000	16,761.7862
2020	306.6208	14.1072	15.0530	0.0240	1.1911	0.7537	1.3104	0.3160	0.6934	0.7261	0.0000	2,326.4032	2,326.4032	0.7176	0.0000	2,344.3432
Maximum	**306.6208**	**68.0175**	**52.1507**	**0.1656**	**8.8376**	**3.0739**	**11.9116**	**3.6401**	**2.8280**	**6.4681**	**0.0000**	**17,000.4760**	**17,000.4760**	**1.9506**	**0.0000**	**17,039.6942**

2.1 Overall Construction (Maximum Daily Emission)

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					
2017	5.8545	68.0175	39.5192	0.0638	4.0673	3.0739	7.1412	1.6620	2.8280	4.4900	0.0000	6,518.2300	6,518.2300	1.9506	0.0000	6,566.9950
2018	7.7016	63.3746	52.1507	0.1656	7.8947	2.6349	9.7351	2.1376	2.4241	4.0861	0.0000	17,000.4760	17,000.4760	1.9498	0.0000	17,039.6942
2019	6.9530	58.5571	48.5000	0.1630	7.8947	1.5817	9.4765	2.1375	1.4904	3.6280	0.0000	16,723.9503	16,723.9503	1.5134	0.0000	16,761.7862
2020	306.6208	14.1072	15.0530	0.0240	1.1911	0.7537	1.3104	0.3160	0.6934	0.7261	0.0000	2,326.4032	2,326.4032	0.7176	0.0000	2,344.3432
Maximum	**306.6208**	**68.0175**	**52.1507**	**0.1656**	**7.8947**	**3.0739**	**9.7351**	**2.1376**	**2.8280**	**4.4900**	**0.0000**	**17,000.4760**	**17,000.4760**	**1.9506**	**0.0000**	**17,039.6942**

	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**	**21.35**	**0.00**	**19.04**	**35.76**	**0.00**	**23.43**	**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	23.7197	1.7900e-003	0.1955	1.0000e-005		7.0000e-004	7.0000e-004		7.0000e-004	7.0000e-004		0.4175	0.4175	1.1100e-003		0.4452
Energy	0.2894	2.6306	2.2097	0.0158		0.1999	0.1999		0.1999	0.1999		3,156.6640	3,156.6640	0.0605	0.0579	3,175.4225
Mobile	7.3297	31.8950	88.2878	0.2947	26.1555	0.2540	26.4095	6.9906	0.2375	7.2281		29,936.0012	29,936.0012	1.6143		29,976.3581
Total	**31.3387**	**34.5274**	**90.6930**	**0.3105**	**26.1555**	**0.4546**	**26.6101**	**6.9906**	**0.4381**	**7.4287**		**33,093.0826**	**33,093.0826**	**1.6759**	**0.0579**	**33,152.2257**

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	20.4525	1.7900e-003	0.1955	1.0000e-005		7.0000e-004	7.0000e-004		7.0000e-004	7.0000e-004		0.4175	0.4175	1.1100e-003		0.4452
Energy	0.2894	2.6306	2.2097	0.0158		0.1999	0.1999		0.1999	0.1999		3,156.6640	3,156.6640	0.0605	0.0579	3,175.4225
Mobile	7.3297	31.8950	88.2878	0.2947	26.1555	0.2540	26.4095	6.9906	0.2375	7.2281		29,936.0012	29,936.0012	1.6143		29,976.3581
Total	**28.0715**	**34.5274**	**90.6930**	**0.3105**	**26.1555**	**0.4546**	**26.6101**	**6.9906**	**0.4381**	**7.4287**		**33,093.0826**	**33,093.0826**	**1.6759**	**0.0579**	**33,152.2257**

	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	10.43	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	Excavation/Grading	Grading	11/1/2017	2/13/2018	5	75	Phase I
2	Building Construction	Building Construction	2/14/2018	11/13/2019	5	456	Phase I/II
3	Paving	Paving	11/14/2019	12/19/2019	5	26	Phase I
4	Paving Phase II	Paving	12/20/2019	1/24/2020	5	26	Phase II
5	Architectural Coating	Architectural Coating	1/25/2020	3/2/2020	5	26	Phase I
6	Architectural Coating Phase II	Architectural Coating	3/3/2020	4/7/2020	5	26	Phase II

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 21.6

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 1,267,500; Non-Residential Outdoor: 422,500; Striped Parking Area: 25,248 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Excavation/Grading	Excavators	2	8.00	158	0.38
Excavation/Grading	Graders	1	8.00	187	0.41
Excavation/Grading	Rubber Tired Dozers	1	8.00	247	0.40
Excavation/Grading	Scrapers	2	8.00	367	0.48
Excavation/Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Paving Phase II	Pavers	2	8.00	130	0.42
Paving Phase II	Paving Equipment	2	8.00	132	0.36
Paving Phase II	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48
Architectural Coating Phase II	Air Compressors	1	6.00	78	0.48

Trips and VMT

Sunroad 50 - San Diego County, Winter

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
Excavation/Grading	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	727.00	284.00	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
Paving Phase II	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	145.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating Phase II	1	145.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Soil Stabilizer

Water Exposed Area

3.2 Excavation/Grading - 2017

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					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	5.7483	67.9396	38.7826	0.0620		3.0727	3.0727		2.8269	2.8269		6,344.886 3	6,344.886 3	1.9441		6,393.487 9
Total	**5.7483**	**67.9396**	**38.7826**	**0.0620**	**8.6733**	**3.0727**	**11.7460**	**3.5965**	**2.8269**	**6.4234**		**6,344.886 3**	**6,344.886 3**	**1.9441**		**6,393.487 9**

3.2 Excavation/Grading - 2017

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	0.1061	0.0779	0.7366	1.7400e-003	0.1643	1.2100e-003	0.1655	0.0436	1.1200e-003	0.0447		173.3437	173.3437	6.5400e-003		173.5071
Total	**0.1061**	**0.0779**	**0.7366**	**1.7400e-003**	**0.1643**	**1.2100e-003**	**0.1655**	**0.0436**	**1.1200e-003**	**0.0447**		**173.3437**	**173.3437**	**6.5400e-003**		**173.5071**

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					3.9030	0.0000	3.9030	1.6184	0.0000	1.6184			0.0000			0.0000
Off-Road	5.7483	67.9396	38.7826	0.0620		3.0727	3.0727		2.8269	2.8269	0.0000	6,344.886 3	6,344.886 3	1.9441		6,393.487 8
Total	**5.7483**	**67.9396**	**38.7826**	**0.0620**	**3.9030**	**3.0727**	**6.9757**	**1.6184**	**2.8269**	**4.4453**	**0.0000**	**6,344.886 3**	**6,344.886 3**	**1.9441**		**6,393.487 8**

3.2 Excavation/Grading - 2017

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	0.1061	0.0779	0.7366	1.7400e-003	0.1643	1.2100e-003	0.1655	0.0436	1.1200e-003	0.0447		173.3437	173.3437	6.5400e-003		173.5071
Total	**0.1061**	**0.0779**	**0.7366**	**1.7400e-003**	**0.1643**	**1.2100e-003**	**0.1655**	**0.0436**	**1.1200e-003**	**0.0447**		**173.3437**	**173.3437**	**6.5400e-003**		**173.5071**

3.2 Excavation/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					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	5.0901	59.5218	35.0894	0.0620		2.6337	2.6337		2.4230	2.4230		6,244.428 4	6,244.428 4	1.9440		6,293.027 8
Total	**5.0901**	**59.5218**	**35.0894**	**0.0620**	**8.6733**	**2.6337**	**11.3071**	**3.5965**	**2.4230**	**6.0195**		**6,244.428 4**	**6,244.428 4**	**1.9440**		**6,293.027 8**

3.2 Excavation/Grading - 2018

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	0.0962	0.0689	0.6495	1.6900e-003	0.1643	1.1800e-003	0.1655	0.0436	1.0900e-003	0.0447		168.4655	168.4655	5.8400e-003		168.6114
Total	**0.0962**	**0.0689**	**0.6495**	**1.6900e-003**	**0.1643**	**1.1800e-003**	**0.1655**	**0.0436**	**1.0900e-003**	**0.0447**		**168.4655**	**168.4655**	**5.8400e-003**		**168.6114**

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					3.9030	0.0000	3.9030	1.6184	0.0000	1.6184			0.0000			0.0000
Off-Road	5.0901	59.5218	35.0894	0.0620		2.6337	2.6337		2.4230	2.4230	0.0000	6,244.4284	6,244.4284	1.9440		6,293.0278
Total	**5.0901**	**59.5218**	**35.0894**	**0.0620**	**3.9030**	**2.6337**	**6.5367**	**1.6184**	**2.4230**	**4.0415**	**0.0000**	**6,244.4284**	**6,244.4284**	**1.9440**		**6,293.0278**

3.2 Excavation/Grading - 2018

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	0.0962	0.0689	0.6495	1.6900e-003	0.1643	1.1800e-003	0.1655	0.0436	1.0900e-003	0.0447		168.4655	168.4655	5.8400e-003		168.6114
Total	**0.0962**	**0.0689**	**0.6495**	**1.6900e-003**	**0.1643**	**1.1800e-003**	**0.1655**	**0.0436**	**1.0900e-003**	**0.0447**		**168.4655**	**168.4655**	**5.8400e-003**		**168.6114**

3.3 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	2.6795	23.3900	17.5804	0.0269		1.4999	1.4999		1.4099	1.4099		2,620.935 1	2,620.935 1	0.6421		2,636.988 3
Total	**2.6795**	**23.3900**	**17.5804**	**0.0269**		**1.4999**	**1.4999**		**1.4099**	**1.4099**		**2,620.935 1**	**2,620.935 1**	**0.6421**		**2,636.988 3**

3.3 Building Construction - 2018

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	1.5266	37.4818	10.9627	0.0772	1.9226	0.2975	2.2201	0.5535	0.2846	0.8381		8,255.821 5	8,255.821 5	0.7144		8,273.681 3
Worker	3.4956	2.5028	23.6076	0.0615	5.9721	0.0430	6.0151	1.5841	0.0397	1.6237		6,123.719 3	6,123.719 3	0.2122		6,129.024 7
Total	**5.0221**	**39.9846**	**34.5703**	**0.1387**	**7.8947**	**0.3405**	**8.2352**	**2.1376**	**0.3243**	**2.4618**		**14,379.54 09**	**14,379.54 09**	**0.9266**		**14,402.70 60**

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	2.6795	23.3900	17.5804	0.0269		1.4999	1.4999		1.4099	1.4099	0.0000	2,620.935 1	2,620.935 1	0.6421		2,636.988 3
Total	**2.6795**	**23.3900**	**17.5804**	**0.0269**		**1.4999**	**1.4999**		**1.4099**	**1.4099**	**0.0000**	**2,620.935 1**	**2,620.935 1**	**0.6421**		**2,636.988 3**

3.3 Building Construction - 2018

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	1.5266	37.4818	10.9627	0.0772	1.9226	0.2975	2.2201	0.5535	0.2846	0.8381		8,255.821 5	8,255.821 5	0.7144		8,273.681 3
Worker	3.4956	2.5028	23.6076	0.0615	5.9721	0.0430	6.0151	1.5841	0.0397	1.6237		6,123.719 3	6,123.719 3	0.2122		6,129.024 7
Total	**5.0221**	**39.9846**	**34.5703**	**0.1387**	**7.8947**	**0.3405**	**8.2352**	**2.1376**	**0.3243**	**2.4618**		**14,379.54 09**	**14,379.54 09**	**0.9266**		**14,402.70 60**

3.3 Building Construction - 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					
Off-Road	2.3612	21.0788	17.1638	0.0269		1.2899	1.2899		1.2127	1.2127		2,591.580 2	2,591.580 2	0.6313		2,607.363 5
Total	**2.3612**	**21.0788**	**17.1638**	**0.0269**		**1.2899**	**1.2899**		**1.2127**	**1.2127**		**2,591.580 2**	**2,591.580 2**	**0.6313**		**2,607.363 5**

3.3 Building Construction - 2019

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	1.3634	35.2409	10.0792	0.0765	1.9226	0.2493	2.1719	0.5535	0.2385	0.7919		8,193.407 2	8,193.407 2	0.6905		8,210.669 0
Worker	3.2284	2.2373	21.2570	0.0596	5.9721	0.0426	6.0147	1.5841	0.0392	1.6233		5,938.963 0	5,938.963 0	0.1916		5,943.753 7
Total	**4.5918**	**37.4783**	**31.3362**	**0.1361**	**7.8947**	**0.2919**	**8.1866**	**2.1375**	**0.2777**	**2.4153**		**14,132.37 01**	**14,132.37 01**	**0.8821**		**14,154.42 27**

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	2.3612	21.0788	17.1638	0.0269		1.2899	1.2899		1.2127	1.2127	0.0000	2,591.580 2	2,591.580 2	0.6313		2,607.363 5
Total	**2.3612**	**21.0788**	**17.1638**	**0.0269**		**1.2899**	**1.2899**		**1.2127**	**1.2127**	**0.0000**	**2,591.580 2**	**2,591.580 2**	**0.6313**		**2,607.363 5**

3.3 Building Construction - 2019

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	1.3634	35.2409	10.0792	0.0765	1.9226	0.2493	2.1719	0.5535	0.2385	0.7919		8,193.4072	8,193.4072	0.6905		8,210.6690
Worker	3.2284	2.2373	21.2570	0.0596	5.9721	0.0426	6.0147	1.5841	0.0392	1.6233		5,938.9630	5,938.9630	0.1916		5,943.7537
Total	**4.5918**	**37.4783**	**31.3362**	**0.1361**	**7.8947**	**0.2919**	**8.1866**	**2.1375**	**0.2777**	**2.4153**		**14,132.3701**	**14,132.3701**	**0.8821**		**14,154.4227**

3.4 Paving - 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					
Off-Road	1.4544	15.2441	14.6648	0.0228		0.8246	0.8246		0.7586	0.7586		2,257.0025	2,257.0025	0.7141		2,274.8548
Paving	2.1766					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**3.6311**	**15.2441**	**14.6648**	**0.0228**		**0.8246**	**0.8246**		**0.7586**	**0.7586**		**2,257.0025**	**2,257.0025**	**0.7141**		**2,274.8548**

3.4 Paving - 2019

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	0.0666	0.0462	0.4386	1.2300e-003	0.1232	8.8000e-004	0.1241	0.0327	8.1000e-004	0.0335		122.5371	122.5371	3.9500e-003		122.6359
Total	**0.0666**	**0.0462**	**0.4386**	**1.2300e-003**	**0.1232**	**8.8000e-004**	**0.1241**	**0.0327**	**8.1000e-004**	**0.0335**		**122.5371**	**122.5371**	**3.9500e-003**		**122.6359**

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	1.4544	15.2441	14.6648	0.0228		0.8246	0.8246		0.7586	0.7586	0.0000	2,257.0025	2,257.0025	0.7141		2,274.8548
Paving	2.1766					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**3.6311**	**15.2441**	**14.6648**	**0.0228**		**0.8246**	**0.8246**		**0.7586**	**0.7586**	**0.0000**	**2,257.0025**	**2,257.0025**	**0.7141**		**2,274.8548**

3.4 Paving - 2019

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	0.0666	0.0462	0.4386	1.2300e-003	0.1232	8.8000e-004	0.1241	0.0327	8.1000e-004	0.0335		122.5371	122.5371	3.9500e-003		122.6359
Total	**0.0666**	**0.0462**	**0.4386**	**1.2300e-003**	**0.1232**	**8.8000e-004**	**0.1241**	**0.0327**	**8.1000e-004**	**0.0335**		**122.5371**	**122.5371**	**3.9500e-003**		**122.6359**

3.5 Paving Phase II - 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					
Off-Road	1.4544	15.2441	14.6648	0.0228		0.8246	0.8246		0.7586	0.7586		2,257.0025	2,257.0025	0.7141		2,274.8548
Paving	2.1766					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**3.6311**	**15.2441**	**14.6648**	**0.0228**		**0.8246**	**0.8246**		**0.7586**	**0.7586**		**2,257.0025**	**2,257.0025**	**0.7141**		**2,274.8548**

3.5 Paving Phase II - 2019

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	0.0666	0.0462	0.4386	1.2300e-003	0.1232	8.8000e-004	0.1241	0.0327	8.1000e-004	0.0335		122.5371	122.5371	3.9500e-003		122.6359
Total	**0.0666**	**0.0462**	**0.4386**	**1.2300e-003**	**0.1232**	**8.8000e-004**	**0.1241**	**0.0327**	**8.1000e-004**	**0.0335**		**122.5371**	**122.5371**	**3.9500e-003**		**122.6359**

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	1.4544	15.2441	14.6648	0.0228		0.8246	0.8246		0.7586	0.7586	0.0000	2,257.0025	2,257.0025	0.7141		2,274.8548
Paving	2.1766					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**3.6311**	**15.2441**	**14.6648**	**0.0228**		**0.8246**	**0.8246**		**0.7586**	**0.7586**	**0.0000**	**2,257.0025**	**2,257.0025**	**0.7141**		**2,274.8548**

3.5 Paving Phase II - 2019

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	0.0666	0.0462	0.4386	1.2300e-003	0.1232	8.8000e-004	0.1241	0.0327	8.1000e-004	0.0335		122.5371	122.5371	3.9500e-003		122.6359
Total	**0.0666**	**0.0462**	**0.4386**	**1.2300e-003**	**0.1232**	**8.8000e-004**	**0.1241**	**0.0327**	**8.1000e-004**	**0.0335**		**122.5371**	**122.5371**	**3.9500e-003**		**122.6359**

3.5 Paving Phase II - 2020

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	1.3566	14.0656	14.6521	0.0228		0.7528	0.7528		0.6926	0.6926		2,207.7334	2,207.7334	0.7140		2,225.5841
Paving	2.1766					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**3.5332**	**14.0656**	**14.6521**	**0.0228**		**0.7528**	**0.7528**		**0.6926**	**0.6926**		**2,207.7334**	**2,207.7334**	**0.7140**		**2,225.5841**

3.5 Paving Phase II - 2020

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	0.0623	0.0416	0.4009	1.1900e-003	0.1232	8.6000e-004	0.1241	0.0327	8.0000e-004	0.0335		118.6698	118.6698	3.5700e-003		118.7591
Total	**0.0623**	**0.0416**	**0.4009**	**1.1900e-003**	**0.1232**	**8.6000e-004**	**0.1241**	**0.0327**	**8.0000e-004**	**0.0335**		**118.6698**	**118.6698**	**3.5700e-003**		**118.7591**

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	1.3566	14.0656	14.6521	0.0228		0.7528	0.7528		0.6926	0.6926	0.0000	2,207.7334	2,207.7334	0.7140		2,225.5841
Paving	2.1766					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**3.5332**	**14.0656**	**14.6521**	**0.0228**		**0.7528**	**0.7528**		**0.6926**	**0.6926**	**0.0000**	**2,207.7334**	**2,207.7334**	**0.7140**		**2,225.5841**

3.5 Paving Phase II - 2020

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	0.0623	0.0416	0.4009	1.1900e-003	0.1232	8.6000e-004	0.1241	0.0327	8.0000e-004	0.0335		118.6698	118.6698	3.5700e-003		118.7591
Total	**0.0623**	**0.0416**	**0.4009**	**1.1900e-003**	**0.1232**	**8.6000e-004**	**0.1241**	**0.0327**	**8.0000e-004**	**0.0335**		**118.6698**	**118.6698**	**3.5700e-003**		**118.7591**

3.6 Architectural Coating - 2020

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	305.7759					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2422	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109		281.4481	281.4481	0.0218		281.9928
Total	**306.0181**	**1.6838**	**1.8314**	**2.9700e-003**		**0.1109**	**0.1109**		**0.1109**	**0.1109**		**281.4481**	**281.4481**	**0.0218**		**281.9928**

3.6 Architectural Coating - 2020

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	0.6026	0.4025	3.8751	0.0115	1.1911	8.3600e-003	1.1995	0.3160	7.7000e-003	0.3237		1,147.1413	1,147.1413	0.0345		1,148.0048
Total	**0.6026**	**0.4025**	**3.8751**	**0.0115**	**1.1911**	**8.3600e-003**	**1.1995**	**0.3160**	**7.7000e-003**	**0.3237**		**1,147.1413**	**1,147.1413**	**0.0345**		**1,148.0048**

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	305.7759					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2422	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109	0.0000	281.4481	281.4481	0.0218		281.9928
Total	**306.0181**	**1.6838**	**1.8314**	**2.9700e-003**		**0.1109**	**0.1109**		**0.1109**	**0.1109**	**0.0000**	**281.4481**	**281.4481**	**0.0218**		**281.9928**

3.6 Architectural Coating - 2020

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	0.6026	0.4025	3.8751	0.0115	1.1911	8.3600e-003	1.1995	0.3160	7.7000e-003	0.3237		1,147.1413	1,147.1413	0.0345		1,148.0048
Total	**0.6026**	**0.4025**	**3.8751**	**0.0115**	**1.1911**	**8.3600e-003**	**1.1995**	**0.3160**	**7.7000e-003**	**0.3237**		**1,147.1413**	**1,147.1413**	**0.0345**		**1,148.0048**

3.7 Architectural Coating Phase II - 2020

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	305.7759					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2422	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109		281.4481	281.4481	0.0218		281.9928
Total	**306.0181**	**1.6838**	**1.8314**	**2.9700e-003**		**0.1109**	**0.1109**		**0.1109**	**0.1109**		**281.4481**	**281.4481**	**0.0218**		**281.9928**

3.7 Architectural Coating Phase II - 2020

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	0.6026	0.4025	3.8751	0.0115	1.1911	8.3600e-003	1.1995	0.3160	7.7000e-003	0.3237		1,147.1413	1,147.1413	0.0345		1,148.0048
Total	**0.6026**	**0.4025**	**3.8751**	**0.0115**	**1.1911**	**8.3600e-003**	**1.1995**	**0.3160**	**7.7000e-003**	**0.3237**		**1,147.1413**	**1,147.1413**	**0.0345**		**1,148.0048**

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	305.7759					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2422	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109	0.0000	281.4481	281.4481	0.0218		281.9928
Total	**306.0181**	**1.6838**	**1.8314**	**2.9700e-003**		**0.1109**	**0.1109**		**0.1109**	**0.1109**	**0.0000**	**281.4481**	**281.4481**	**0.0218**		**281.9928**

3.7 Architectural Coating Phase II - 2020

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	0.6026	0.4025	3.8751	0.0115	1.1911	8.3600e-003	1.1995	0.3160	7.7000e-003	0.3237		1,147.1413	1,147.1413	0.0345		1,148.0048
Total	**0.6026**	**0.4025**	**3.8751**	**0.0115**	**1.1911**	**8.3600e-003**	**1.1995**	**0.3160**	**7.7000e-003**	**0.3237**		**1,147.1413**	**1,147.1413**	**0.0345**		**1,148.0048**

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	7.3297	31.8950	88.2878	0.2947	26.1555	0.2540	26.4095	6.9906	0.2375	7.2281		29,936.0012	29,936.0012	1.6143		29,976.3581
Unmitigated	7.3297	31.8950	88.2878	0.2947	26.1555	0.2540	26.4095	6.9906	0.2375	7.2281		29,936.0012	29,936.0012	1.6143		29,976.3581

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	0.00	0.00	0.00		
General Light Industry	4,225.00	4,225.00	4225.00	12,334,935	12,334,935
Parking Lot	0.00	0.00	0.00		
Total	4,225.00	4,225.00	4,225.00	12,334,935	12,334,935

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
City Park	9.50	7.30	7.30	33.00	48.00	19.00	66	28	6
General Light Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
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 Light Industry	0.593936	0.041843	0.182569	0.108325	0.016436	0.005513	0.015940	0.023523	0.001912	0.001972	0.006090	0.000748	0.001193
Parking Lot	0.593936	0.041843	0.182569	0.108325	0.016436	0.005513	0.015940	0.023523	0.001912	0.001972	0.006090	0.000748	0.001193
City Park	0.593936	0.041843	0.182569	0.108325	0.016436	0.005513	0.015940	0.023523	0.001912	0.001972	0.006090	0.000748	0.001193

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	0.2894	2.6306	2.2097	0.0158		0.1999	0.1999		0.1999	0.1999		3,156.664 0	3,156.664 0	0.0605	0.0579	3,175.422 5
NaturalGas Unmitigated	0.2894	2.6306	2.2097	0.0158		0.1999	0.1999		0.1999	0.1999		3,156.664 0	3,156.664 0	0.0605	0.0579	3,175.422 5

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					
City Park	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
General Light Industry	26831.6	0.2894	2.6306	2.2097	0.0158		0.1999	0.1999		0.1999	0.1999		3,156.6640	3,156.6640	0.0605	0.0579	3,175.4225
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		**0.2894**	**2.6306**	**2.2097**	**0.0158**		**0.1999**	**0.1999**		**0.1999**	**0.1999**		**3,156.6640**	**3,156.6640**	**0.0605**	**0.0579**	**3,175.4225**

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					
City Park	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
General Light Industry	26.8316	0.2894	2.6306	2.2097	0.0158		0.1999	0.1999		0.1999	0.1999		3,156.6640	3,156.6640	0.0605	0.0579	3,175.4225
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		**0.2894**	**2.6306**	**2.2097**	**0.0158**		**0.1999**	**0.1999**		**0.1999**	**0.1999**		**3,156.6640**	**3,156.6640**	**0.0605**	**0.0579**	**3,175.4225**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

	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	20.4525	1.7900e-003	0.1955	1.0000e-005		7.0000e-004	7.0000e-004		7.0000e-004	7.0000e-004		0.4175	0.4175	1.1100e-003		0.4452
Unmitigated	23.7197	1.7900e-003	0.1955	1.0000e-005		7.0000e-004	7.0000e-004		7.0000e-004	7.0000e-004		0.4175	0.4175	1.1100e-003		0.4452

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	5.4453					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	18.2561					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0183	1.7900e-003	0.1955	1.0000e-005		7.0000e-004	7.0000e-004		7.0000e-004	7.0000e-004		0.4175	0.4175	1.1100e-003		0.4452
Total	**23.7196**	**1.7900e-003**	**0.1955**	**1.0000e-005**		**7.0000e-004**	**7.0000e-004**		**7.0000e-004**	**7.0000e-004**		**0.4175**	**0.4175**	**1.1100e-003**		**0.4452**

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	2.1781					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	18.2561					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0183	1.7900e-003	0.1955	1.0000e-005		7.0000e-004	7.0000e-004		7.0000e-004	7.0000e-004		0.4175	0.4175	1.1100e-003		0.4452
Total	**20.4525**	**1.7900e-003**	**0.1955**	**1.0000e-005**		**7.0000e-004**	**7.0000e-004**		**7.0000e-004**	**7.0000e-004**		**0.4175**	**0.4175**	**1.1100e-003**		**0.4452**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

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

Biological Technical Report for the Sunroad Otay Project

(Project Number 538140)

February 21, 2019

Prepared for:

Sunroad Enterprises
4445 Eastgate Mall, Suite 400
San Diego, CA 92121

Prepared by:

Alden Environmental, Inc.
3245 University Avenue, #1188
San Diego, CA 92104

Principal Preparer:

Greg Mason, Senior Biologist

ALDEN
ENVIRONMENTAL, INC

Biological Technical Report for the Sunroad Otay Project

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1.0 INTRODUCTION

This report describes existing biological conditions on the Sunroad Otay project site and provides the U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Wildlife (CDFW), City of San Diego (City), and project applicant with information necessary to assess impacts to biological resources under the California Environmental Quality Act (CEQA) and City, State, and Federal regulations.

1.1 PROJECT LOCATION

The Sunroad Otay project site occupies approximately 49.1 acres and is located within the Otay Mesa Community Plan boundaries in the City. The project site is north of State Route (SR) 905 south of Otay Mesa Road, and west of SR 125 (Figures 1 and 2).

1.2 PROJECT DESCRIPTION

Sunroad Enterprises proposes a Vesting Tentative Map for development of four buildings totaling approximately 845,050 square feet for light industrial warehouse and office use, surface parking, landscaping, and associated improvements. Bioretention areas are proposed in the center and western portions of the site, with a detention basin proposed for the southwest portion of the site. Primary access to the project would occur via two driveways from Otay Mesa Road. Off-site roadway improvements are also proposed along Otay Mesa Road and at the intersection of Otay Mesa Road and La Media Road (west of the project site).

In addition, Sunroad Enterprises proposes the vacation of the public rights-of-way of St. Andrews Avenue, Avenida Costa Azul, and Piper Ranch Road as previously dedicated. Project discretionary actions include a Vesting Tentative Map, Site Development Permit, Planned Development Permit, Street Vacation, and Community Plan Amendment.

From here forward in this report, the “project site” or “site” includes the off-site improvement (impact) areas unless otherwise noted.

2.0 METHODS AND SURVEY LIMITATIONS

2.1 LITERATURE REVIEW

Prior to conducting its field investigations, Alden Environmental, Inc. (Alden) conducted a review of an existing burrowing owl (*Athene cunicularia*) survey report for the project site (REC 2016). Alden also performed searches of CDFW’s California Natural Diversity Database and the USFWS database for information regarding sensitive species known to occur on site or within the project site vicinity.

2.2 BIOLOGICAL SURVEYS

REC conducted a burrowing owl survey on the project site in 2016 (REC 2016). The survey report can be found in Appendix A. REC also mapped vegetation and compiled lists of all plants and animal species observed/detected during the survey (Appendices B and C).

In 2017, Alden surveyed the site to: 1) verify/update REC's earlier vegetation mapping; 2) look for evidence of Waters of the U.S. (WUS), Waters of the State (WS), and City wetlands; and 3) conduct a sensitive plant survey and Quino checkerspot butterfly (*Euphydryas editha quino*) site assessment (Table 1). Alden also compiled lists of all plant and animal species observed/detected during all surveys (Appendices B and C).

Table 1
SITE VISIT INFORMATION

Date	Personnel	Purpose
4/13/2016	Catherine MacGregor, Lee BenVau	REC burrowing owl survey #1 of 4.
5/4/2016	Lee BenVau	REC burrowing owl survey #2 of 4.
5/25/2016	Lee BenVau	REC burrowing owl survey #3 of 4.
6/17/2016	Catherine MacGregor, Lee BenVau	REC burrowing owl survey #4 of 4.
3/2/2017	Greg Mason	Confirm and update previous vegetation mapping, search for potential wetland features, and conduct habitat assessment.
3/31/2017	Hedy Levine	Site visit by REC to review and confirm Alden vegetation mapping.
4/3/2017	Greg Mason	Spring rare plant survey.
5/23/2017	Greg Mason, Anna McPherson, Kristy Forburger, Anita Eng, Anrdrea Contreras Rosati	Site visit with City staff to assess site and confirm vegetation mapping.
5/24/2017	Tara Baxter	Site visit to take additional representative photographs from previous photo point locations.
6/7/2017	Greg Mason	Site visit to collect additional quantitative transect data in problem upland habitat mapping areas (NNG vs DH) to support the vegetation mapping.

2.2.1 Vegetation Mapping Verification/Update

REC mapped vegetation in 2016 as part of the burrowing owl survey effort (Appendix A). REC conducted generalized mapping of the vegetation on site for their burrowing owl survey effort, but did not create a focused vegetation map for the site.

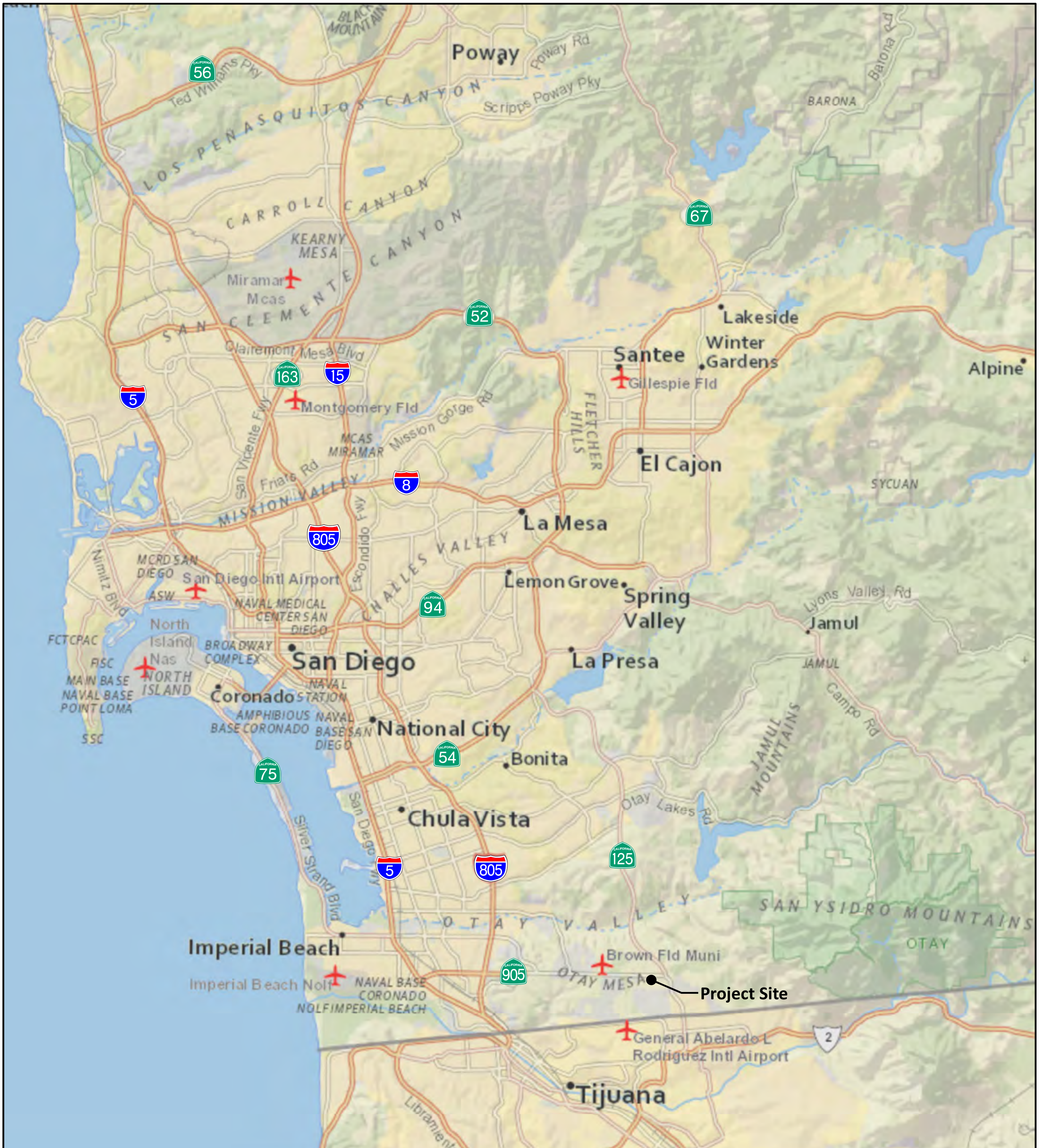

Figure 1

Regional Location

SUNROAD OTAY

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Figure 2

Project Location

SUNROAD OTAY

Alden Biologist Greg Mason conducted a site visit on March 2, 2017 to confirm/update the vegetation mapping as part of a CEQA impact analysis for the current project. Following a site visit with City personnel, an additional site visit was conducted on June 7, 2017 to collect supplemental quantitative transect sampling data within the mapped vegetation to help ensure compliance with the City's guidelines for Problem Mapping Areas (City 2012). The vegetation mapping took into account the City's defined differentiation between non-native grassland and other disturbed areas as listed below.

According to the City's guidelines for Problem Mapping Areas:

> Non-native annual grasslands (NNGL) contain annual grass species (Poaceae family) including, but not limited to, bromes *(Bromus* spp.), wildoat (*Avena* spp.), ryegrass (*Lolium* spp.) and fescues (*Vulpia* spp.). Typically, NNGL includes at least 50% cover of the entire herbaceous layer attributable to annual non-native grass species, although other plant species (native or non-native) may be intermixed. Other common plant species found in NNGL include filaree (*Erodium* spp.), California poppy (*Eschscholzia californica*), tecolote (*Centaurea melitensis*), mustards (*Brassica* spp.), artichoke thistle (*Cynara cardunculus*), sweet fennel (*Foeniculum vulgare*), and others.
>
> Other Disturbed Areas include lands commonly defined as Ruderal Habitat or Agricultural/Fallow. Ruderal habitat typically develops on sites with heavily compacted soils following intense levels of disturbance such as grading. Agricultural/fallow lands include areas of active agricultural cultivation (e.g., nurseries, orchards, field crops) and fallow areas which have been disturbed in the recent past by cultivation or agricultural activity. These types of disturbed areas should not be confused with areas that are degraded, yet still retain sufficient vegetation community (e.g., "disturbed" coastal sage scrub does not meet the definition of disturbed under this definition). Disturbed areas are usually associated with prior development (e.g., previous grading) or agricultural use. These areas can consist of bare ground, or when vegetated, are dominated by at least 50 percent cover of invasive broad-leaved non-native plant species including, but are not limited to, horseweed, (*Conyza* spp.), garland chrysanthemum (*Chrysanthemum coronarium*), pineapple weed (*Chamomilla suaveolens*), sow-thistle (*Sonchus* spp.), Russian thistle (*Salsola tragus*), mustards, knotweed (*Polygonum* spp.), bur-clover (*Medicago polymorpha*), fennel and others. Minor amounts of other species including non-native annual grasses can also be present.
>
> To distinguish between NNGL and other disturbed areas, the relative percent cover of the herbaceous species should be used as a diagnostic tool. Within the area in question, the percent cover and relative percent cover of all herbaceous species should be assessed. The cumulative total of each species should be determined and ranked in descending order of abundance….The vegetation community should be determined based upon the total cumulative relative percent cover of non-native grasses (*Poaceae* family). If native habitats have been ruled out and if the majority (50 percent or greater) of the observed species are introduced members of the Poaceae family, then the area should be characterized

as non-native annual grassland. Otherwise, consideration should be given to identified types of disturbed areas.

While vegetative cover for problem areas is usually determined by visual estimate, additional point-intercept transect data was collected in areas that were not clearly dominated by grass (Poaceae) species. No transect data was collected in areas that clearly were dominated by non-native grassland species (e.g. the majority of the western half of the site). A total of 14 transects were sampled to help differentiate the mapping of non-native grassland and disturbed habitat on site (Figure 3). Each transect was 150 feet in length, with data being collected at 3 foot intervals. The plant species intersecting the transect at each point was recorded. In situations where both a grass species and a non-grass species overlapped a single point, the grass species was recorded. Relative cover of grass and non-grass species was then determined. The results of the transect data collection are presented in Appendix D.

Alden's mapping was conducted in the field with the aid of historic and recent aerial imagery to determine the limits of the different vegetation communities. Photographs of the vegetation were taken at established photo-documentation points throughout the site on May 2, 2017 and again on May 24, 2017 (Appendix E). REC reviewed the Alden vegetation mapping, revisited the site on March 31, 2017, and concluded that Alden's mapping is accurate (Appendix F). Finally, additional transect data was collected in "problem" upland areas.

Alden used a 0.1-acre minimum mapping unit and mapped non-native grassland where the relative cover of non-native, annual grass species was at least 50 percent. Alden mapped disturbed land where the relative vegetative cover consisted of at least 50 percent invasive, broad-leaved, non-native species such as Russian thistle (*Salsola tragus*) and black mustard (*Brassica nigra*).

2.2.2 Jurisdictional Delineation

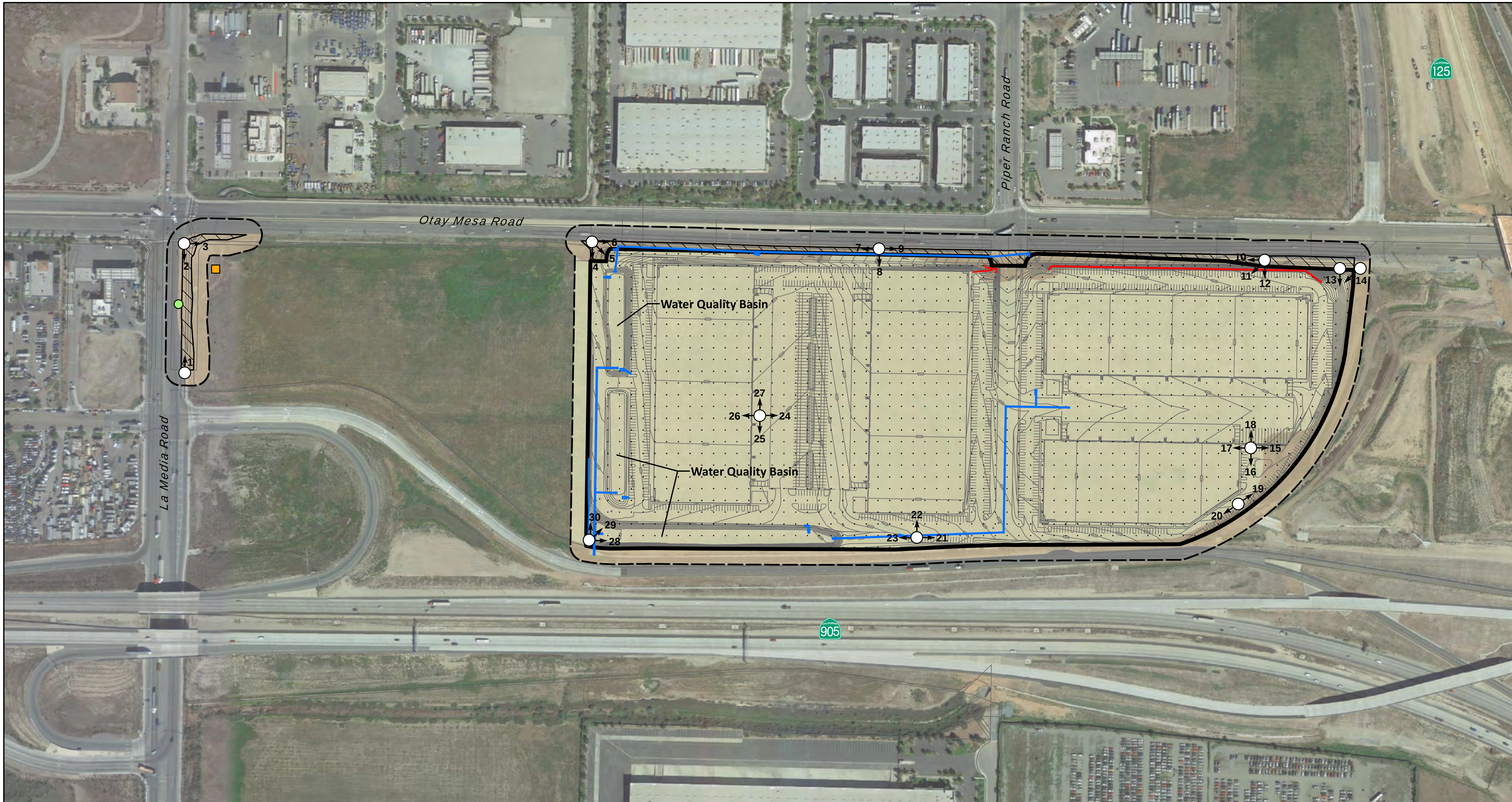
No potential WUS, WS, or City wetlands were observed on site on March 2, 2017 (or any of the subsequent visits); therefore, no jurisdictional delineation was conducted.

WUS and WS encompass wetlands but also may include ephemeral and intermittent streams that may or may not be vegetated. Generally, wetlands are lands where saturation with water is the dominant factor determining the nature of soil development and the types of plant and animal communities present.

WUS include wetlands and non-wetlands (streams) under the jurisdiction of the Corps. WS include wetland habitats and streambeds under the jurisdiction of the CDFW.

City wetlands are defined by the City Municipal Code (Chapter 11, Article 3, Division 1) as areas that are characterized by any of the following summarized conditions.

1. All areas persistently or periodically containing naturally occurring wetland vegetation communities;
2. Areas that have hydric soils or wetland hydrology and lack naturally occurring wetland vegetation communities; and/or



Boundary
50-foot Mapping Buffer
Photo Locations
Project Impacts - On-site
Project Impacts - Off-site
Proposed Storm Drains
Proposed Retaining Walls
Non-native Grassland
Disturbed Land
Developed
Burrowing owl (*Athene cunicularia*)*
San Diego bur-sage (*Ambrosia chenopodiifolia*)-one plant

*Observed during Recon survey for adjacent property (April 4, 2017).
California horned lark (*Eremophila alpestris actia*) and San Diego black-tailed jackrabbit (*Lepus californicus bennettii*) were observed in non-native grassland by REC in 2016 but were not mapped.

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Figure 3

Biological Resources/Impacts

SUNROAD OTAY

3. Areas lacking wetland vegetation communities, hydric soils, and wetland hydrology due to non-permitted filling of previously existing wetlands.

The definition of City Wetlands, however, is intended to differentiate uplands (terrestrial areas) from wetlands and, furthermore, to differentiate naturally occurring wetland areas from those created by human activities. Except for areas created for the purposes of wetland habitat or resulting from human actions to create open waters or from the alteration of natural stream courses, it is not the intent of the City to regulate artificially created wetlands in historically non-wetland areas unless they have been delineated as wetlands by the Corps and/or CDFW. Therefore, artificially created wetland features that are not Corps and CDFW wetlands are also not considered City Wetlands.

2.2.3 Sensitive Species

Sensitive species are those that are considered Federal, State, or California Native Plant Society (CNPS) rare, threatened, or endangered; Multiple Species Conservation Program (MSCP) Narrow Endemics; or MSCP Covered Species. For simplicity, "sensitive" may be used throughout this document to refer to any of these categories.

Sensitive Plant Species

A spring sensitive plant survey was conducted on the project site by Alden Biologist Greg Mason on April 3, 2017. The survey was conducted by walking transects across the site and searching for sensitive plant species with potential to occur. Sensitive plant species also were searched for opportunistically during all other site visits.

Burrowing Owl

REC conducted a breeding season burrowing owl survey on the project site with site visits made in April, May, and June of 2016 (REC 2016a). The survey was conducted in accordance with the CDFW's March 2012 Staff Report on Burrowing Owls (California Department of Fish and Game 2012). The burrowing owl survey report is provided in Appendix A. While the burrowing owl report refers to the project as Sunroad Otay Plaza, the project is now referred to as Sunroad Otay.

Quino Checkerspot Butterfly

Alden performed a Quino checkerspot butterfly site assessment of the project site on March 2, 2017 during the vegetation mapping effort and in accordance with the Quino Checkerspot Butterfly Survey Guidelines (USFWS 2014).

2.2.4 Survey Limitations

Sensitive species surveys were conducted during appropriate times of year and covered the activity periods for most species. The results of both the previous (REC) survey along with the results of the site visits conducted by Alden have been incorporated into the analysis in this report (Appendices B and C). Noted animal species were identified by direct observation, vocalizations, or the observance of scat, tracks, or other signs. However, the lists of species identified in Appendices B and C are not necessarily a comprehensive account of all species that utilize the project site as species that are nocturnal, secretive, or seasonally restricted may not have been observed/detected. The species that are sensitive and have potential to occur on site, however, are still addressed in this report in Section 5.5.2, *Sensitive Plant Species,* Section 5.5.3, *Sensitive Animal Species*, and Section 6.1.4, *Direct Impacts to Sensitive Plant and Animal Species with Potential to Occur*.

2.2.5 Nomenclature

Nomenclature used in this report is from the following sources: City Biology Guidelines (City 2012) and the City's MSCP Subarea Plan (City 1997a); Holland (1986); Oberbauer et al. (2008); Hickman, ed. (1993); CNPS (2015); Jepson Flora Project (2015); Crother (2008); The American Ornithologists' Union (2014); Jones, et al. (1992); and CDFW (2017).

3.0 REGULATORY CONTEXT

3.1 REGULATORY ISSUES

Biological resources that would be impacted on the project site are subject to regulatory administration by the Federal government, State of California, and City as follows.

3.1.1 Federal

Endangered Species Act

The Federal Endangered Species Act (FESA) designates threatened and endangered animals and plants and provides measures for their protection and recovery. "Take" of listed animal species and of listed plant species in areas under Federal jurisdiction is prohibited without obtaining a Federal permit. Take is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct." Harm includes any act that actually kills or injures fish or wildlife, including significant habitat modification or degradation that significantly impairs essential behavioral patterns of fish or wildlife. Activities that damage the habitat of (i.e., harm) listed wildlife species require approval from the USFWS for terrestrial species. The FESA also generally requires determination of Critical Habitat for listed species. If a project would involve a Federal action potentially affecting Critical Habitat, the Federal agency would be required to consult with USFWS. No Federal listed species or Critical Habitat occurs on the project site.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA; 16 U.S. Code Sections 703-711) includes provisions for protection of migratory birds, including the non-permitted take of migratory birds. The MBTA regulates or prohibits taking, killing, possession of, or harm to migratory bird species listed in Title 50 Code of Federal Regulations Section 10.13. Migratory birds include geese, ducks, shorebirds, raptors, songbirds, and many others (including those that are not sensitive; see Section 5.5.3, *Sensitive Animal Species,* for an explanation of which species are sensitive). Disturbance that causes nest abandonment and/or loss of reproductive effort (killing or abandonment of eggs or young) is considered a "take." The MBTA is an international treaty for the conservation and management of bird species that migrate through more than one country, and is enforced in the United States by the USFWS. The MBTA was amended in 1972 to include protection for migratory birds of prey (raptors). As a general/standard condition, the Sunroad Otay Project must comply with the MBTA.

3.1.2 State of California

California Environmental Quality Act

Primary environmental legislation in California is found in the CEQA and its implementing guidelines (State CEQA Guidelines), requiring that projects with potential adverse effects or impacts on the environment undergo environmental review. Adverse impacts to the environment are typically mitigated as a result of the environmental review process in accordance with existing laws and regulations. The City is the Lead Agency under the CEQA for the proposed project, and this report is part of that environmental review process.

California Fish and Game Code

Pursuant to California Fish and Game Code Section 3503, it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto. Raptors and owls and their active nests are protected by California Fish and Game Code Section 3503.5, which states that it is unlawful to take, possess, or destroy any birds of prey or to take, possess, or destroy the nest or eggs of any such bird unless authorized by the CDFW. Section 3513 states that it is unlawful to take or possess any migratory non-game bird as designated in the MBTA. These regulations could require that construction activities (particularly vegetation removal or construction near nests) be reduced or eliminated during critical phases of the nesting cycle unless surveys by a qualified biologist demonstrate that nests, eggs, or nesting birds will not be disturbed, subject to approval by CDFW and/or USFWS. As a general/standard condition, the Sunroad Otay Project must comply with California Fish and Game Code Sections 3503 and 3503.5.

3.1.3 City of San Diego Environmentally Sensitive Lands Regulations

Mitigation requirements for sensitive biological resources follow the requirements of the City's Biology Guidelines (2012) as outlined in the City's Municipal Code Environmentally Sensitive Lands (ESL) Regulations (Chapter 14, Article 3, Division 1). ESL include sensitive biological resources, steep hillsides, coastal beaches, sensitive coastal bluffs and 100-year floodplains (San Diego Municipal Code [SDMC] 143.0110).

The ESL regulations also specify development requirements inside and outside of the City's preserve, the Multi-habitat Planning Area (MHPA). Inside the MHPA, development must be located in the least sensitive portion of a given site; outside of the MHPA, development must avoid wetlands and non-MSCP Covered Species (City 2012). The project site is outside the MHPA. The MHPA is further discussed in Section 4.0, *Regional Context.*

The ESL regulations further require that impacts to sensitive biological resources must be assessed and mitigation provided where necessary, as required by Section III of the City's Biology Guidelines.

City Biology Guidelines

The City's Biology Guidelines (2012) have been formulated by the Development Services Department to aid in the implementation and interpretation of the ESL Regulations; San Diego Land Development Code, Chapter 14, Division 1, Section 143.0101 et seq; and the Open Space Residential (OR-1-2) Zone, Chapter 13, Division 2, Section 131.0201 et seq. Section III of the Biology Guidelines (Biological Impact Analysis and Mitigation Procedures) also serves as standards for the determination of impact and mitigation under CEQA. The Biology Guidelines are the baseline biological standards for processing permits issued pursuant to ESL Regulations.

4.0 REGIONAL CONTEXT

4.1 MULTIPLE SPECIES CONSERVATION PROGRAM SUBAREA PLAN

The City, USFWS, CDFW, and other local jurisdictions joined together in the late 1990s to develop the MSCP, a comprehensive program to preserve a network of habitat and open space in the region and ensure the viability of (generally) upland habitat and species, while still permitting some level of continued development. The City's MSCP Subarea Plan (1997a) was prepared pursuant to the outline developed by USFWS and CDFW to meet the requirements of the State Natural Communities Conservation Planning (NCCP) Act of 1992. Adopted by the City in March 1997, the City's Subarea Plan forms the basis for the MSCP Implementing Agreement, which is the contract between the City, USFWS, and CDFW (City 1997b). The Implementing Agreement ensures implementation of the City's Subarea Plan and thereby allows the City to issue "take" permits under the FESA and State Endangered Species Act to address impacts at the local level. Under the FESA, an Incidental Take Permit is required when non-Federal activities would result in "take" of a threatened or endangered species. A Habitat Conservation Plan, such as the City's MSCP Subarea Plan, must accompany an application for a Federal Incidental Take Permit. In July 1997, the USFWS, CDFW, and City entered into the 50-year MSCP

Implementing Agreement, wherein the City received its FESA Section 10(a) Incidental Take Permit (City 1997b).

Pursuant to its MSCP permit issued under Section 10(a), the City has incidental "take" authority over 85 rare, threatened, and endangered species including regionally sensitive species that it aims to conserve (i.e., "MSCP Covered Species"). "MSCP Covered" refers to species that are covered by the City's Federal Incidental Take Permit and considered to be adequately protected within the MHPA. Special conditions apply to Covered Species that would be potentially impacted including, for example, designing a project to avoid impacts to Covered Species in the MHPA where feasible. Outside the MHPA, projects must incorporate measures (i.e., Area Specific Management Directives) for the protection of Covered Species as identified in Appendix A of the City's Subarea Plan. No Covered Species have been observed or detected on the project site.

In addition to identifying preserve areas within the City (and guiding implementation of the MSCP within its corporate boundaries), the City's Subarea Plan also regulates effects on natural communities throughout the City.

4.1.1 Multi-habitat Planning Area

The MHPA was developed by the City in cooperation with the USFWS, CDFW, property owners, developers, and environmental groups using the Preserve Design Criteria contained in the MSCP Plan, and the City Council-adopted criteria for the creation of the MHPA.

MHPA lands are large blocks of native habitat that have the ability to support a diversity of plant and animal life and, therefore, have been included within the City's Subarea Plan for conservation. The MHPA also delineates core biological resource areas and corridors targeted for conservation as these lands have been determined to provide the necessary habitat quality, quantity, and connectivity to sustain the unique biodiversity of the San Diego region. The project site is not within or adjacent to the MHPA. The MHPA areas nearest to the project site are 0.5 mile to the southwest and 0.7 mile to the northwest.

4.1.2 Land Use Adjacency Guidelines

Development adjacent to the MHPA must ensure that indirect impacts to the MHPA are minimized. Section 1.4.3 of the City's Subarea Plan outlines the requirements to address indirect effects related to drainage and toxics, lighting, noise, public access, invasive plant species, brush management, and grading/land development. Because the project site is not adjacent to the MHPA, the Land Use Adjacency Guidelines do not apply.

5.0 SURVEY RESULTS

5.1 PHYSICAL CHARACTERISTICS

The project site is relatively flat and consists entirely of undeveloped, previously disturbed land. Previous use of the project site consists of agriculture back to at least 1966 (Nationwide Environmental Title Research, LLC 2017). Elevation ranges from approximately 485 to 525 feet above mean sea level.

The soil types on the project site and adjacent off-site impact area along Otay Mesa Road consist of Salinas clay loam (zero to two percent slopes) and Diablo clay (two to nine percent slopes). The soil in the off-site impact area adjacent to La Media Road is Stockpen gravelly clay loam (two to five percent slopes). The project site is bordered on three sides by roadways, and land uses adjacent to these roadways are commercial and industrial. The land between the project site and the off-site impact area adjacent to La Media Road is undeveloped and was also previously used for agriculture back to at least 1966.

5.2 VEGETATION COMMUNITIES

The site supports of non-native grassland, disturbed land, and developed land (Table 2; Figure 3).

Table 2
EXISTING VEGETATION (acre)

Vegetation	On Site	Off-site Impact Area	Total
Upland[1]			
Non-native grassland (Tier IIIB)	46.8	0.2	47.0
Disturbed land (Tier IV)	2.3	1.5	3.8
Developed (N/A)	0.0	0.1	0.1
TOTAL	**49.1**	**1.8**	**50.9**

[1]Uplands have been divided into tiers of sensitivity (City 2012)

5.2.1 Upland Vegetation Communities

Non-Native Grassland

Non-native grassland on the project site is composed of more than 50 percent cover (relative) of non-native grass species such as slender wild oat (*Avena barbata*) and bromes (*Bromus diandrus*, *B. hordeaceus*, and *B. madritensis* ssp. *rubens*). Other non-native and native species are also present such as non-native black mustard and tocalote (*Centaurea melitensis*), as well as native fiddleneck (*Amsinckia americana*). Non-native grassland occurs as shown on Figure 3 and in Photos 24 through 30, et al. in Appendix E. These grasslands throughout San Diego County serve as valuable raptor foraging habitat. Non-native grassland is recognized as a Tier IIIB upland habitat (common upland) by the City.

5.2.2 <u>Other Uplands</u>

Disturbed Land

Disturbed land on the project site supports more than 50 percent cover (relative) of non-native plant species (that are not grasses) such as Russian thistle, black mustard, and cheese weed (*Malva parviflora*). Other non-native plant species are also present, as are some native species such as broom baccharis (*Baccharis sarothroides*) and California sagebrush (*Artemisia californica*). Disturbed land in the off-site impact area along La Media Road appears to have been seeded with native species in the past. Disturbed land occurs as shown on Figure 3 and in Photos 1, 2, 10, 14, 20, et al. in Appendix E. Disturbed land is considered Tier IV (other uplands) by the City.

As described above, the mapping of disturbed land (versus non-native grassland) in "problem" areas of the site was supported with quantitative transect data. Figure 3 shows the locations of the sampled transects and the collected data is presented in Appendix D.

Developed Land

Developed land occurs in the off-site impact areas and is comprised of pavement. Developed land occurs as shown on Figure 3 and in Photos 1, 6, 7, and 9 in Appendix E. Developed land has not been assigned a tier by the City.

5.3 PLANT SPECIES OBSERVED

Fifty-eight species of plants have been observed on site during all surveys to date. A list of these plant species is presented in Appendix B.

5.4 ANIMAL SPECIES OBSERVED OR DETECTED

Thirty-nine species of animals (21 invertebrates, one reptile, 10 birds, and seven mammals) have been observed or detected on site during all surveys to date. A list these animal species is presented in Appendix C.

5.5 SENSITIVE BIOLOGICAL RESOURCES

According to City Municipal Code (Chapter 11, Article 3, Division 1) and the City's Biology Guidelines (City 2012), sensitive biological resources refers to upland and/or wetland areas that meet any one of the following criteria:

(a) Lands that have been included in the City's MSCP Preserve (i.e., the MHPA);

(b) Wetlands;

(c) Lands outside the MHPA that contain Tier I, Tier II, Tier IIIA, or Tier IIIB habitats;

(d) Lands supporting species or subspecies listed as rare, endangered, or threatened under Section 670.2 or 670.5, Title 14, California Code of Regulations, or the FESA, Title 50, Code of Federal Regulations, Section 17.11 or 17.12, or candidate species under the California Code of Regulations;

(e) Lands containing habitats with MSCP Narrow Endemic species as listed in the Biology Guidelines (City 2012); or

(f) Lands containing habitats of MSCP Covered Species as listed in the Biology Guidelines (City 2012).

5.5.1 Sensitive Vegetation Communities

Additionally, sensitive vegetation communities are those considered rare within the region or sensitive by CDFW (Holland 1986) and/or the City. These communities, in any form (e.g., including disturbed or burned), are considered sensitive because they have been historically depleted, are naturally uncommon, or support sensitive species. The project site supports one sensitive vegetation community: non-native grassland.

5.5.2 Sensitive Plant Species

Sensitive plant species are those that are considered Federal, State, or CNPS rare, threatened, or endangered; MSCP Covered Species; or MSCP Narrow Endemic species. More specifically, if a species is designated with any of the following statuses (a-c below), it is considered sensitive per City Municipal Code (Chapter 11, Article 3, Division 1):

(a) A species or subspecies is listed as rare, endangered, or threatened under Section 670.2 or 670.5, Title 14, California Code of Regulations, or the FESA, Title 50, Code of Federal Regulations, Section 17.11 or 17.12, or candidate species under the California Code of Regulations;

(b) A species is a Narrow Endemic as listed in the Biology Guidelines in the Land Development Manual (City 2012); and/or

(c) A species is a Covered Species as listed in the Biology Guidelines in the Land Development Manual (City 2012).

A species may also be considered sensitive if it is included in the CNPS Inventory of Rare and Endangered Plants (CNPS 2015). California Rare Plant Rank 1 includes plants that are rare, threatened or endangered in California. California Rare Plant Rank 2 includes plants that are rare, threatened or endangered in California but more common elsewhere. California Rare Plant Rank 3 includes plants that are eligible for State listing as rare, threatened or endangered. California Rare Plant Rank 4 plants are locally significant but few, if any, are eligible for State listing.

Sensitive plant status is often based on one or more of three distributional attributes: geographic range, habitat specificity, and/or population size. A species that exhibits a small or restricted geographic range (such as those endemic to the region) is geographically rare. A species may be more or less abundant but occur only in very specific habitats. Lastly, a species may be widespread but exists naturally in small populations. One sensitive plant species was observed on site: San Diego bur-sage (*Ambrosia chenopodiifolia*).

San Diego bur-sage (*Ambrosia chenopodiifolia*)
Sensitivity: CNPS Rare Plant Rank 2B.1
Distribution: Southwestern San Diego County, Arizona, and Mexico below 600 feet in elevation.
Habitat(s): Dry, sunny hillsides in coastal sage scrub and maritime succulent scrub.
Presence: One San Diego bur-sage plant was found along the side of La Media Road in the off-site impact area.

Sensitive plant species that were not observed by either Alden or REC but may have potential to occur on site (based on, for example, CNDDB records for the site vicinity, vegetation communities present, and soils present) are listed in Table 3. With the previous, long-standing, agricultural disturbance of the project site, it is unlikely that these species are present.

Table 4 lists MSCP Narrow Endemic species and their potential to occur on site. Narrow Endemic species are a subset of MSCP Covered Species (defined in Section 4.1, *Multiple Species Conservation Program Subarea Plan*). The City specifies additional conservation measures in its MSCP Subarea Plan to ensure impacts to Narrow Endemic species are avoided to the maximum extent practicable. No Narrow Endemic plant species were observed on site.

Table 3 SENSITIVE PLANT SPECIES NOT OBSERVED AND THEIR POTENTIAL TO OCCUR		
SPECIES	**SENSITIVITY[1]**	**POTENTIAL TO OCCUR**
San Diego County needlegrass (*Achnatherum diegoense*)	CNPS RPR 4.2	Low due to the extensive disturbance of the site from agricultural activities dating back to at least 1966. A perennial herb that blooms February to June and would have been observed if present.
South coast saltscale (*Atriplex pacifica*)	CNPS RPR 1B.2	Low due to the extensive disturbance of the site from agricultural activities dating back to at least 1966. An annual herb that blooms March to October and would have been observed if present.
Orcutt's brodiaea (*Brodiaea orcuttii*)	CNPS RPR 1B.1 MSCP Covered	Low due to the extensive disturbance of the site from agricultural activities dating back to at least 1966 that likely extirpated this bulbiferous herb from the site had it been present.
Palmer's goldenbush (*Ericameria palmeri* var. *palmeri*)	CNPS RPR 1B.1 MSCP Covered	Low due to the extensive disturbance of the site from agricultural activities dating back to at least 1966. A perennial, evergreen shrub that would have been observed if present.
San Diego goldenstar (*Bloomeria clevelandii*)	CNPS RPR 1B.1 MSCP Covered	Low due to the extensive disturbance of the site from agricultural activities dating back to at least 1966 that likely extirpated this bulbiferous herb from the site had it been present.
Parry's tetracoccus (*Tetracoccus dioicus*)	CNPS RPR 1B.2 MSCP Covered	Low due to the extensive disturbance of the site from agricultural activities dating back to at least 1966. A perennial shrub that would have been observed if present.

[1]CNPS RPR = California Native Plant Society Rare Plant Rank

1B.1 = Rare, threatened, or endangered in California and elsewhere. Seriously endangered in California (over 80 percent of occurrences threatened/high degree and immediacy of threat).

1B.2 = Rare, threatened, or endangered in California and elsewhere. Moderately endangered in California (20 to 80 percent occurrences threatened/moderate degree and immediacy of threat).

4.2 = A watch list for species of limited distribution. Moderately endangered in California (20 to 80 percent occurrences threatened/moderate degree and immediacy of threat).

MSCP Covered = Species for which the City has take authorization from the USFWS and CDFW within the City's subarea.

Table 4 MSCP NARROW ENDEMIC PLANT SPECIES AND THEIR POTENTIAL TO OCCUR		
SPECIES	**SENSITIVITY[1]**	**POTENTIAL TO OCCUR**
San Diego thorn-mint (*Acanthomintha ilicifolia*)	FT/SE CNPS RPR 1B.1	Low due to the extensive disturbance of the site from agricultural activities dating back to at least 1966 that likely extirpated this annual herb from the site had it been present.
Shaw's agave (*Agave shawii*)	CNPS RPR 2B.1	Very low. A perennial, leaf succulent that would have been observed if present.
San Diego ambrosia (*Ambrosia pumila*)	FE CNPS RPR 1B.1	Not expected. Not known from project vicinity.
Aphanisma (*Aphanisma blitoides*)	CNPS RPR 1B.2	Not expected. No known populations in MSCP Plan Area.
Coastal dunes milk vetch (*Astragalus tener* var. *titi*)	FE/SE CNPS RPR 1B.1	Not expected. Occurs in sandy places along the coast, including coastal dunes. Not known from project vicinity.
Encinitas baccharis (*Baccharis vanessae*)	FT/SE CNPS RPR 1B.1	Not expected. Not known from near the project vicinity.
Otay tarplant (*Deinandra conjugens*)	FT/SE CNPS RPR 1B.1	Low due to the extensive disturbance of the site from agricultural activities dating back to at least 1966 that likely extirpated this annual herb from the site had it been present.
Short-leaved dudleya (*Dudleya brevifolia*)	SE CNPS RPR 1B.1	Not expected. Occurs on dry, sandstone bluffs in chamise chaparral that do not occur on site.
Variegated dudleya (*Dudleya variegata*)	CNPS RPR 1B.2	Low due to the extensive disturbance of the site from agricultural activities dating back to at least 1966 that likely extirpated this perennial herb from the site had it been present.
San Diego button-celery (*Eryngium aristulatum* var. *parishii*)	FE/SE CNPS RPR 1B.1	Low due to the extensive disturbance of the site from agricultural activities dating back to at least 1966 that likely extirpated this annual/perennial herb from the site had it been present.
Prostrate navarretia (*Navarretia prostrata*)	FT CNPS RPR 1B.1	Very low. A vernal pool species. No vernal pool habitat present.
Snake cholla (*Cylindropuntia californica* var. *californica*)	CNPS RPR 1B.1	Very low. A perennial, stem succulent that would have been observed if present.

Table 4 (cont.) MSCP NARROW ENDEMIC PLANT SPECIES AND THEIR POTENTIAL TO OCCUR		
SPECIES	**SENSITIVITY[1]**	**POTENTIAL TO OCCUR**
California Orcutt grass (*Orcuttia californica*)	FE/SE CNPS RPR 1B.1	Very low. A vernal pool species. No vernal pool habitat present.
San Diego mesa mint (*Pogogyne abramsii*)	FE/SE CNPS RPR 1B.1	Not expected. Project site is outside the species' range.
Otay Mesa mint (*Pogogyne nudiuscula*)	FE/SE CNPS RPR 1B.1	Very low. A vernal pool species. No vernal pool habitat present.

[1]FE = Federally listed endangered
FT = Federally listed threatened
SE = State listed endangered

CNPS RPR = California Native Plant Society Rare Plant Rank

1B.1 = Rare, threatened, or endangered in California and elsewhere. Seriously endangered in California (over 80 percent of occurrences threatened/high degree and immediacy of threat).

1B.2 = Rare, threatened, or endangered in California and elsewhere. Moderately endangered in California (20 to 80 percent occurrences threatened/moderate degree and immediacy of threat).

2B.1 = Rare, threatened, or endangered in California but more common elsewhere. Seriously endangered in California (over 80 percent of occurrences threatened/high degree and immediacy of threat).

5.5.3 Sensitive Animal Species

Sensitive animal species are those that are considered Federal or State threatened or endangered; MSCP Covered Species; or MSCP Narrow Endemic species. More specifically, if a species is designated with any of the following statuses (a-c below), it is considered sensitive per City Municipal Code (Chapter 11, Article 3, Division 1):

(a) A species or subspecies is listed as endangered or threatened under Section 670.2 or 670.5, Title 14, California Code of Regulations, or the FESA, Title 50, Code of Federal Regulations, Section 17.11 or 17.12, or candidate species under the California Code of Regulations;

(b) A species is a Narrow Endemic as listed in the Biology Guidelines in the Land Development Manual (City 2012); and/or

(c) A species is a Covered Species as listed in the Biology Guidelines in the Land Development Manual (City 2012).

A species may also be considered sensitive if it is included on the CDFW Special Animals List (CDFW 2017) as a State Species of Special Concern, State Watch List species, State Fully Protected species, or Federal Bird of Conservation Concern.

Generally, the principal reason an individual taxon (species or subspecies) is considered sensitive is the documented or perceived decline or limitations of its population size or geographical extent and/or distribution, resulting in most cases from habitat loss.

Three sensitive animal species were observed on site as described below and shown on Figure 3.

California horned lark (*Eremophila alpestris actia*)
Sensitivity: State Watch List[1]
Distribution: Sonoma County, California south to northern Baja California, Mexico.
Habitat(s): Sandy beaches, agricultural fields, grasslands and open areas on coastal slopes and in lowlands.
Presence: Two individuals were observed (but not mapped) in non-native grassland on site by REC in 2016.

Burrowing owl (*Athene cunicularia*)
Sensitivity: State Species of Special Concern[2], MSCP Covered Species
Distribution: Lower British Columbia to Manitoba, Canada; central and western U.S. south to northern Mexico and Baja.
Habitat(s): Open areas such as grasslands, pastures, coastal dunes, desert scrub, and agriculture fields. Non-native grassland on the project site and in the off-site impact areas is considered suitable for the burrowing owl. Disturbed land on the project site and in the off-site impact areas, however, is characterized by a dense cover of broad-leaved, non-native plant species that is not "open area" and, therefore, is likely unsuitable for the burrowing owl.
Presence: One individual owl was reported as occurring near the intersection of La Media and Otay Mesa Road on April 5, 2017 during an ongoing survey being conducted by Recon Environmental (personal communication, Ted Shaw, 04/05/2017).

San Diego black-tailed jackrabbit (*Lepus californicus bennettii*)
Sensitivity: State Species of Special Concern[2]
Distribution: Southern Santa Barbara County south on coastal slope to vicinity of San Quintín, Baja California, Mexico. Localities on eastern edge of its range include Jacumba and San Felipe Valley in San Diego County.
Habitat(s): Occurs primarily in open habitats including coastal sage scrub, chaparral, grasslands, croplands, and open disturbed areas if there is at least some shrub cover present. Shrubs are used for hiding, nesting, and thermal cover. Shrub-grasslands and grasslands are used for foraging.
Presence: One jackrabbit was observed (but not mapped) in non-native grassland on site by REC in 2016.

Sensitive animal species that were not observed or detected on site but that may have potential to occur (based on, for example, nearby CNDDB records and/or the presence of potential habitat) are listed in Table 5.

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[1] Birds that are/were: a) not on the current list of species of special concern but were on previous lists and have not been State listed under the California Endangered Species Act; b) previously State or federally listed and now are on neither list; or c) on the list of "Fully Protected" species.
[2] Declining population levels, limited ranges, and/or continuing threats have made them vulnerable to extinction.

Table 5 SENSITIVE ANIMAL SPECIES NOT OBSERVED OR DETECTED AND THEIR POTENTIAL TO OCCUR		
SPECIES	**SENSITIVITY[1]**	**POTENTIAL TO OCCUR**
INVERTEBRATES		
Quino checkerspot butterfly (*Euphydryas editha quino*)	FE	Very low. No host plants observed on site. Not reported to the CNDDB in the project area since the 1970s.
VERTEBRATES		
Reptiles		
Orange-throated whiptail (*Aspidoscelis hyperythra*)	SSC MSCP Covered	Low. Found in coastal sage scrub, chaparral, edges of riparian woodlands and washes, as well as weedy, disturbed areas adjacent to these habitats—none of which occur on site.
Birds		
White-tailed kite (*Elanus leucurus*)	Fully Protected	Low. Found in association with riparian woodlands and oak or sycamore groves adjacent to grassland. Woodlands/groves not present on site or nearby.
Northern harrier (*Circus cyaneus*)	SSC MSCP Covered	Low to moderate. Found in open grasslands and marshes.
Mammals		
Pallid bat (*Antrozous pallidus pacificus*)	SSC	Low. Generally found in xeric sage scrub, chaparral, or grassland communities and requires undisturbed rocky areas for roosting that are not present.
Dulzura pocket mouse (*Chaetodipus californicus femoralis*)	SSC	Low. Primarily associated with mature chaparral not present on site.
Southern grasshopper mouse (*Onychomys torridus ramona*)	SSC	Low. Believed to inhabit flat, sandy, valley floor habitats (Collins 1998) not present on site.

[1] FE = Federally listed endangered

SSC = State Species of Special Concern: Declining population levels, limited ranges, and/or continuing threats have made them vulnerable to extinction.

Fully Protected: all vertebrate and invertebrate taxa of concern to the California Natural Diversity Data Base regardless of legal or protection status. These species may not be taken or possessed without a permit from the Fish and Game Commission and/or CDFW.

MSCP Covered = Species for which the City has take authorization from the USFWS and CDFW within the City's subarea.

5.5.4 Waters of the U.S., Waters of the State, and City Wetlands

There are no WUS, WS, or City wetlands on site.

5.5.5 Wildlife Corridors

Wildlife corridors can be local or regional in scale; their functions may vary temporally and spatially based on conditions and species presence. Wildlife corridors represent areas where wildlife movement is concentrated due to natural or anthropogenic constraints. Local corridors provide access to resources such as food, water, and shelter. Animals use these corridors, which are often hillsides or tributary drainages, to move between different habitats areas. Regional corridors provide these functions and link two or more large habitat areas. Regional corridors provide avenues for wildlife dispersal, migration, and contact between otherwise distinct populations.

The MHPA includes core biological resource areas and corridors targeted for conservation that preserve local and regional corridor functions. The project site is not in the MHPA, and the project's location surrounded by State highways and Otay Mesa Road on three sides severely limits, or even precludes, it from connecting off-site habitat areas. The project site may provide some resources such as food for wildlife, but due to the site's disturbed nature from agricultural activities going back to at least 1966, those resources are limited.

6.0 PROJECT IMPACT ANALYSIS

This section analyzes project effects on sensitive biological resources. The City's CEQA Significance Determination Thresholds (City 2012) are used to establish whether or not there is a significant effect. A significant effect is defined as a "substantial or potentially substantial adverse change in the environment." The CEQA Guidelines (i.e., Appendix G of the CEQA Guidelines) further indicate that there may be a significant effect on biological resources if a project will trigger the following criteria:

A. Substantially affect an endangered, rare, or threatened species of animal or plant or the habitat of the species;

B. Interfere substantially with the movement of any resident or migratory fish or wildlife species; or

C. Substantially diminish habitat for fish, wildlife, or plants.

Impacts to biological resources are evaluated by City staff through the CEQA review process, the ESL Regulations and City's Biology Guidelines, and through the review of a project's consistency with the City's MSCP Subarea Plan. According to the ESL Regulations, Site Development Permits are required for impacts to wetlands and listed species habitat. There are no wetlands or listed species habitat on site. The project would be required to obtain any applicable Federal and State permits prior to the issuance of any discretionary permit by the City. Prior to the issuance of any construction permit(s), the project applicant must provide a copy of the permit, authorization letter, or other official mode of communication from the Federal and

State permitting agencies to the City. No Federal or State permit requirements are anticipated, however.

For projects within the City or carried out by the City which may affect sensitive biological resources, potential impacts to such sensitive biological resources must be evaluated using the following significance criteria:

1. Would the project result in substantial adverse impacts, either directly or through habitat modifications, to any species identified as a candidate, sensitive or special status species in the MSCP or other local or regional plans, policies or regulations, or by the CDFW or USFWS?

2. Would the project result in a substantial adverse impacts on any Tier I, Tier II, Tier IIIA or Tier IIIB habitats as identified in the Biology Guidelines or other sensitive natural community identified in local or regional plans, policies, regulations or by the CDFW or USFWS?

3. Would the project result in a substantial adverse impact on wetlands (including, but not limited to, marsh, vernal pools, riparian areas, etc.) through direct removal, filling, hydrological interruption, or other means? There are no wetlands on the project site, so this significance criterion is not addressed further.

4. Would the project substantially interfere with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, including linkages identified in the MSCP Plan, or impede the use of native wildlife nursery sites?

5. Would the project conflict with the provisions of an adopted Habitat Conservation Plan, NCCP, or other approved local, regional or state habitat conservation plan, either within the MSCP plan area or in the surrounding region? The project would not conflict with any such plan as it would be consistent with the City's MSCP Subarea Plan either through project design and/or implemented mitigation.

6. Would the project introduce a land use within an area adjacent to the MHPA that would result in adverse edge effects? The project would not because it is not adjacent to the MHPA.

7. Would the project conflict with any local policies or ordinances protecting biological resources? The project would be consistent with the ESL Regulations as described in Section 3.1.3, *City of San Diego Environmentally Sensitive Lands Regulations* and Section 6.3.2, *General Management Directives*.

8. Would the project introduce invasive species of plants in to natural open space?

6.1 DIRECT IMPACTS

Direct impacts immediately alter the affected biological resources such that those resources are eliminated temporarily or permanently. The removal of vegetation would be considered a direct impact. All direct impacts associated with the project and the future extension of Airway Road would be permanent.

6.1.1 Direct Impacts to Vegetation Communities

The entire approximately 49.1 acre project site and approximately 1.8 acres off site along Otay Mesa Road and La Media Road would be directly and permanently impacted by the project (Table 6; Figure 3).

Table 6
DIRECT IMPACTS TO VEGETATION (acre)

Vegetation	On Site	Off Site	Total
Upland[1]			
Non-native grassland (Tier IIIB)[2]	46.8	0.2	47.0
Disturbed land (Tier IV)	2.3	1.5	3.8
Developed (N/A)	0.0	0.1	0.1
TOTAL	**49.1**	**1.8**	**50.9**

[1]Uplands have been divided into tiers of sensitivity (City 2012).
[2]Considered occupied by the burrowing owl.

Analysis of Significance of Impacts to Vegetation Communities

Upland Vegetation Communities. Impacts to Tier IIIB non-native grassland would be significant according to the significance criteria described previously in Section 6.0, *Project Impact Analysis* (see below). Mitigation for these impacts would be required. Impacts to Tier IV disturbed land and developed (no tier) would be less than significant as the impacts would not meet criteria for significance described in Section 6.0, *Project Impact Analysis*.

Significance Criterion C: A project would substantially diminish habitat for fish, wildlife, or plants. The project would replace 47.0 acres of non-native grassland, which provides habitat for plants and animals, including the burrowing owl, with urban development. Since the City considers any impact to one acre or more of non-native grassland that is not completely surrounded by existing urban development to be significant, this impact would be substantial.

Significance Criterion 2: A project would result in a substantial adverse impact on any Tier IIIB habitat as identified in the Biology Guidelines or other sensitive natural community identified in local or regional plans, policies, regulations, or by the CDFW or USFWS. As stated above under Significance Criterion C, impacts would occur to Tier IIIB non-native grassland that would be considered substantial and adverse; mitigation would be required.

6.1.2 Direct Impacts to Sensitive Plant Species

Off-site impacts adjacent to La Media Road would remove one San Diego bur-sage plant, a CNPS Rare Plant Rank 2B.1 species. Due to the fact that only one plant would be impacted, the impact is considered less than significant (Significance Criterion 1).

6.1.3 Direct Impacts to Sensitive Animal Species

The project would not directly impact any known burrowing owl burrow, but it would impact 47.0 acres of burrowing owl-occupied non-native grassland habitat. This impact would be considered significant according to Significance Criterion 1. Mitigation would be required.

Impacts to the California horned lark would occur from habitat removal and potential injury or mortality to this species that forages on the ground. The California horned lark is a State Watch List species; it is not an MSCP Covered Species. Impacts to this species would be significant according to Significance Criterion 1 due to the acreage of lost habitat and potential injury and mortality. Mitigation would be required.

Impacts to the San Diego black-tailed jackrabbit would also occur from habitat removal and potential injury or mortality to very young jackrabbit litters that may be immobile. The San Diego black-tailed jackrabbit is a State Species of Special Concern; it is not an MSCP Covered Species. Impacts to this species would be significant according to Significance Criterion 1 due to the acreage of lost habitat and potential injury and mortality. Mitigation would be required.

Raptor Foraging Habitat

Loss of non-native grassland due to development of the project would result in a loss of potential raptor foraging habitat (Tier III B non-native grassland). The loss of raptor foraging habitat would be significant according to Significance Criterion 1 (substantial adverse impacts, either directly or through habitat modifications, to [sensitive] species) and Significance Criterion 2 (substantial adverse impact on sensitive natural communities). Mitigation would be required.

Analysis of Significance of Impacts to Sensitive Animal Species

Direct impacts to the burrowing owl, California horned lark, San Diego black-tailed jackrabbit, and raptor foraging habitat would be significant according to the criteria described previously in Section 6.0, *Project Impact Analysis*. See below. Mitigation for these impacts would be required.

Significance Criterion A: A project would substantially affect an endangered, rare, or threatened species of animal or plant or the habitat of the species. The project could directly injure or kill individuals of these species during construction.

Significance Criterion C: A project would substantially diminish habitat for fish, wildlife, or plants. The project would remove 47.0 acres of non-native grassland that is habitat for the burrowing owl, California horned lark, and San Diego black-tailed jackrabbit and that may provide habitat for foraging raptors. The City considers any impact to one acre or more of non-native grassland not completely surrounded by existing urban development to be significant.

Significance Criterion 1: A project would result in substantial adverse impacts, either directly or through habitat modifications, to any species identified as a candidate, sensitive or special status species in the MSCP or other local or regional plans, policies or regulations, or by the CDFW or USFWS. The project would impact the burrowing owl, California horned lark, and San Diego black-tailed jackrabbit through removal of 47.0 acres of non-native grassland habitat for these species and could cause injury or mortality to individuals.

Significance Criterion 2: A project would result in a substantial adverse impact on sensitive natural communities identified in local or regional plans, policies, regulations, or by the CDFW or USFWS. As presented in Table 6 in Section 6.1.1, *Direct Impacts to Vegetation Communities*, the project would directly impact 47.0 acres of non-native grassland, which is a Tier IIIB habitat and occupied by the burrowing owl. This impact is considered substantial and adverse due to the sensitivity of this resource and the acreage that would be lost.

6.1.4 Direct Impacts to Sensitive Plant and Animal Species with Potential to Occur

Tables 3 and 4 presented lists of the sensitive and MSCP Narrow Endemic plant species not observed during surveys and their potential to occur on site. All of these species have low potential to occur or are not expected to occur based on the location of the site, the long agricultural history of the site, the habitats present, and/or because these species were not found during site surveys. Therefore, impacts to these species are not anticipated.

Table 5 presented a list of sensitive animal species not observed or detected and their potential to occur on site. All of these species, with one exception, have either very low or low potential to occur. Impacts to these species are not anticipated.

There is low to moderate potential for the northern harrier to utilize non-native grassland on site. The northern harrier is a State Species of Special Concern; it is also an MSCP Covered Species with special conditions for its coverage prescribed in Appendix A of the City's Subarea Plan. Those conditions for coverage include Area Specific Management Directives for managing lands conserved as part of the preserve. None of the project site is proposed to be part of the preserve, nor is it adjacent to the preserve.

Direct impacts to non-native grassland habitat of the northern harrier, should the harrier be present, would be significant according to Significance Criterion 1 (substantial adverse impacts to sensitive species). Mitigation would be required.

6.1.5 Wildlife Corridors

The project site is surrounded by State highways and Otay Mesa Road on three sides, which severely limits, or even precludes, it from connecting off-site habitat areas. Therefore, the project would not significantly alter wildlife movement (Significance Criterion 4).

6.2 INDIRECT IMPACTS

Indirect impacts consist of secondary effects of a project that can occur during construction or from a project once built. For this project, indirect impacts could occur from erosion/sedimentation/pollution, fugitive dust, lighting, noise, and, invasive plant species. The magnitude of an indirect impact can be the same as a direct impact, but the effect usually takes a longer time to become apparent.

6.2.1 Erosion/Sedimentation/Pollution

Water quality can be adversely affected by potential surface runoff and sedimentation during construction. The use of petroleum products (fuels, oils, and/or lubricants) and erosion of cleared land during construction or from runoff from parking lots, for example, can pollute downstream surface waters. Decreased water quality may adversely affect vegetation, aquatic animals, and terrestrial wildlife that depend upon these resources.

Potential erosion/sedimentation/pollution impacts from project construction would be minimized through the required use of the City's Construction Site Best Management Practices (SDMC §43.0301; BMPs) and by project design that would capture, treat, and store storm water runoff before it enters undeveloped or transitional areas consistent with the existing drainage conditions and per current storm water regulations.

Sunroad Enterprises proposes bioretention areas in the center and western portions of the site and a detention basin for the southwest portion of the site that would address potential issues with contaminated runoff from the built project.

The use of BMPs, bioretention areas, and a detention basin would adequately address potential issues of erosion/sedimentation/pollution during construction and occupancy of the built project. Therefore, potential impacts would be less than significant.

6.2.2 Fugitive Dust

Fugitive dust produced by construction can disperse onto adjacent vegetation. A continual cover of dust may reduce the overall vigor of individual plants by reducing their photosynthetic capabilities and increasing their susceptibility to pests or disease. This, in turn, could affect animals dependent on these plants. Fugitive dust also may make plants unsuitable as habitat for insects and birds. Fugitive dust impacts to adjacent, off-site habitat can have potential to be significant under Significance Criteria 1 and/or 2.

Construction of the project would include the use of dust control measures required in SDMC Section 142.0101 et seq. Therefore, the project would result in less-than-significant impacts from fugitive dust.

6.2.3 Lighting

Night lighting exposes wildlife to an unnatural light regime that may adversely affect foraging patterns, increase predation risk, cause biological clock disruptions, and result in a loss of species diversity. Lighting can be a significant indirect impact according to Significance Criterion 1 (impact to special status species) if it spills into ESL (such as non-native grassland off site). Potential night lighting impacts would be minimized to less-than-significant levels, however, by the project by adherence to the City's Outdoor Lighting Regulations (SDMC §142.0740).

6.2.4 Noise

Construction-related noise from such sources as clearing, grading, and construction vehicular traffic can result in significant, temporary noise-related impacts to wildlife in undeveloped habitat adjacent to the project site. Noise-related impacts, however, would only be considered significant if a sensitive species is present (Significance Criterion 1) that is susceptible to noise, such as the coastal California gnatcatcher (*Polioptila californica californica*). There are no such species present adjacent to the project site (there is no potential habitat for such species there), so there would be no construction-related noise impacts to wildlife.

6.2.5 Invasive Plant Species

Invasive, non-native plants can colonize areas disturbed by construction and potentially spread and impact nearby sensitive plant and animal species. Such invasions could displace native plant species, reduce diversity, increase flammability and fire frequency, change ground and surface water levels, and adversely affect the native wildlife that are dependent on native or naturalized vegetation. This impact can also occur if invasive, non-native plant species are included in a project's landscaping. The project site and surrounding area, which is not natural open space, are already colonized by invasive, non-native plant species. Therefore, there would be no impact from the project related to such species (Significance Criterion 8).

6.3 MSCP EVALUATION

The City's Subarea Plan provides policies and guidelines that require project compliance. These policies/guidelines are addressed below.

6.3.1 General Planning Policies and Design Guidelines

Section 1.4.2 of the City's Subarea Plan includes general planning policies and design guidelines that have been applied in the review and approval of development projects within or adjacent to the MHPA. The project is not within or adjacent to the MHPA; therefore, these policies and guidelines are not applicable.

6.3.2 General Management Directives

General management directives have been prescribed for all areas of the City's MSCP Subarea Plan, as appropriate. The one that applies to the project is listed below. Directives related to Public Access, Trails, and Recreation; Adjacency Management Issues; Invasive Exotics Control and Removal; Litter/Trash and Materials Storage; and Flood Control are not applicable to the project.

1. Mitigation shall be performed in accordance with ESL Regulations and the City's Biology Guidelines.

   The mitigation measures in Section 7.0, *Mitigation Measures*, of this report have been formulated to satisfy the requirements of the City's MSCP Subarea Plan, ESL Regulations, and Biology Guidelines.

6.3.3 Area Specific Management Directives

Burrowing Owl

The MSCP requires special measures/conditions for coverage of the burrowing owl. The MSCP requires mitigation for impacts to occupied habitat (at the Subarea plan specified ratio) through the conservation of occupied burrowing owl habitat or conservation of lands appropriate for restoration, management, and enhancement of burrowing owl nesting and foraging requirements.

The MSCP notes that persistence of the burrowing owl in San Diego County is, in part, dependent on conservation of known concentrations of the species in Santa Maria Valley. The mitigation proposed for impacts to non-native grassland from the project (considered occupied by the burrowing owl) is acquisition and preservation of the Turecek parcel in the County of San Diego (see Appendix G) and the purchase of credits in the Ramona Grasslands Preserve located in Santa Maria Valley (see Section 7.2.1, *Mitigation for Direct Impacts to Upland Vegetation*). The Preserve and the Turecek parcel are appropriate for management and enhancement of burrowing owl nesting and/or foraging requirements as follows.

Burrowing owls are known to have inhabited the Ramona Grasslands Preserve historically (Lincer 2007 *in* County of San Diego 2010), and a few pairs reside there (County of San Diego 2010). The MSCP requires that management plans include enhancement of known, historical and potential burrowing owl habitat and management for ground squirrels (the primary excavator of burrowing owl burrows), monitoring of burrowing owl nest sites to determine use and nesting success, predator control, and establishing a 300 foot-wide impact avoidance area (within the preserve) around occupied burrows. The Ramona Grasslands Preserve Resource Management Plan (County of San Diego 2013) addresses these conditions for the Preserve.

The East Otay Mesa/Otay Mesa area is currently the primary location of burrowing owls in San Diego County (County of San Diego 2010). The Turecek parcel is located in East Otay Mesa. The goals and objectives for burrowing owls in East Otay Mesa emphasize long-term habitat conservation, habitat improvement, and creation and maintenance of as much native and naturalized habitat as possible for burrowing owls. One of the goals for burrowing owls in East

Otay Mesa is to preserve grasslands. The 18.75 acre Turecek parcel supports non-native grassland that would be preserved as mitigation for the project (see Section 7.2.1, *Mitigation for Direct Impacts to Upland Vegetation*). Another goal is to establish two burrowing owl nodes of at least 150 acres each in East Otay Mesa. A node is a generalized area identified by the Wildlife Agencies, the County of San Diego, and the City as an area in which to concentrate preservation and restoration/enhancement of burrowing owl habitat. The Turecek parcel is located just southeast of one of the East Otay Mesa nodes and, therefore, would contribute to the establishment and enlargement of that node. Preservation and enhancement of squirrel and burrowing owl habitat on the parcel would further contribute toward meeting the node goal. A Resource Management Plan (RMP; Appendix H) has been prepared for City and Wildlife Agency approval for the Turecek parcel, as a condition for issuance of the grading permit. The RMP includes specific enhancement activities designed to improve the habitat suitability for the burrowing owl. Specific activities included in the RMP are discussed in Section 7.2.1.

Northern Harrier

Area Specific Management Directives for the northern harrier must manage agricultural and disturbed lands (which become part of the MSCP preserve) within four miles of nesting habitat to provide foraging habitat and include an impact avoidance area (900 foot or maximum possible within the MSCP preserve) around active nests. They also include measures of maintaining winter foraging habitat in preserve areas in Proctor Valley, around Sweetwater Reservoir, San Miguel Ranch, Otay Ranch east of Wueste Road, Lake Hodges, and San Pasqual Valley.

The northern harrier is not known to breed in the Ramona Grasslands Preserve (County of San Diego 2013), so nest impact avoidance is not an issue at the Preserve. The northern harrier is known to forage and winter there, however (County of San Diego 2013). Agricultural land occurs in the Preserve and consists of an area that was heavily grazed by cattle. Disturbed habitat occurs in the Preserve primarily as ranch roads that are bare ground. One of the goals of the management of the Preserve is to maintain connectivity through natural lands as well as agricultural lands to other preserved habitat for raptors; the latter of which would maintain agricultural foraging habitat for the harrier. One purpose of the Ramona Grasslands Preserve Resource Management Plan is to preserve and manage the biological resources in the Preserve to protect and, where appropriate, enhance biological values, which would include raptor foraging habitat (County of San Diego 2013).

The Turecek parcel supports non-native grassland that is potential foraging and nesting habitat for the northern harrier. A RMP (Appendix H) has been prepared for City and Wildlife Agency approval for the Turecek parcel.

6.4 CUMULATIVE IMPACTS

The MSCP was designed to compensate for the cumulative loss of biological resources throughout the San Diego region. Projects that conform to the MSCP as specified by the City's Subarea Plan and implementing ordinances, (i.e., Biology Guidelines and ESL Regulations) are not expected to result in a significant cumulative impact for those biological resources adequately covered by the MSCP. These resources include the vegetation communities identified as Tier I through IV and MSCP Covered Species (City 2012).

The project would comply with the City's Subarea Plan by mitigating for significant impacts in accordance with ESL Regulations and the City's Biology Guidelines (see Section 7.0, *Mitigation Measures*). Other projects in the City would also be required to comply with the City's Subarea Plan. Therefore, the project would not contribute considerably to cumulatively significant impacts on sensitive biological resources in the City, and no mitigation for cumulative impacts would be required.

7.0 MITIGATION MEASURES

The project would impact sensitive vegetation and sensitive animal species. The following measures are proposed to mitigate the significant impacts to these resources in accordance with the City's MSCP Subarea Plan, ESL Regulations, and Biology Guidelines. Successful implementation of the mitigation measures listed in this section would reduce each impact to a less-than-significant level.

7.1 BIOLOGICAL RESOURCE PROTECTION DURING CONSTRUCTION INCLUDING GENERAL AVIAN PROTECTION

I. Prior to Construction

A. **Biologist Verification:** The owner/permittee shall provide a letter to the City's MMC Section stating that a Project Biologist (Qualified Biologist), as defined in the City of San Diego's Biological Guidelines (2012), has been retained to implement the project's biological monitoring program. The letter shall include the names and contact information of all persons involved in the biological monitoring of the project.

B. **Pre-construction Meeting:** The Qualified Biologist shall attend a pre-construction meeting, discuss the project's biological monitoring program, and arrange to perform any follow up mitigation measures and reporting including site-specific monitoring, restoration or revegetation, and additional fauna/flora surveys/salvage.

C. **Biological Documents:** The Qualified Biologist shall submit all required documentation to Mitigation Monitoring Coordination verifying that any special mitigation reports including but not limited to, maps, plans, surveys, survey timelines, or buffers are completed or scheduled per City Biology Guidelines, MSCP, ESL Ordinance, project permit conditions; CEQA; endangered species acts; and/or other local, State or Federal requirements.

D. **Biological Construction Mitigation/Monitoring Exhibit:** The Qualified Biologist shall present a Biological Construction Mitigation/Monitoring Exhibit which includes the biological documents in C, above. In addition, include: restoration/revegetation plans, plant salvage/relocation requirements, avian or other wildlife surveys/survey schedules (including general avian nesting and USFWS protocol), timing of surveys, wetland buffers, avian construction avoidance areas/noise buffers/ barriers, other impact avoidance areas, and any subsequent requirements determined by the Qualified Biologist and the City

Assistant Deputy Director/MMC. The Biological Construction Mitigation/Monitoring Exhibit shall include a site plan, written and graphic depiction of the project's biological mitigation/monitoring program, and a schedule. The Biological Construction Mitigation/Monitoring Exhibit shall be approved by MMC and referenced in the construction documents.

E. **Resource Delineation:** Prior to construction activities, the Qualified Biologist shall supervise the placement of silt and orange construction fencing or equivalent along the limits of disturbance and verify compliance with any other project conditions as shown on the Biological Construction Mitigation/Monitoring Exhibit. This phase shall include, as applicable, flagging plant specimens and delimiting buffers to protect sensitive biological resources (e.g., habitats/flora and fauna species, including BUOW, California horned lark, and northern harrier) during construction. Appropriate steps/care should be taken to minimize attraction of nest predators to the site.

F. **Education:** Prior to commencement of construction activities, the Qualified Biologist shall meet with the owner/permittee or designee and the construction crew and conduct an on-site educational session regarding the need to avoid impacts outside of the approved construction area and to protect sensitive flora and fauna (e.g., explain the avian buffers and clarify acceptable access routes/methods and staging areas, etc.).

II. During Construction

A. **Monitoring:** All construction (including access/staging areas) shall be restricted to areas previously identified, proposed for development/staging, or previously disturbed as shown on "Exhibit A" and/or the Biological Construction Mitigation/Monitoring Exhibit. The Qualified Biologist shall monitor construction activities as needed to ensure that construction activities do not encroach into biologically sensitive areas, or cause other similar damage, and that the work plan has been amended to accommodate any sensitive species located during the pre-construction surveys. In addition, the Qualified Biologist shall document field activity via the Consultant Site Visit Record. The Consultant Site Visit Record shall be e-mailed to Mitigation Monitoring Coordination on the 1st day of monitoring, the 1st week of each month, the last day of monitoring, and immediately in the case of any undocumented condition or discovery.

The Qualified Biologist shall monitor, as is feasible, for the presence of sensitive animals species and shall, if practicable, direct or move these animals out of harm's way (i.e., to a location of suitable habitat outside the impact footprint).

B. **Subsequent Resource Identification:** The Qualified Biologist shall note/act to prevent any new disturbances to habitat, flora, and/or fauna on site (e.g., flag plant specimens for avoidance during access, etc). If active nests or other previously unknown sensitive resources are detected, all project activities that directly impact the resource shall be delayed until species specific local, State or Federal regulations have been determined and applied by the Qualified Biologist.

III. Post Construction

In the event that impacts exceed previously allowed amounts, additional impacts shall be mitigated in accordance with City Biology Guidelines, ESL Ordinance and MSCP, CEQA, and other applicable local, State and Federal laws. The Qualified Biologist shall submit a final Biological Construction Mitigation/Monitoring Exhibit /report to the satisfaction of the City Assistant Deputy Director /MMC within 30 days of construction completion.

7.2 MITIGATION FOR DIRECT IMPACTS

The following mitigation measures have been formulated to satisfy the requirements of the City's MSCP Subarea Plan and Biology Guidelines. The mitigation ratios used in this report follow the City's ESL Regulations tier system for impacts to sensitive upland vegetation. The ratios used in this report are as follows:

- **Tier IIIB**: Non-native grasslands (0.5:1)

- **Tier IV**: Disturbed, agricultural, and eucalyptus (0:1)

7.2.1 Mitigation for Direct Impacts to Upland Vegetation

The project proponent conducted a search for suitable parcels of land within the City that would meet the needed criteria for non-native grassland mitigation. The following criteria were evaluated for each parcel:

- Is the parcel in the City and on Otay Mesa?
- Does the parcel support grassland habitat?
- Is the topography relatively flat?
- Is the parcel large enough to provide required mitigation?
- Is the parcel within or adjacent to the MHPA?
- Is the parcel available for purchase?

Appendix I includes: 1) a list of parcels in the City that were evaluated for the above-listed criteria; 2) the results of the evaluation; and 3) a map showing the location of each parcel. Parcel availability information from local real estate professionals and developers was also used in the search. Parcels that are publicly owned (City, State, federal) are included in Appendix I but were not considered as potential mitigation sites. None of the parcels met the criteria or was available for purchase.

Mitigation for impacts to 47.0 acres of burrowing owl-occupied non-native grassland from the project shall occur at a ratio of 0.5:1. To, in part, satisfy the required 23.5 acres of non-native grassland mitigation, the 18.75 acre (net) Turecek parcel is proposed to be preserved and enhanced for the burrowing owl. An analysis of this site was conducted by Alden on February 9, 2017 (Appendix G). The Turecek parcel is in the County of San Diego at the corner of Harvest Road and Lonestar Road, approximately 0.75 mile northeast of the project site. This site is adjacent to a burrowing owl node (see Section 6.3.3, Area Specific Management Directives for the burrowing owl) and supports suitable features (non-native grassland) to be used as foraging habitat for burrowing owls. Soils on the parcel are mapped as Diablo clay and are not noted as being friable. Mitigation land outside the City requires CDFW and USFWS concurrence, consistent with MSCP Subarea Plan Implementing Agreement.[3]

Prior to the issuance a grading permit, a covenant of easement in favor of the City, CDFW, and USFWS shall be placed over the preserved mitigation land. In addition, implementation of the RMP will be a condition of approval for issuance of the grading permit.

Turecek Resource Management Plan

The goal of the RMP (Appendix H) is to manage the Turecek parcel such that it continues to support suitable habitat conditions for the burrowing owl. To meet this goal, the RMP includes initial site enhancement measures and long-term management tasks to increase the potential for the Turecek parcel to support ground squirrels and eventually the burrowing owl. The RMP includes the following measures.:

- Trash and debris removal
- Focused weed removal
- Soil ripping/decompaction
- Hole auguring (starter burrows)
- Limited soil berming/mounding
- Vegetation mowing (to reduce height)
- Dethatching
- Rock/boulder placement (structural refugia)

The intent of the initial enhancement activities is to contribute to the development of a self-sustaining squirrel population after a one-time implementation. This would be a first step in the eventual establishment of a burrowing owl population on the site.

In addition to the site improvements, the RMP includes a maintenance/management component with specific criteria to be met. A regular maintenance, monitoring and reporting schedule is included to direct the effort.

The project proponent will be responsible for funding the implementation of the RMP and the long-term management of the preserved Turecek parcel. Long-term funding will be through an endowment or other mechanism approved by the City and regulatory agencies. The final RMP will be approved by the City and regulatory agencies prior to implementation.

[3] During a field meeting on September 18, 2017 between City Staff and Wildlife Agencies, the agencies concurred that the Turecek parcel supports non-native grassland and is suitable as mitigation for non-native grassland impacts (considered occupied by burrowing owl).

Acquisition of Credits in the Ramona Grasslands Preserve

The remaining required 4.75 acres of non-native grassland mitigation would be satisfied through acquisition of non-native grassland credits from the Ramona Grasslands Preserve in San Diego County (this bank currently has available credits). The project proponent is currently in contact with the owner to purchase the credits and will be responsible for carrying out the implementation and funding of the mitigation.

7.2.2 Mitigation for Direct Impacts to Sensitive Animal Species

San Diego Black-tailed Jackrabbit, Raptor Foraging, and California Horned Lark

Direct impacts to San Diego black-tailed jackrabbit, raptor foraging, and California horned lark non-native grassland habitat from the project shall be mitigated as described in Section 7.2.1, *Mitigation for Direct Impacts to Upland Vegetation*.

Potential direct impacts to individuals of the San Diego black-tailed jackrabbit and California horned lark shall be mitigated through implementation of the measures outlined in Section 7.1, *Biological Resource Protection During Construction Including General Avian Protection*.

Burrowing Owl

Direct impacts to burrowing owl-occupied non-native grassland habitat from the project shall be mitigated as described in Section 7.2.1, *Mitigation for Direct Impacts to Upland Vegetation*.

Potential direct impacts to individual burrowing owls or burrowing owl burrows shall be mitigated via the following:

Preconstruction Survey Element

Prior to Permit or Notice to Proceed Issuance:

1. As this project site has been determined to be BUOW occupied or to have BUOW occupation potential, the Permit Holder shall submit evidence to the Assistant Deputy Director of Entitlements verifying that a Biologist possessing qualifications pursuant "Staff Report on Burrowing Owl Mitigation, State of California Natural Resources Agency Department of Fish and Game. March 7, 2012 (hereafter referred as CDFG 2012, Staff Report), has been retained to implement a burrowing owl construction impact avoidance program.

2. The Qualified BUOW Biologist (or their designated biological representative) shall attend the pre-construction meeting to inform construction personnel about the City's BUOW requirements and subsequent survey schedule.

Prior to Start of Construction:

1. The Permit Holder and Qualified Biologist must ensure that initial pre-construction/take avoidance surveys of the project "site" are completed between 14 and 30 days before initial construction activities, including brushing, clearing, grubbing, or grading regardless of the time of the year. "Site" means the project site and the area within a radius of 450 feet of the project site. The report shall be submitted and approved by the Wildlife Agencies (WAs) and/or City MSCP staff prior to construction or BUOW eviction(s) and shall include maps of the project site and BUOW locations on aerial photos.

2. The pre-construction survey shall follow the methods described in CDFG 2012, Staff Report -Appendix D *(please note, in 2013, CDFG became California Department of Fish and Wildlife).*

3. 24 hours prior to commencement of ground disturbing activities, the Qualified Biologist shall verify results of pre-construction/take avoidance surveys. Verification shall be provided to the City's Mitigation Monitoring and Coordination (MMC) Section. If results of the pre-construction surveys have changed and BUOW are present in areas not previously identified, immediate notification to the City and WAs shall be provided prior to ground disturbing activities.

During Construction:

1. **Best Management Practices shall be employed** as BUOWs are known to use open pipes, culverts, excavated holes, and other burrow-like structures at construction sites. Legally permitted active construction projects which are BUOW occupied and have followed all protocol in this mitigation section, or sites within 450 feet of occupied BUOW areas, should undertake measures to discourage BUOWs from re-colonizing previously occupied areas or colonizing new portions of the site. Such measures include, but are not limited to, ensuring that the ends of all pipes and culverts are covered when they are not being worked on, and covering rubble piles, dirt piles, ditches, and berms.

2. **On-going BUOW Detection** - If BUOWs or active burrows are not detected during the pre-construction surveys, Section "A" below shall be followed. If BUOWs or burrows are detected during the pre-construction surveys, Section "B" shall be followed. Neither the MSCP subarea plan nor this mitigation section allows for any BUOWs to be injured or killed outside or within the MHPA; in addition, impacts to BUOWs within the MHPA must be avoided.

A. Post Survey Follow-Up if BUOW and/or Signs of Active Natural or Artificial Burrows Are Not Detected During the Initial Pre-Construction Survey

Monitoring the site for new burrows is required using Appendix D protocol for the period following the initial pre-construction survey until construction is scheduled to be complete and is complete *(NOTE - Using a projected completion date [that is amended if needed] will allow development of a monitoring schedule which adheres to the required number of surveys in the detection protocol)*

1) If no active burrows are found but BUOWs are observed to occasionally (1-3 sightings) use the site for roosting or foraging, they should be allowed to do so with no changes in the construction or construction schedule.

2) If no active burrows are found but BUOWs are observed during follow-up monitoring to repeatedly (4 or more sightings) use the site for roosting or foraging, the City's MMC Section shall be notified, and any portion of the site where owls have been observed and that has not been graded or otherwise disturbed shall be avoided until further notice.
3) If a BUOW begins using a burrow on the site at any time after the initial pre-construction survey, procedures described in Section B must be followed.

4) Any actions other than these require the approval of the City and the WAs.

B. Post Survey Follow-Up if BUOWs and/or Active Natural or Artificial Burrows are detected during the Initial Pre-Construction Survey

Monitoring the site for new burrows is required using the Appendix D CDFG 2012 Staff Report for the period following the initial pre-construction survey until construction is scheduled to be complete and is complete *(NOTE - Using a projected completion date [that is amended if needed] will allow development of a monitoring schedule which adheres to the required number of surveys in the detection protocol).*

1) This section (B) applies only to sites (including biologically defined territory) wholly outside of the MHPA – **all direct and indirect impacts to BUOWs within the MHPA SHALL be avoided.**

2) If one or more BUOWs are using any burrows (including pipes, culverts, debris piles *etc.*) on or within 300 feet of the proposed construction area, the City's MMC Section shall be contacted. The City's MMC Section shall contact the WAs regarding eviction/collapsing burrows and shall enlist appropriate City biologist for on-going coordination with the WAs and the Qualified BUOW Biologist. No construction shall occur within 300 feet of an active burrow without written concurrence from the WAs. This distance may increase or decrease, depending on the burrow's location in relation to the site's topography and other physical and biological characteristics.

a) **Outside the Breeding Season** - If the BUOW is using a burrow on site outside the breeding season (i.e., September 1 – January 31), the BUOW may be evicted after the qualified BUOW biologist has determined via fiber optic camera or other appropriate device, that no eggs, young, or adults are in the burrow and written concurrence from the WAs for eviction is obtained prior to implementation.

b) **During Breeding Season** - If a BUOW is using a burrow on site during the breeding season (February 1– August 31), construction shall not occur within 300 feet of the burrow until the young have fledged and are no longer dependent on the burrow, at which time the BUOWs can be evicted. Eviction requires written concurrence from the WAs prior to implementation.

3. Survey Reporting During Construction - Details of construction surveys and evictions (if applicable) carried out shall be immediately (within 5 working days or sooner) reported to the City's MMC Section and the WAs and must be provided in writing (as by e-mail) and acknowledged to have been received by the required agencies and Development Services Department Staff member(s).

Post Construction:

1. Details of the all surveys and actions undertaken on site with respect to BUOWs (i.e., occupation, eviction, locations, etc.) shall be reported to the City's MMC Section and the WAs within 21 days post-construction and prior to the release of any grading bonds. This report must include summaries off all previous reports for the site, maps of the project site, and BUOW locations on aerial photos.

7.2.3 Mitigation for Direct Impacts to Sensitive Animal Species with Moderate Potential to Occur

Direct impacts to non-native grassland habitat of the northern harrier, which has low to moderate potential to occur on the project site, would be significant should the harrier be present. Mitigation to render that potential impact less than significant shall include the preservation and enhancement of non-native grassland habitat on the Turecek parcel prescribed in Section 7.2.1, *Mitigation for Direct Impacts to Upland Vegetation.*

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9.0 PREPARER'S QUALIFICATIONS/CERTIFICATIONS

Greg Mason, Principal/Senior Biologist, Alden Environmental, Inc.

Summary of Qualifications
Mr. Mason is the Principal and Senior Biologist at Alden Environmental, Inc. He has over 20 years' experience working in the environmental field and has participated in hundreds of projects in San Diego County. His experience includes oversight of large- and small-scale mitigation compliance programs, including habitat restoration, sensitive species surveys, vegetation mapping, wetland delineations, construction monitoring, impact analysis, report preparation, project permitting, and project management. He has worked extensively with both public and private clients, in coordination with federal, state and local regulatory staff, in the implementation of mitigation and monitoring programs in the field. He assists clients in obtaining aquatic resources permits including U.S. Army Corps Section 404 Permits, RWQCB Section 401 Certifications, and CDFW 1600 Streambed Alteration Agreements. Through his permitting work, Mr. Mason also facilitates the Section 7 consultation process with the USFWS and negotiates conservation measures. Mr. Mason is permitted by the USFWS to conduct presence/absence surveys for Quino checkerspot butterfly; San Diego, Riverside, vernal pool, Conservancy, and longhorn fairy shrimps; and vernal pool tadpole shrimp throughout the range of each species, and is also authorized to conduct dry season fairy shrimp analysis, identification, and culturing.

Professional Experience

Jr. Environmental Planner	Helix Environmental Planning, Inc., La Mesa, CA	1992 - 1993
Peace Corps Volunteer	U.S. Peace Corps, Paraguay	1993 - 1996
Environmental Planner	Helix Environmental Planning, Inc., La Mesa, CA	1996 - 1998
Biologist	Helix Environmental Planning, Inc., La Mesa, CA	1998 - 2001
Biology Group Manager	Helix Environmental Planning, Inc., La Mesa, CA	2001 - 2004
Division Manager, Biological Services	Helix Environmental Planning, Inc., La Mesa, CA	2004 - 2008
Vice President, Biological Services	Helix Environmental Planning, Inc., La Mesa, CA	2008 - 2011
Principal and Senior Biologist	Alden Environmental, Inc., San Diego, CA	2011 - Present

Education
Bachelor of Science, Natural Resources Planning & Interpretation, Humboldt State University, 1992

Registrations/Certifications/Licenses
- USFWS Threatened/ Endangered Wildlife Species Permit (quino checkerspot butterfly; San Diego, Riverside, vernal pool, Conservancy, and longhorn fairy shrimps; and vernal pool tadpole shrimp)
- USFWS authorized for dry season fairy shrimp analysis, identification, and culturing
- CDFW Scientific Collecting Permit SC-007619
- County of San Diego, Approved Biological Consultant and Approved Revegetation Planner

Professional Affiliations
- California Native Plant Society
- Returned Peace Corps Volunteer Association

Appendix A

Burrowing Owl Survey Report

BURROWING OWL PROTOCOL SURVEY REPORT
for the
Sunroad Otay Plaza Project, PTS 268422

Prepared by:

REC Consultants, Inc.

2442 Second Avenue
San Diego, California 92101
(619) 232-9200

Prepared for:

California Department of Fish and Wildlife
South Coast Regional Office
3883 Ruffin Road
San Diego, CA 92123

and

Andrea Rosati
Sunroad Enterprises
4445 Eastgate Mall, Suite 400
San Diego, CA 92121

Catherine MacGregor

Catherine MacGregor
Senior Biologist

June 2016

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1.0 INTRODUCTION

REC Consultants, Inc. conducted focused protocol surveys for burrowing owl (*Athene cunicularia*) on the Sunroad Otay Plaza project site and associated offsite impact area, located in Otay Mesa, City of San Diego, California. The purpose of these surveys was to determine if the site is currently used by burrowing owl ("BUOW"). Surveys were conducted according to the standards and protocols set forth by the California Department of Fish and Wildlife in their March 2012 "Staff Report on Burrowing Owl Mitigation" (CDFG 2012), and this report provides the results of the surveys. The project site ("Project") discussed in this report consists of a 51-acre property and 1.3 acres of associated offsite impacts.

1.1 <u>Project Location</u>

The approximately 51-acre Project site is located on APNs 646-290-17, -18, and -19; 646-290-04, 646-290-08; 646-290-24 through -27; 646-121-31; and 646-121-29. An associated 1.3-acre offsite impact area is located within APN 646-121-32-00. These parcels are immediately south of Otay Mesa Road and north of State Route (SR) 905, and 0.25 mile east of La Media Road. **Figure 1** provides the regional location of the Project and **Figure 2** shows the Project and vicinity superimposed on the United States Geological Survey Otay Mesa 7.5-minute topographic quadrangle map.

1.2 <u>Site Characteristics</u>

Project site elevations range from 485 feet above mean sea level (AMSL) to 520 feet AMSL. Site topography slopes very gently upward from west to east. According to the USDA Web Soil Survey (USDA 2013), two soil series are mapped on the site: Salinas clay, 0-2% slopes (ScA) occurs in the western and southern portion of the site, and Diablo clay, 2-9% slopes (DaC) occurs on the northeastern portion of the site. The offsite improvement area to the west originally contained Salinas clay, 0-2% slopes, and Stockpen gravelly clay loam, 2-5% slopes (SuB). (USDA 2015)

Three habitat types as classified according Oberbauer et al. (2008) were observed on the Project site: non-native grassland, disturbed land, and developed land. A list of plants observed on the Project site is provided in **Appendix A**, and a list of animals observed is provided in **Appendix B**. Photographs of habitats in the Project area are provided in **Appendix C**.

<u>Non-native Grassland – 49.5 acres total (Habitat Code 42200)</u>
Most of the Project site is non-native grassland. This land was historically farmed, and topographic indicators of this, such as parallel furrowing, are still visible. In 2016, the non-native grassland was dominated by cheeseweed (*Malva parviflora*), glaucous barley (*Hordeum murinum* subsp. *glaucum*), Russian-thistle (*Salsola* sp.), and ripgut brome (*Bromus diandrus*). Density ranged from sparse to dense. In the eastern area, open patches were more common. The soil contained numerous holes of small rodents and

other burrowing animals, of which few were ground squirrels (*Spermophilus beecheyi*). Photographs 1 through 5 in Appendix C show non-native grassland on and adjacent to the site Non-native grassland is present in the 150-m offsite BUOW survey area within Brown Field to the northwest, adjacent to SR 125 to the northeast and east, and adjacent to SR 905 to the south and southwest.

Disturbed Land – 1.3 acres total (Habitat Code 11300)

Disturbed land occurs along the margins of the Project site, associated with Otay Mesa Road, La Media Road, and drainage improvements not related to the Project. Vegetation in the disturbed areas was predominantly sparse disturbance-associated non-native species such as Russian-thistle, garland daisy (*Glebionis coronaria*), iceplant (*Mesembryanthemum crystallinum*), black mustard (*Brassica nigra*), Mediterranean schismus grass (*Schismus barbatus*), and oats (*Avena* sp.). A patch adjacent to La Media Road also contained coastal sage scrub plants such as California sagebrush (*Artemisia californica*), coast buckwheat (*Eriogonum fasciculatum*), San Diego bur-sage (*Ambrosia chenopodiifolia*), and native needlegrass (*Stipa* sp.); this area appeared to have been hydroseeded with natives after La Media roadwork. The most important areas of disturbed land for the BUOW survey are the berms/banks along La Media Road and Otay Mesa Road, where numerous burrows of various sizes, including ground squirrel burrows, were observed. Disturbed land is also present within the 150-m offsite BUOW survey area.

Developed Land – 0.2 acre (Habitat Code 12000)

Developed land occurs along Otay Mesa Road and La Media Road, and contains little vegetation except for a few non-native species such as garland daisy, London rocket (*Sisymbrium irio*), and Russian-thistle. Developed land, including light industrial development, is also common within the 150-m offsite BUOW survey area.

Habitats in the Project site and within a 150 m buffer around the site are illustrated in **Figure 3**. Photographs of the site are provided in **Appendix C**.

1.3 Project Description

The 51.0 acre project proposes the development of one or more industrial buildings with surface parking, landscaping, and supporting infrastructure in the Industrial Subdistrict of the Otay Mesa Development District within the Otay Mesa Community Plan area. Infrastructure to support the development is proposed including storm drains, sewer, and water lines.

1.4 Surrounding Land Use

The Project area is surrounded by roads and highways: Otay Mesa Road to the north, the connector between SR 125 and SR 905 (under construction) to the east and southeast, SR 905 to the south, and La Media Road to the West. Industrial/commercial warehouses, gas stations, and parking areas are located to the north and west of the site. A Pilot gas station and travel center with truck parking are located to the northeast of the site. A warehouse and parking are located to the south of SR 905. Four areas of non-native grassland are located near the site: the offsite area between the Project site and La Media road, a corner of Brown Field to the northwest, an area between the Pilot Travel center and SR 125 to the northeast, and a field to the south-southwest. Small patches also occur along the SR 905 ramps.

2.0 METHODOLOGY

REC biologists follow the standard protocol developed by the Burrowing Owl Consortium and updated by CDFW in their March 2012 Staff Report on Burrowing Owls Mitigation, Appendix D "Breeding and Non-breeding Season Surveys and Reports."

The breeding season survey methodology consists of 1) background research for any historical burrowing owl records, 2) an initial habitat assessment site visit to evaluate the presence and/or quality of burrowing owl potential habitat on the site and within a 150-meter (500-foot) buffer zone around it, and 3) a minimum of four survey visits at least three weeks apart. The four survey visits should be conducted between February 15 and July 15, with at least one survey visit between February 15 and April 15, and at least three survey visits during the peak breeding season of April 15 and July 15, with at least one of those three visits after June 15.

The survey technique involves walking transects through suitable habitat spaced adequately to provide complete coverage for the habitat (typically 7 to 20 m apart), with stops at the beginning of each transect and approximately every 100 m to scan the entire visible area with binoculars. While walking the transects, the biologist records all potential burrows and sign such as pellets, prey remains, and whitewash. The surveys should be conducted during suitable weather conditions and in the morning between morning civil twilight and 10:00 AM or in the evening between two hours before sunset and evening civil twilight.

2.1 Habitat Assessment and Background Research

Because the site has already been extensively surveyed by REC and site conditions have not substantially changed, a new habitat assessment was not conducted. The occurrence of BUOW within the Project footprint in 2012 indicated that the site is suitable for BUOW use and occupation. Habitat conditions were confirmed by REC Senior Biologist Catherine MacGregor and Field Biologist Lee BenVau during REC's first special-status plant survey on April 11, 2016.

Background research consisted of searching CNDDB and SanBIOS for burrowing owl records in the Otay Mesa region and reviewing REC's prior biological and BUOW survey reports. BUOWs have historically been documented in the vicinity of the Project, and were also found within the western portion of the Project site in 2012.

2.2 Breeding Season Survey Transects

Four protocol breeding season burrowing owl surveys were performed according to the 2012 updated protocol to provide complete coverage of the site. Catherine MacGregor and Lee BenVau (resumes provided in **Appendix D**) performed all surveys. The onsite and offsite Project areas were covered by walking transects at approximately 20 m apart, and reducing the width where needed. Transects were generally aligned north-south through the main Project site, north-south in the eastern offsite impact area along La Media Road, and east-west along the offsite impact area adjacent to Otay Mesa Road. The surveys provided 100 percent visual coverage of the Project's onsite and offsite areas.

The locations of previous BUOW observations on the La Media Road bank and in the debris pile were carefully inspected during each survey for any sign of re-occupation. These areas consisted of the bank on the eastern side of the graded area along La Media Road (photograph 3), and the debris pile in the southwestern corner of the Project site (photograph 6).

Adjacent private lands were surveyed with binoculars from the site because REC did not have permission to enter the other properties. The offsite non-native grassland between the main site and La Media Road, which was closest to the 2012 BUOW locations, was surveyed with binoculars from three sides.

See Table 1 below for a summary of all survey visits associated with the burrowing owl survey.

Table 1. Burrowing Owls Surveys Conducted on the Sunroad Otay Plaza Site

Date	Time	Temp (°F)	Sky	Wind (MPH)	Survey Type	Personnel
4/13/2016	0645 to 0900	63-64	Overcast	0-4 to 0	BUOW 1	C. MacGregor, L. BenVau
5/4/2016	0645 to 1000	59-61	Overcast	0-1 to 2-6	BUOW 2	L. BenVau
5/25/2016	0640 to 1000	54-64	30% to 60% clouds	0-2 to 5-10	BUOW 3	L. BenVau
6/17/2016	0700 to 0915	60-73	Clear	0 to 0-1 mph	BUOW 4	C. MacGregor, L. BenVau

All of the surveys were conducted within the California burrowing owl breeding season of February 1 through August 31 (Appendix B, CDFG 2012), and the second, third and fourth surveys were conducted during the peak breeding season of April 15 through July 15, as recommended in the 2012 protocol.

3.0 RESULTS

REC's protocol surveys detected no burrowing owls, burrowing owl sign (tracks, molted feathers, cast pellets, prey remains, egg shell fragments, white-wash or nest burrow decoration), or burrows with any sign of owl use on the Project site or within the 150-m buffer.

The old burrow in the debris pile that was found in 2012 was still detectable, but showed no sign of recent BUOW use or activity (see photograph 6 in Appendix C). All burrows in the bank near La Media Road were occupied only by rodents (ground squirrels) and none of these burrows had an entrance large enough (i.e. greater than 11 cm in diameter) to indicate use by BUOW, or any other BUOW sign such as fossorial mammal bones, whitewash, or feathers. Abundant evidence of Botta's pocket gopher (*Thomomys bottae*) activity was observed in the non-native grassland, and other very small rodent (mouse) holes were observed, but no ground squirrel burrows were observed in the non-native grassland. Ground squirrel burrows were observed in the berm along Otay Mesa Road, but all were small and showed no sign of BUOW activity such as a start of enlarging the burrows. The entire site is subject to high noise levels due to freeway and street traffic and the many large trucks that drive through this area.

Potential BUOW perches observed onsite consisted of two real estate signs and several wooden stakes in the non-native grassland, and private property signs on the western boundary of the onsite Project area. Fences along the southern and eastern edges of the property could also be used, but were exposed to heavy street traffic.

The large soil banks to the east of the site, associated with construction of the SR 905-125 connector, were carefully checked with binoculars during these 2016 surveys. No signs of burrows or owls were observed. No sign of BUOW was observed in any other areas outside the Project site when they were surveyed with binoculars.

4.0 CONCLUSIONS

The Project site supports prey, perches, burrows that have been used by BUOW in the past, and ground squirrel burrows suitable for enlargement and use by BUOW. However, no sign of recent use of the site by BUOW was detected during the 2016 surveys. Because no burrowing owls or burrowing owl sign from recent years were found onsite or observed within the 150-m buffer, the results of REC's 2016 protocol surveys strongly indicate that the Project site is not currently and has not recently been used by burrowing owls.

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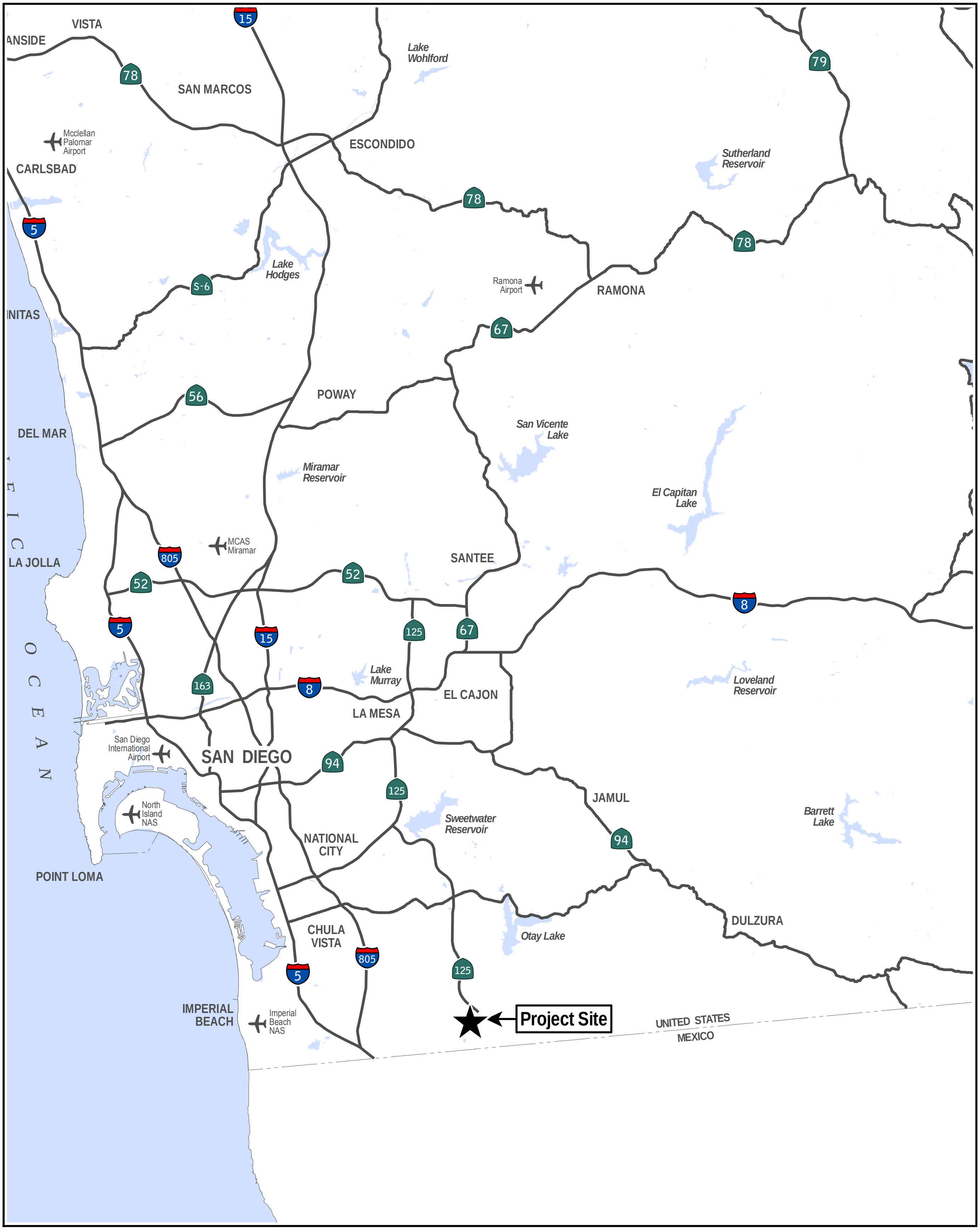

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Regional Location

SUNROAD OTAY PLAZA

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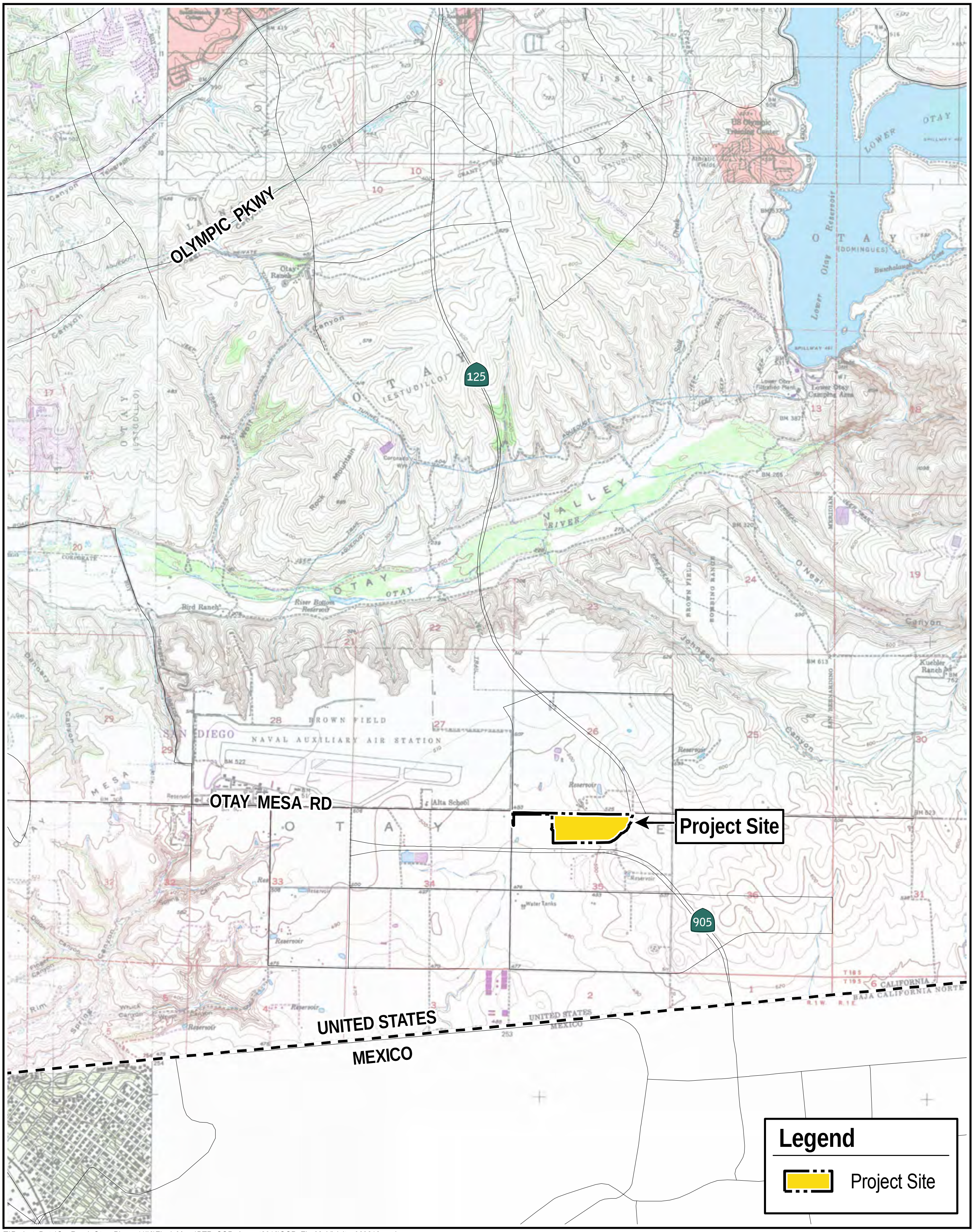
FIGURE 1

Source: SANGIS GIS Data, 2011.

June 2016



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R·E·C Consultants, Inc.

Vicinity Map

SUNROAD OTAY PLAZA

0 2,500 5,000 Feet

Source: USGS DRG Mosaic.

FIGURE 2

June 2016

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REC Consultants, Inc.

Biological Resources

SUNROAD OTAY PLAZA

Aerial Source: Google, March 2016. Data Source: REC Biological Survey.

FIGURE 3

June 2016

APPENDIX A PLANTS OBSERVED ON THE SUNROAD OTAY PLAZA SITE			
Species Name	**Common Name**	**Family**	**Habitat**
Ambrosia chenopodiifolia!	San Diego bur-sage	Asteraceae	NNG/DIS
Amsinckia sp.	fiddleneck	Boraginaceae	NNG
Artemisia californica	coastal sagebrush	Asteraceae	NNG
*Atriplex semibaccata**	Australian saltbush	Chenopodiaceae	DIS
*Avena sp.**	oats	Poaceae	DIS, NNG
Baccharis sarothroides	broom baccharis	Asteraceae	DIS
*Beta vulgaris subsp. maritima**	sea beet	Chenopodiaceae	DIS
*Brassica nigra**	black mustard	Brassicaceae	DIS, NNG
*Bromus diandrus**	ripgut grass	Poaceae	DIS, NNG
*Bromus hordeaceus**	soft chess brome	Poaceae	DIS
*Bromus madritensis subsp. rubens**	red brome, foxtail chess	Poaceae	DIS, NNG
*Centaurea melitensis**	tocalote	Asteraceae	DIS, NNG
*Chenopodium murale**	nettle-leaf goosefoot	Chenopodiaceae	NNG
*Convolvulus arvensis**	field bindweed	Convolvulaceae	DIS, NNG
*Cotula coronopifolia**	African brass-buttons	Asteraceae	DIS
Cyperus eragrostis	tall flatsedge	Cyperaceae	DIS
*Dittrichia graveolens**	stinkwort	Asteraceae	DIS
Encelia californica	California encelia	Asteraceae	DIS, NNG
Erigeron sp.(*)	horseweed, fleabane	Asteraceae	DEV, DIS, NNG
Eriogonum fasciculatum	California buckwheat	Polygonaceae	DIS
*Erodium cicutarium**	red-stem filaree/storksbill	Geraniaceae	DIS
*Erodium sp.**	filaree/storksbill	Geraniaceae	NNG
*Festuca perennis**	perennial rye grass	Poaceae	DIS, NNG
*Foeniculum vulgare**	sweet fennel	Apiaceae	NNG
*Glebionis coronaria**	garland daisy, crown daisy	Asteraceae	DIS, NNG
Helianthus annuus	western sunflower	Asteraceae	DIS
Helianthus gracilentus	slender sunflower	Asteraceae	NNG
*Helminthotheca echioides**	bristly ox-tongue	Asteraceae	DIS, NNG
Heterotheca grandiflora	telegraph weed	Asteraceae	DEV, DIS
*Hirschfeldia incana**	short-pod mustard	Brassicaceae	NNG
*Hordeum murinum subsp. glaucum**	glaucous barley	Poaceae	DIS, NNG
*Lactuca serriola**	prickly lettuce	Asteraceae	DIS, NNG
*Lamarckia aurea**	golden-top	Poaceae	DIS, NNG
Leptochloa fusca subsp. uninervia	Mexican sprangletop	Poaceae	DIS
*Lythrum hyssopifolia**	grass poly	Lythraceae	DIS
*Malva parviflora**	cheeseweed	Malvaceae	DIS, NNG
Malvella leprosa	alkali mallow	Malvaceae	NNG
*Medicago polymorpha**	California burclover	Fabaceae	DEV, DIS
*Melilotus albus**	white sweetclover	Fabaceae	NNG
*Melilotus indicus**	Indian sweetclover	Fabaceae	DEV, DIS, NNG
*Mesembryanthemum crystallinum**	crystalline iceplant	Aizoaceae	DIS
*Mesembryanthemum nodiflorum**	slender-leaf iceplant	Aizoaceae	DIS
*Myoporum parvifolium**	slender myoporum	Scrophulariaceae	DIS
*Phalaris paradoxa**	paradox canary grass	Poaceae	DIS, NNG
*Polypogon monspeliensis**	annual beard grass	Poaceae	DIS, NNG
*Rumex crispus**	curly dock	Polygonaceae	DIS
*Salsola sp.**	Russian-thistle	Chenopodiaceae	DIS, NNG

Species Name	Common Name	Family	Habitat
*Salsola tragus**	prickly Russian-thistle, tumbleweed	Chenopodiaceae	DEV, DIS
Sambucus nigra subsp. caerulea	blue elderberry	Adoxaceae	NNG
*Schismus barbatus**	Mediterranean schismus	Poaceae	DEV, DIS
*Silybum marianum**	milk thistle	Asteraceae	DIS
*Sinapis arvensis**	charlock	Brassicaceae	NNG
*Sisymbrium irio**	London rocket	Brassicaceae	DIS, NNG
*Sonchus asper subsp. asper**	prickly sow-thistle	Asteraceae	NNG
*Sonchus oleraceus**	common sow-thistle	Asteraceae	NNG
Stipa sp.	needlegrass	Poaceae	DIS
Symphyotrichum subulatum(*)	(aster)	Asteraceae	DIS
*Urtica urens**	dwarf nettle	Urticaceae	DIS

* non-native
! State or Federal special-status (State endangered, threatened, or rare; Federal endangered, threatened, or candidate for listing, CRPR 1-4)

DEV = Developed Land
DIS = Disturbed Land
NNG = Non-Native Grassland

APPENDIX B
ANIMALS OBSERVED ON THE SUNROAD OTAY PLAZA SITE

Scientific Name	Common Name	Habitat Observed	No. Observed (estimate)
*Apis mellifera**	western honey bee	DIS	1
Bombus sp.	bumble bee	NNG	1
Class Gastropoda	snail	DIS, NNG	many, shells
*Coccinella septempunctata**	seven-spotted lady beetle	DIS, NNG	many
Eleodes sp.	desert stink beetle	NNG	1
Family Aphididae	aphid	DIS	many
Family Gryllidae	true cricket	NNG	1
*Linepithema humile**	Argentine ant		many
Order Dermaptera(*)	earwig		
Order Lepidoptera	moth	NNG	many
*Pieris rapae rapae**	cabbage white (nominate)	NNG	1
Pontia protodice	checkered white	NNG	16
*Porcellio laevis**	dooryard sow bug	NNG	several
Pyrgus albescens	white checkered-skipper		
Strymon melinus pudica	gray hairstreak (pudica)	NNG	20+
Subfamily Pierinae	white buttefly (unidentified)	NNG	many
Subfamily Polyommatinae	blue butterfly (unidentified)	NNG	1
Suborder Anisoptera	dragonfly	NNG	1
Thyanta custator	red-shouldered stink bug	NNG	many
Vanessa annabella	west coast lady	DIS, NNG	7
Vanessa sp.	lady butterfly (unidentified)	NNG	1
Reptiles			
Order Squamata	lizard (unidentified)		1
Birds			
Agelaius phoeniceus	red-winged blackbird	DIS, NNG	~24
Athene cunicularia (*hypugaea*)!	burrowing owl (western)	NNG	Remains of 1 old burrow
Corvus corax clarionensis	common raven (clarionensis)	FO	1
Eremophila alpestris actia!	California horned lark	NNG	2
Falco sparverius sparverius	American kestrel (northern)	NNG	1
Haemorhous mexicanus frontalis	house finch (northern)	DIS, NNG	6
Melospiza melodia	song sparrow	NNG	several
Mimus polyglottos polyglottos	northern mockingbird (nominate)	DIS, DEV	2
Sturnella neglecta	western meadowlark	DIS, NNG	7
*Sturnus vulgaris vulgaris**	European starling	FO	3
Zenaida macroura marginella	mourning dove (marginella)	NNG	3
Mammals			
Canis latrans clepticus	coyote (clepticus)	scat	NNG
Family Leporidae	rabbit or hare (unidentified)	DIS	scat
Lepus californicus californicus! (*L. c. bennettii*)	San Diego black-tailed jackrabbit	NNG	1
Order Rodentia	rodent (unidentified)	DIS	1
Spermophilus beecheyi nudipes	California ground squirrel (nudipes)	DIS, NNG	5 in DIS; many holes in DIS, 1 hole in NNG
Sylvilagus audubonii arizonae	desert cottontail (arizonae)	DIS	1

Scientific Name	Common Name	Habitat Observed	No. Observed (estimate)
Thomomys bottae	Botta's pocket gopher	DIS, NNG	many mounds

* Non-native species
! State or Federal special-status species (State endangered, threatened, endangered candidate, fully protected, watchlist, or CDF sensitive; or federal endangered, threatened, candidate for listing, USFWS Bird of Conservation Concern, BLM sensitive, or USFWS sensitive)

DEV = Developed Land
DIS = Disturbed Land
NNG = Non-Native Grassland

APPENDIX C
Sunroad Otay Plaza 2016 Burrowing Owl Report

1. View north from mid-site, April 2016.

2. View south from mid-site, April 2016.

3. View of soil bank next to La Media Road in western offsite project area, June 2016.

4. View west along Otay Mesa Road from near eastern edge of site, May 2016.

5. View east from near eastern edge of site, toward SR 125 construction, May 2016.

6. Remains of inactive 2012 owl burrow in May 2016.

APPENDIX D

Surveying Biologist Resumes

CIVIL ENGINEERING
ENVIRONMENTAL
LAND SURVEYING
R·E·C Consultants, Inc.

Catherine MacGregor

SENIOR BIOLOGIST AND BOTANIST

Education: Bachelor of Arts, Biological Sciences with Plant Ecology emphasis, minor in Marine and Coastal Science; Smith College, Northampton, MA

Professional Background: REC Consultants, Inc. – 2001 to 2006 and 2013 to present
URS Corporation – 2012 to 2013
TRC and SDG&E through Aerotek Staffing – 2011 to 2012
Consulting Botanist and Volunteer Botanist, La Jolla Band of Luiseño Indians – 2008 through 2010

Professional Experience:

In her 17 years of biological, botanical, and environmental science experience, Ms. MacGregor has performed extensive field work for floristic and rare plant surveys, habitat mapping, avian surveys, and jurisdictional wetlands and waters delineations. Botanical experience includes floristic and rare plant surveys in the coastal, mountain, and desert regions of southern California; detailed habitat mapping and assessment; and development, implementation, and monitoring of rare plant and habitat restoration projects. Wildlife experience includes general wildlife surveys; protocol surveys for Burrowing Owl and Least Bell's Vireo; and Gila Woodpecker, Mojave fringe-toed lizard, and nesting bird surveys. Ms. MacGregor has performed numerous jurisdictional delineations according to USACE, state, and local regulations in San Diego County, Riverside County, and Florida. She has managed teams of field biologists, prepared numerous biological technical reports and monitoring reports, managed environmental permit compliance, and coordinated with clients and agency personnel to successfully move projects through the permitting and approval processes.

Specific Sensitive Avian Species Experience

- Protocol Burrowing Owl surveys at two BrightSource Energy proposed solar project sites of approximately 7,500 acres each, with a team of experienced surveyors including Dr. Jeff Lincer, in eastern Riverside County.
- Protocol Burrowing Owls surveys on a 250-acre site on eastern Otay Mesa.
- Protocol Burrowing Owl surveys at a grassland site on the US-Mexico border, a 5-acre site south of Brown Field Municipal Airport, and a 13-acre site near the intersection of SR 905 and 125 in eastern Otay Mesa, San Diego County.
- Burrowing Owl habitat assessments at sites on Otay Mesa and in the City of Temecula.
- Participation in a Burrowing Owl artificial burrow construction project within a conservation area on eastern Otay Mesa.
- Protocol Least Bell's Vireo surveys on a tributary to the San Luis Rey River.
- Coastal California Gnatcatcher mapping at numerous sites in San Diego County.
- Avian and Biological Survey adjacent to Occupied Least Bell's Vireo Habitat along San Diego River, City of Santee.
- Habitat Restoration Project for formerly occupied Least Bell's Vireo habitat, Lakeside, San Diego County.

REC Consultants, Inc. CIVIL ENGINEERING ENVIRONMENTAL LAND SURVEYING

Lee BenVau
FIELD BIOLOGIST

Education: Bachelor of Science, Biological Sciences (Ecology, Behavior, and Evolution)
University of California, San Diego, CA, 2012

Master of Science, Biological Sciences
University of California, San Diego, CA, 2014

Professional Background: REC Consultants, Inc., 2014 to present

Professional Experience:

As a biologist in the San Diego region, Mr. BenVau has worked on focused sensitive species surveys, native plant and wildlife identification surveys, habitat assessments, construction monitoring, and habitat restoration projects throughout San Diego County. He has participated in focused burrowing owl, least Bell's vireo, and coastal California gnatcatcher surveys and conducted numerous biological field surveys which included the identification of sensitive plants such as Orcutt's brodiaea, small-flower bindweed, southern tarplant, variegated dudleya, Palmer's goldenbush, and Nuttall's scrub oak; and additional sensitive animals such as orange-throated whiptail, yellow warbler, yellow-breasted chat, Southern California rufous-crowned sparrow, northern harrier, and San Diego black-tailed jackrabbit. Research for his Master's thesis involved the study of European honey bees infected with a microsporidian associated with Colony Collapse Disorder and its interactions with the honey bee regulatory protein vitellogenin.

Specific Sensitive Avian Species Experience:

- Burrowing owl take avoidance surveys and construction monitoring at a 5-acre site in Otay Mesa, City of San Diego.
- Burrowing owl habitat assessment and protocol burrowing owl surveys, rare plant surveys, and habitat mapping on a 250-acre site in eastern Otay Mesa, San Diego County.
- Burrowing owl artificial burrow monitoring, coastal California gnatcatcher and rare plant surveys within a conservation area on eastern Otay Mesa.
- Periodic visits to known burrowing owl sites for reference in other Otay Mesa burrowing owl surveys.
- Nesting bird surveys and construction monitoring in a section of Chollas Creek, City of San Diego.
- Biological surveys adjacent to California gnatcatcher occupied habitat and rare plant surveys in the City of Encinitas.
- Habitat restoration construction monitoring along formerly occupied least Bell's vireo habitat in Lakeside, San Diego County.
- Protocol least Bell's vireo surveys in occupied habitat and nesting bird surveys along a tributary to the San Luis Rey River, Fallbrook, County of San Diego.
- Avian and biological survey adjacent to occupied least Bell's vireo habitat along San Diego River, City of Santee.

Appendix B

Plant Species Observed

Appendix B
PLANT SPECIES OBSERVED

SCIENTIFIC NAME	COMMON NAME	VEGETATION COMMUNITY[1]
ANGIOSPERMAE – MONOCOTYLEDONEAE		
Poaceae (Gramineae) – Grass Family		
Avena barbata[2]	slender wild oat	DL, NNG
Bromus diandrus[2]	ripgut grass	DL, NNG
Bromus hordeaceus[2]	soft chess	DL, NNG
Bromus madritensis ssp. *rubens*[2]	red brome, foxtail chess	DL, NNG
Festuca perennis[2]	perennial rye grass	DL, NNG
Hordeum murinum ssp. *glaucum*[2]	glaucous barley	DL, NNG
Lamarckia aurea[2]	golden-top	DL, NNG
Leptochloa fusca ssp. *uninervia*	Mexican sprangletop	DL
Phalaris paradoxa[2]	paradox canary grass	DL, NNG
Polypogon monspeliensis[2]	annual beard grass	DL, NNG
Schismus barbatus[2]	Mediterranean schismus	DL, NNG
Stipa pulchra	purple needlegrass	DL
ANGIOSPERMAE – DICOTYLEDONEAE		
Aizoaceae – Ice Plant Family		
Mesembryanthemum	crystalline iceplant	DL, NNG
Mesembryanthemum nodiflorum[2]	slender-leaf iceplant	DL
Asteraceae (Compositae) – Sunflower Family		
Ambrosia chenopodiifolia	San Diego bur-sage	DL
Artemisia californica	coastal sagebrush	DL
Baccharis sarothroides	broom baccharis	DL
Centaurea melitensis[2]	tocalote	DL, NNG
Deinandra fasciculata	fascicled tarplant	DL
Dittrichia graveolens[2]	stinkwort	DL
Encelia californica	California encelia	DL, NNG
Erigeron sp.[2]	horseweed, fleabane	DL, NNG
Glebionis coronaria[2]	garland daisy, crown daisy	DL, NNG
Helianthus annuus	western sunflower	DL
Helianthus gracilentus	slender sunflower	NNG
Helminthotheca echioides[2]	bristly ox-tongue	DL, NNG
Heterotheca grandiflora	telegraph weed	DL, NNG
Hypochaeris glabra[2]	smooth cat's-ear	DL, NNG
Lactuca serriola[2]	prickly lettuce	DL, NNG
Lasthenia californica	goldfields	DL
Silybum marianum[2]	milk thistle	DL
Sonchus asper subsp. asper[2]	prickly sow-thistle	DL, NNG
Sonchus oleraceus[2]	common sow-thistle	DL

Appendix B (cont.)
PLANT SPECIES OBSERVED

SCIENTIFIC NAME	COMMON NAME	VEGETATION COMMUNITY[1]
Apiaceae – Carrot Family		
Foeniculum vulgare[2]	sweet fennel	DL, NNG
Boraginaceae – Borage Family		
Amsinckia americana	fiddleneck	DL, NNG
Brassicaceae – Mustard Family		
Brassica nigra[2]	black mustard	DL, NNG
Hirschfeldia incana[2]	short-pod mustard	DL
Sinapis arvensis[2]	charlock	NNG
Sisymbrium irio[2]	London rocket	DL, NNG
Chenopodiaceae – Goosefoot Family		
Atriplex semibaccata[2]	Australian saltbush	DL
Beta vulgaris subsp. maritima[2]	sea beet	DL
Chenopodium murale[2]	nettle-leaf goosefoot	DL
Salsola tragus[2]	Russian-thistle	DL, NNG
Convolvulaceae – Morning glory Family		
Convolvulus arvensis[2]	field bindweed	DL, NNG
Fabaceae (Leguminosae) – Pea Family		
Lupinus succulentus	arroyo lupine	DL
Medicago polymorpha[2]	California burclover	DL, NNG
Melilotus albus[2]	white sweetclover	DL, NNG
Melilotus indicus[2]	Indian sweetclover	DL, NNG
Geraniaceae – Geranium Family		
Erodium botrys[2]	storksbill	DL, NNG
Erodium cicutarium[2]	red-stem filaree	DL, NNG
Malvaceae – Mallow Family		
Malva parviflora[2]	cheeseweed	DL, NNG
Oxalidaceae – Sorrel Family		
Oxalis pes-caprae[2]	sourgrass	DL, NNG
Polygonaceae – Buckwheat Family		
Eriogonum fasciculatum	California buckwheat	DL
Polygonum aviculare aviculare[2]	yard knotweed	DL, NNG
Rumex crispus[2]	curly dock	DL

Appendix B (cont.)
PLANT SPECIES OBSERVED

SCIENTIFIC NAME	**COMMON NAME**	**VEGETATION COMMUNITY**[1]
Plantaginaceae – Plantain Family		
Plantago ovata	wooly plantain	DL
Primulaceae – Primrose Family		
Anagallis arvensis[2]	scarlet pimpernel	DL, NNG
Urticaceae – Nettle Family		
Urtica urens[2]	dwarf nettle	DL

[1] Vegetation community acronyms: NNG = non-native grassland; DL = disturbed land
[2] Non-native species

Appendix C

Animal Species Observed or Detected

Appendix C
ANIMAL SPECIES OBSERVED OR DETECTED

SCIENTIFIC NAME	COMMON NAME	LOCATION[1]
INVERTEBRATES		
Crustaceans		
Apis mellifera	western honey bee	DL
Bombus sp.	bumble bee	NNG
Class Gastropoda	snail	DL, NNG
Coccinella septempunctata	seven-spotted lady beetle	DL, NNG
Eleodes sp.	desert stink beetle	NNG
Family Aphididae	aphid	DL
Family Gryllidae	true cricket	NNG
Linepithema humile	Argentine ant	
Order Dermaptera	earwig	
Order Lepidoptera	moth	NNG
Butterflies		
Pieris rapae rapae	cabbage white	NNG
Pontia protodice	checkered white	NNG
Porcellio laevis	dooryard sow bug	NNG
Pyrgus albescens	white checkered-skipper	
Strymon melinus pudica	gray hairstreak	NNG
Subfamily Pierinae	white buttefly (unidentified)	NNG
Subfamily Polyommatinae	blue butterfly (unidentified)	NNG
Suborder Anisoptera	dragonfly	NNG
Thyanta custator	red-shouldered stink bug	NNG
Vanessa annabella	west coast lady	DL, NNG
Vanessa sp.	lady butterfly (unidentified)	NNG
VERTEBRATES		
Reptiles		
Order Squamata	lizard (unidentified)	
Birds		
Agelaius phoeniceus	red-winged blackbird	DL, NNG
Corvus corax	common raven	Fly Over
Eremophila alpestris actia[2]	California horned lark	NNG
Falco sparverius	American kestrel	NNG
Haemorhous mexicanus	house finch	DL, NNG
Melospiza melodia	song sparrow	NNG
Mimus polyglottos polyglottos	northern mockingbird	DL
Sturnella neglecta	western meadowlark	DL, NNG

Appendix C (cont.)
ANIMAL SPECIES OBSERVED OR DETECTED

SCIENTIFIC NAME	COMMON NAME	LOCATION[1]
VERTEBRATES (cont.)		
Sturnus vulgaris vulgaris	European starling	Fly Over
Zenaida macroura	mourning dove	NNG
Mammals		
Canis latrans (scat)	coyote	
Family Leporidae (scat)	rabbit/hare (unidentified)	DL
Lepus californicus bennettii[2]	San Diego black-tailed jackrabbit	NNG
Order Rodentia	rodent (unidentified)	DL
Otopermophilus beecheyi	California ground squirrel	DL, NNG
Sylvilagus audubonii	desert cottontail	DL
Thomomys bottae (many mounds)	Botta's pocket gopher	DL, NNG

[1]Habitat acronyms: VP=vernal pool, RP = road pool, NNG=non-native grassland, MSS=maritime succulent scrub, DH=disturbed habitat

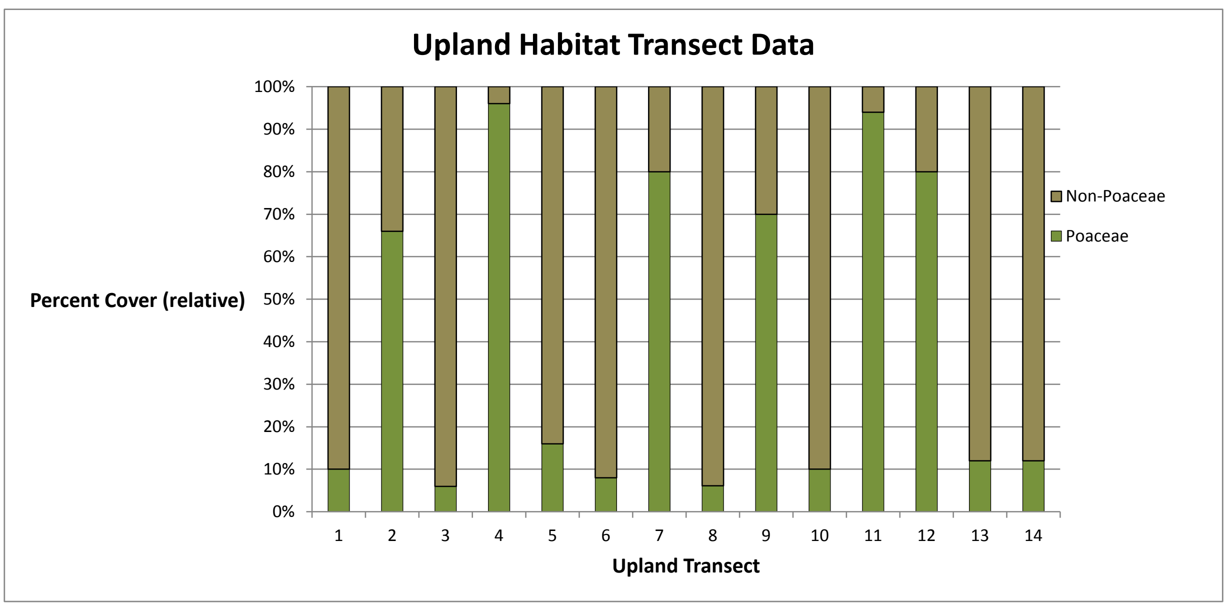
[2] Sensitive species

Appendix D

Upland Transect Data

Upland Transect Data Summary

Transect	Poaceae Species Relative Cover				Non-Poaceae Species Relative Cover						Poaceae Relative Cover	Non-Poaceae Relative Cover
	AveFat	BroHor	HorMur	BroSp	BraNig	SonOle	MalPar	SalTra	CenMel	ChrCor		
1	2.0	4.0	4.0	-	86.0	2.0	2.0	-	-	-	10.0	90.0
2	66.0	-	-	-	2.0	-	-	32.0	-	-	66.0	34.0
3	-	-	6.0	-	58.0	4.0	18.0	10.0	4.0	-	6.0	94.0
4	2.0	-	94.0	-	4.0	-	-	-	-	-	96.0	4.0
5	2.0	-	14.0	-	78.0	-	6.0	-	-	-	16.0	84.0
6		-	8.0	-	84.0	-	8.0	-	-	-	8.0	92.0
7	72.0	-	-	8.0	-	-	-	18.0	2.0	-	80.0	20.0
8	4.1	-	2.0	-	44.9	2.0	-	36.7	2.0	8.2	6.1	93.8
9	70.0	-	-	-	28.0	-	2.0	-	-	-	70.0	30.0
10	8.0	2.0	-	-	90.0	-	-	-	-	-	10.0	90.0
11	94.0	-	-	-	2.0	2.0	-	2.0	-	-	94.0	6.0
12	80.0	-	-	-	18.0	2.0	-	-	-	-	80.0	20.0
13	8.0	-	4.0	-	74.0	4.0	10.0	-	-	-	12.0	88.0
14	10.0	-	2.0	-	82.0	2.0	2.0	-	-	2.0	12.0	88.0



Project SUN-03
Transect #: 1 of 14
Page #: 1 of 1

Date: 6/7/17
Surveyor: GM

Point	Species	Point	Species
1	BraNig	26	BraNig
2		27	
3		28	
4		29	
5		30	
6		31	
7		32	Bro Hor
8		33	BraNig
9		34	
10		35	
11		36	
12		37	
13		38	
14	AveFat	39	
15	BraNig	40	
16	BraNig	41	
17	SenOle	42	Hor Mur
18	BraNig	43	Hor Mur
19	BraNig	44	BraNig
20	Mal Par	45	
21	BroHor	46	
22	BraNig	47	
23		48	
24		49	
25		50	

Belt Data

Hir Inc
Era div

Poaceae	% Cov Rel
AveFat	2
BroHor	4
HorMur	4
	10%

Non-Poaceae	% Rel
BraNig	86
SenOle	2
MalPar	2

Native Cover: —
Non-Native Cover: 100%

Total/Relative
Poaceae Cover: 10%
Ruderal Cover: 90%

→ DH

Project: SuN-03 Date: 6/7/17
Transect #: 2 of 14 Surveyor: GM
Page #: 1 of 1

Point	Species	Point	Species
1	AveFat	26	AveFat
2		27	
3		28	
4		29	
5		30	
6	SalTra	31	
7		32	BraNig
8		33	AveFat
9		34	
10		35	
11	Sal Tra	36	
12		37	
13		38	
14		39	
15		40	
16		41	
17		42	
18		43	
19		44	
20		45	
21	Sal Tra	46	
22	AveFat	47	
23		48	
24		49	
25		50	

Belt Data

Phalaris
RumCri
HirInc
HorMur
SenOle

Poaceae	% Rel
AveFat	66%

Non-Poaceae	% Rel
Sal Tra	32
BraNig	2
	34%

Native Cover: —
Non-Native Cover: 100%

Total/Relative
Poaceae Cover: 66%
Ruderal Cover: 34%

→ NNG

Project SUN-07 Date: 6/7/17

Transect #: 3 of 14 Surveyor: GM

Page #: 1 of 1

Point	Species	Point	Species	Belt Data
1	BraNig	26	SalTra	SanOle
2	CenMel	27	BraNig	SalTra
3	CenMel	28	↓	#Telegraph
4	BraNig	29		BraHer
5	↓	30	↓	
6		31	SalTra	
7		32	↓	
8		33	↓	
9		34	MalPar	
10		35	↓	Poaceae Rel %
11		36	BraNig	HarMur 6%
12		37	↓	
13		38	↓	
14		39	SanOle	
15		40	MalPar	Non-Poaceae Rel%
16		41	BraNig	BraNig 58
17	↓	42	MalPar	CenMel 4
18	SanOle	43	↓	SanOle 4
19	BraNig	44	↓	MalPar 18
20	↓	45	HarMur	SalTra 10
21		46	↓	94%
22		47	↓	
23		48	MalPar	
24	↓	49	↓	
25	SalTra	50	↓	

Total/Relative

Native Cover: —

Poaceae Cover: 6%

Non-Native Cover: 100%

Ruderal Cover: 94% → DH

Project SUN-03

Transecct #: 4 of 14

Page #: 1 of 1

Date: 6/7/17

Surveyor: GM

Point	Species	Point	Species
1	HorMur	26	HorMur
2		27	
3		28	
4		29	
5		30	
6		31	
7		32	
8		33	
9		34	
10		35	
11		36	
12		37	
13	BraNig	38	
14	HorMur	39	
15		40	BraNig
16		41	AveFat
17		42	HorMur
18		43	
19		44	
20		45	
21		46	
22		47	
23		48	
24		49	
25		50	

Belt Data

Bromus

Poaceae	% Rel
HorMur	94
AveFat	2
	96 %

Non-Poaceae	% Rel
BraNig	4%

Native Cover: —

Non-Native Cover: 100%

Total / Relative

Poaceae Cover: 96%

Ruderal Cover: 4% → NNG

Project: SUN-03
Transect #: 5 of 14
Page #: 1 of 1

Date: 6/7/17
Surveyor: GM

Point	Species	Point	Species
1	BraNig	26	AveFat
2		27	BraNig
3		28	
4		29	
5		30	
6		31	
7		32	
8		33	
9		34	
10		35	
11		36	
12	HorMur	37	
13		38	
14		39	HorMur
15	BraNig	40	
16		41	
17		42	
18		43	BraNig
19		44	
20		45	
21		46	
22		47	
23		48	
24	MalPar	49	MalPar
25	BraNig	50	

Belt Data

Bro Hor
Hir Inc
Sma Ole
Sal Tra

Poaceae	% Rel
HorMur	14
AveFat	2
	16%

Non-Poaceae	% Rel
BraNig	78
MalPar	6
	84%

Native Cover: —
Non-Native Cover: 100%

Total/Relative
Poaceae Cover: 16%
Ruderal Cover: 84% → DH

Project SUN-03
Transect #: 6 of 14
Page #: 1 of 1

Date: 6/7/17
Surveyor: GM

Point	Species	Point	Species
1	BrANig	26	MalPer
2		27	BraNig
3		28	
4		29	
5		30	
6		31	
7		32	
8		33	HorMur
9		34	
10		35	
11		36	
12		37	BraNig
13		38	
14		39	
15		40	
16		41	
17		42	
18		43	
19		44	
20		45	
21		46	
22		47	
23	MalPer	48	
24		49	
25		50	

Belt Data

Poaceae % Rel

HorMur 8%

NonPoaceae % Rel

BraNig 84

MalPer 8

92%

Native Cover: —

Non-Native Cover: 100%

Total/Relative

Poaceae Cover: 8%

Ruderal Cover: 92% → DH

Project SVN-03 | Date: 6/7/17
Transect #: 7 of 14 | Surveyor: GM
Page #: 1 of 1

Point	Species	Point	Species
1	AveFat	26	AveFat
2		27	
3		28	
4		29	
5		30	
6		31	SalTra
7		32	
8		33	
9		34	
10		35	
11		36	
12		37	
13		38	AveFat
14		39	
15		40	
16	CenMel	41	
17	AveFat	42	BroHorMad
18	SalTra	43	
19		44	
20	AveFat	45	
21		46	AveFat
22		47	
23		48	
24		49	
25		50	

Belt Data

SanOle
BroNig

Poaceae	% Rel
AveFat	72
Bromus	8
	80%

Non-Poaceae	% Rel
CenMel	2
SalTra	18
	20%

Native Cover: —
Non-Native Cover: 100%

Total/Relative
Poaceae Cover: 80%
Ruderal Cover: 20%
→ NNG

Project SVN-03
Transect #: 8 of 14
Page #: 1 of 1

Date: 6/7/17
Surveyor: GM

Point	Species	Point	Species	Belt Data
1	B	26	BraNig	RumCri
2	SanOle	27	↓	HetGra
3	SalTra	28		
4	↓	29		
5		30		
6		31		
7	ChrCor	32		
8	SalTra	33		
9	CenMel	34	SalTra	
10	HorMur	35	BraNig	
11	SalTra	36	↓	
12	↓	37		
13		38		
14		39		
15	ChrCor	40	AveFat	
16	↓	41	↓	
17		42	BraNig	
18	SalTra	43	↓	
19	↓	44		
20		45		
21		46		
22		47		
23		48		
24		49		
25		50		

Poaceae	% Rel
AveFat	4.1
HorMur	2.0
	6.1 %

Non Poaceae	% Rel
SanOle	2.0
SalTra	36.7
ChrCor	8.2
CenMel	2.0
BraNig	44.9

Native Cover: —
Non-Native Cover: 98%
Bare 2%

Poaceae Cover: Total 6%
Ruderal Cover: 92%

Relative
6.1 %
93.9 %

→ DH

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Date: 6/7/17 | Surveyor: GM

Point	Species	Point	Species
1	BraNig	26	BraNig
2	AveFat	27	↓
3	↓	28	AveFat
4	BraNig	29	
5	AveFat	30	
6	BraNig	31	
7	↓	32	
8	↓	33	↓
9	AveFat	34	BraNig
10		35	
11		36	↓
12		37	AveFat
13	↓	38	
14	MalPar	39	
15	AveFat	40	
16		41	
17		42	↓
18		43	BraNig
19		44	
20	↓	45	↓
21		46	AveFat
22		47	
23		48	
24	↓	49	
25	BraNig	50	↓

Belt Data

Poaceae	% Rel
AveFat	70%

Non-Poaceae	% Rel
BraNig	28%
MalPar	2

Native Cover: —

Non-Native Cover: 100%

Total/Relative

Poaceae Cover: 70%

Ruderal Cover: 30% → NNG

Project: SDN-03 | Date: 6/7/17
Transect #: 10 of 14 | Surveyor: GM
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Point	Species	Point	Species	Belt Data
1	BraNig	26	BraNig	SonOle
2	AveFat	27		MalPar
3	BroHor	28		BroMad Ru
4	BraNig	29		HirInc
5		30		
6		31	AveFat	
7		32		
8		33		
9		34	BraNig	
10		35		
11		36		
12		37		
13		38		
14		39		
15		40		
16		41		
17		42		
18		43		
19		44		
20		45		
21		46		
22		47		
23		48		
24		49		
25		50		

Poaceae	% Rel
AveFat	8
BroHor	2

Non-Poaceae	% Rel
BraNig	90

Native Cover: —
Non-Native Cover: 100%

Total/Relative
Poaceae Cover: 10% → DH
Ruderal Cover: 90%

Project SVN-c3 Transect #: 11 of 14 Page #: 1 of 1

Date: 6/7/17 Surveyor: GM

Point	Species		Point	Species	
1	AveFat	–	26	AveFat	–
2		–	27		–
3		–	28		–
4		–	29		–
5		–	30		–
6		–	31	SalTra	
7		–	32	AveFat	–
8		–	33		–
9		–	34		–
10		–	35		–
11		–	36		–
12		–	37		–
13		–	38		–
14	SonOle	–	39		–
15	AveFat	–	40		–
16		–	41		–
17		–	42		–
18		–	43		
19		–	44	BraNig	
20		–	45	AveFat	–
21		–	46		–
22		–	47		–
23		–	48		–
24		–	49		–
25		–	50		–

Belt Data

AmsAme
MalPar
SonOle
CenMel

Poaceae	% Rel
AveFat	94

Non Poaceae	% Rel
SonOle	2
BraNig	2
SalTra	2
	6

Native Cover: —

Non-Native Cover: 100%

Total/Relative

Poaceae Cover: 94% → NNG

Ruderal Cover: 6%

Project SUN-03 | Date: 6/7/17
Transect #: 12 of 14 | Surveyor: GM
Page #: 1 of 1

Point	Species	Point	Species
1	AveFat	26	AveFat
2		27	
3		28	
4		29	
5	SonOle	30	
6	AveFat	31	
7		32	
8		33	
9		34	
10		35	
11		36	
12		37	
13		38	
14	BraNig	39	BraNig
15	AveFat	40	
16		41	
17		42	AveFat
18		43	
19		44	
20		45	
21		46	
22		47	BraNig
23		48	
24	BraNig	49	
25		50	AveFat

Belt Data

AmsAme

Poaceae % Rel
AveFat 80%

Non-Poaceae % rel
SonOle 2
BraNig 18
20%

Native Cover: —
Non-Native Cover: 100%

Tot/Rel
Poaceae Cover: 80%
Ruderal Cover: 20% → NNG

Project: SVN-03
Transect #: 13 of 14
Page #: 1 of 1

Date: 6/7/17
Surveyor: GM

Point	Species		Point	Species	
1	BraNis	–	26	BraNis	–
2		–	27		–
3		–	28	HarMur	–
4	AveFat	–	29		–
5		–	30	BraNis	–
6	SanOle	–	31		–
7		–	32	MalPar	–
8	BraNis	–	33		–
9		–	34		–
10		–	35		–
11		–	36		–
12		–	37	BraNis	–
13		–	38		–
14		–	39		–
15		–	40		–
16		–	41		–
17		–	42		–
18		–	43		–
19		–	44		–
20		–	45	AveFat	–
21		–	46	BraNis	–
22		–	47		–
23		–	48	AveFat	–
24		–	49	BraNis	–
25		–	50		–

Belt Data

Poaceae	% rel
AveFat	8
HarMur	4
	12 %

Non-Poaceae	% rel
BraNis	74
SanOle	4
MalPar	10
	88 %

Native Cover: –
Non-Native Cover: 100%

Poaceae Cover: 12 %
Ruderal Cover: 88 % → DH

Project SUN-03
Transect #: 14 of 14
Page #: 1 of 1

Date: 6/7/17
Surveyor: GM

Point	Species	Point	Species
1	AveFat –	26	SonOle
2	BraNig	27	BraNig
3	Cr + Cov	28	
4	AveFat –	29	
5	–	30	
6	–	31	
7	BraNig	32	
8		33	
9		34	HorMur
10		35	BraNig
11		36	
12		37	
13		38	
14		39	
15		40	
16		41	
17		42	
18		43	
19		44	
20	AveFat ~	45	
21	BraNig	46	
22		47	MalPar
23		48	BraNig
24		49	
25		50	

Belt Data

Poaceae % rel
AveFat 10
HorMur 2
12%

Non-Poaceae % rel
BraNig

Total/Relative

Native Cover: —
Non-Native Cover: 100%

Poaceae Cover: 12%
Ruderal Cover: 88%

Appendix E

Representative Photographs

Representative Photographs

Photo Point 1, northward view along La Media Road. 3/2/2017

Photo Point 1, northward view along La Media Road. 3/24/2017

Photo Point 2, southward view along La Media Road. 3/2/2017

Photo Point 2, southward view along La Media Road. 3/24/2017

Photo Point 3, eastward view along Otay Mesa Road. 3/2/2017

Photo Point 3, eastward view along Otay Mesa Road. 3/24/2017

Photo Point 4, southward from NW project corner. 3/2/2017

Photo Point 4, southward from NW project corner. 3/24/2017

Photo Point 5, southeasterly view from NW project corner. 3/2/2017

Photo Point 5, southeasterly view from NW project corner. 3/24/2017

Photo Point 6, eastward from NW project corner along Otay Mesa Road. 3/2/2017

Photo Point 6, eastward from NW project corner along Otay Mesa Road. 3/24/2017

Photo Point 7, westward view along Otay Mesa Rd, west of Piper Ranch Rd. 3/2/2017

Photo Point 7, westward view along Otay Mesa Rd, west of Piper Ranch Rd. 3/24/2017

Photo Point 8, southward view from Otay Mesa Rd, west of Piper Ranch Rd. 3/2/2017

Photo Point 8, southward view from Otay Mesa Rd, west of Piper Ranch Rd. 3/24/2017

Photo Point 9, eastward view along Otay Mesa Rd, west of Piper Ranch Rd. 3/2/2017

Photo Point 9, eastward view along Otay Mesa Rd, west of Piper Ranch Rd. 3/24/2017

Photo Point 10, westward view along Otay Mesa Rd, east of Piper Ranch Rd. 3/2/2017

Photo Point 10, westward view along Otay Mesa Rd, east of Piper Ranch Rd. 3/24/2017

Photo Point 11, southwest view from Otay Mesa Rd, east of Piper Ranch Rd. 3/2/2017

Photo Point 11, southwest view from Otay Mesa Rd, east of Piper Ranch Rd. 3/24/2017

Photo Point 12, southward view along Otay Mesa Rd, east of Piper Ranch Rd. 3/2/2017

Photo Point 12, southward view along Otay Mesa Rd, east of Piper Ranch Rd. 3/24/2017

Photo Point 13, southward view from NE project corner. 3/2/2017

Photo Point 13, southward view from NE project corner. 3/24/2017

Photo Point 14, southwest view from NE project corner. 3/2/2017

Photo Point 14, southwest view from NE project corner. 3/24/2017

Photo Point 15, eastward view from eastern end of project. 3/2/2017

Photo Point 15, eastward view from eastern end of project. 3/24/2017

Photo Point 16, southward view from eastern end of project. 3/2/2017

Photo Point 16, southward view from eastern end of project. 3/24/2017

Photo Point 17, westward view from eastern end of project. 3/2/2017

Photo Point 17, westward view from eastern end of project. 3/24/2017

Photo Point 18, northward view from eastern end of project. 3/2/2017

Photo Point 18, northward view from eastern end of project. 3/24/2017

Photo Point 19, northeast view from SE corner of project. 3/2/2017

Photo Point 19, northeast view from SE corner of project. 3/24/2017

Photo Point 20, southwest view from SE corner of project. 3/2/2017

Photo Point 20, southwest view from SE corner of project. 3/24/2017

Photo Point 21, eastward view along southern boundary of project. 3/2/2017

Photo Point 21, eastward view along southern boundary of project. 3/24/2017

Photo Point 22, northward view from southern boundary of project. 3/2/2017

Photo Point 22, northward view from southern boundary of project. 3/24/2017

Photo Point 23, westward view along southern boundary of project. 3/2/2017

Photo Point 23, westward view along southern boundary of project. 3/24/2017

Photo Point 24, eastward view from central area of western side of project. 3/2/2017

Photo Point 24, eastward view from central area of western side of project. 3/24/2017

Photo Point 25, southward view from central area of western side of project. 3/2/2017

Photo Point 25, southward view from central area of western side of project. 3/24/2017

Photo Point 26, westward view from central area of western side of project. 3/2/2017

Photo Point 26, westward view from central area of western side of project. 3/24/2017

Photo Point 27, northward view from central area of western side of project. 3/2/2017

Photo Point 27, northward view from central area of western side of project. 3/24/2017

Photo Point 28, eastward view from SW corner of project. 3/2/2017

Photo Point 28, eastward view from SW corner of project. 3/24/2017

Photo Point 29, northeastward view from SW corner of project. 3/2/2017

Photo Point 29, northeastward view from SW corner of project. 3/24/2017

Photo Point 30, northward view from SW corner of project. 3/2/2017

Photo Point 30, northward view from SW corner of project. 3/24/2017

Appendix F

Vegetation Mapping
Letter from REC

R·E·C Civil Engineering
Environmental
Land Surveying
rec-consultants.com

2442 Second Avenue
San Diego, California 92101
Phone: 619.232.9200
Fax: 619.232.9210

April 3, 2017

Andrea Rosati
Sunroad Enterprises
4445 Eastgate Mall, Suite 400
San Diego, CA 92121

Subject: Sunroad Otay Plaza –Habitat Mapping Update

Dear Ms. Rosati,

Following my review of the 2017 Alden Environmental, Inc. (Alden) habitat mapping for the Sunroad Otay Plaza property and revisiting the property on March 31, 2017, I conclude that the habitat mapping of the site as shown in the 2017 Alden report represents accurate mapping of the project site. The earlier habitat mapping included in the 2016 Burrowing Owl report prepared by REC Consultants, Inc. was accurate at that time, although not conducted at such a fine scale as Alden's mapping a year later. Therefore, Alden's mapping should be used as the current habitat mapping. This does not, in any way, change the findings of the 2016 Burrowing Owl report. Please let me know if you have any questions. Thank you.

Sincerely,

Hedy Levine

Hedy Levine
Director of Environmental Division

Appendix G

Turecek Parcel
Biological Conditions

ALDEN ENVIRONMENTAL, INC
3245 University Ave, #1188 | San Diego, CA 92104 | Phone/Fax: 619.284.3815

February 13, 2017

Ms. Andrea Contreras Rosati
Vice President and Counsel
Sunroad Enterprises
4445 Eastgate Mall, Suite 400
San Diego, CA 92121

Subject: Biological Conditions on the Harvest Road Parcel

Dear Ms. Rosati:

This letter reports the results of a biological analysis conducted for the approximately 18-acre Harvest Road parcel. The analysis is intended to present the site's existing biological conditions and asses its suitability for use as mitigation.

INTRODUCTION

The Study Area consists of an approximately 18-acre parcel located at the corner of Harvest Road and Lonestar Road in the County of San Diego (County; Figures 1 and 2). The site is currently undeveloped. Undeveloped land surrounds the site on all sides. Elevation on site ranges from 550 to 610 feet above mean sea level. Soils on site are mapped as Diablo clay (Bowman 1973). The site is within the County's Multiple Species Conservation Program (MSCP) Minor Amendment Area.

METHODS

Prior to visiting the site, available maps, air photos, and existing condition materials for the site were reviewed. A California Native Diversity Database (CNDDB) search also was conducted to identify previously mapped resources on the site and in the vicinity. A single site visit was conducted on February 9, 2017 to identify existing biological resources within the parcel. Existing vegetation communities were mapped on a recent aerial photograph (Figure 3).

The site was walked and observed plant and animal species were recorded. Plant species names followed the Jepson Manual (Baldwin 2012). Vegetation communities were mapped according to Holland's Preliminary Descriptions of the Terrestrial Natural Communities of California (Holland 1986) as updated (Oberbauer 2008). While no focused species surveys were conducted, the site was evaluated for the potential for sensitive species to occur.

EXISTING CONDITIONS

Vegetation Communities

Two vegetation communities were mapped within the study area: non-native grassland and disturbed/developed areas (Figure 3). The site is nearly 100% non-native grassland, with a small area of disturbed habitat at the north eastern corner of the site where Harvest Road intersects with Lonestar Road.

Non-Native Grassland

Non-native grassland occurs as a dense to sparse cover of non-native grasses, sometimes associated with species of showy-flowered, native, annual forbs. This community characteristically occurs on gradual slopes with deep, fine-textured, usually clay soils. Dominant grass species include wild oats (*Avena barbata*), red brome (*Bromus madritensis* ssp. *rubens*), ripgut grass (*Bromus diandrus*), barley (*Hordeum murinum*), and Bermuda grass (*Cynodon dactylon*). Other species occurring throughout the site include garland daisy (*Glebionis coronarium*), black mustard (*Brassica nigra*), and Russian thistle (*Salsola tragus*). Most of the annual, introduced species that comprise the majority of the species and biomass within non-native grassland originated from the Mediterranean region, an area with a long history of agriculture and a climate similar to California's. These two factors, in addition to intensive grazing and agricultural practices in conjunction with severe droughts, contributed to the successful invasion and establishment of these species and the replacement of native grasses with an annual-dominated, non-native grassland (Jackson 1985). These grasslands are common throughout San Diego County and serve as valuable raptor foraging habitat. This habitat on site meets both the County's and City of San Diego's criteria for non-native grassland. This habitat is classified as a Tier III habitat and is considered sensitive.

Disturbed Habitat

Disturbed habitat includes land cleared of vegetation, land containing a preponderance of non-native plant species, or land showing signs of past or present usage that reduces its capability of providing viable wildlife habitat. Less than 0.1 acre of disturbed habitat is present in the northeastern corner of the site at the corner of Harvest Road and Lonestar Road. This area is disturbed by vehicular traffic turning right from Lonestar Road on to Harvest Road. This habitat is not considered to be sensitive. If the vehicular traffic were precluded from this area it is anticipated that non-native grassland vegetation would become established over time.

Sensitive Plants

No sensitive or rare plants were observed within the study area during the field visit. The overall potential for sensitive plants to occur on site is considered to be low; however, there are some low-sensitivity annual (spring flowering) plant species that could occur within the non-native grassland.

Sensitive Animals

No sensitive animals were observed within the study area during the field visit. While not observed, the site does support numerous habitat components that make the site potentially suitable for burrowing owls. The grassland is suitable as foraging habitat for burrowing owls. The ground squirrels and gophers have created numerous burrows, principally on the berms along the edges of the property, which could be used by owls. In addition, a population of burrowing owls is known to occur on preserved land just north of the site, across Lonestar Road. It is likely that the owls in this area are currently using the site as foraging habitat.

Habitat Connectivity

The site is not within any designated local or regional wildlife corridor; however, the land to the north is part of a larger assemblage of preserved habitat providing connectivity between Otay Mesa and the Otay River Valley to the north. Both City and County MSCP preserve areas are located in this area. USFWS designated Critical Habitat for the federal endangered San Diego fairy shrimp (*Branchinecta sandiegonensis*) and quino checkerspot butterfly (*Euphydryas editha quino*) also occur in this area.

SUMMARY

The site is essentially 100% vegetated with non-native grassland habitat. This habitat is considered sensitive by both the City and County of San Diego. Given the vegetative makeup, generally good condition, and location adjacent to a larger preserved area with regional connectivity, the site is considered to be suitable as mitigation for non-native grassland habitat impacts elsewhere in the region.

If you have any comments or questions, please call me.

Sincerely,

Principal/Senior Biologist

Enclosures:

Figure 1 Regional Location Map
Figure 2 Project Location Map
Figure 3 Biological Resources
Representative Photos

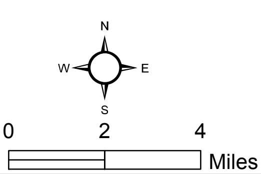

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Figure 1

Regional Location

SUNROAD HARVEST ROAD PARCEL

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Figure 2

Project Location

SUNROAD HARVEST ROAD PARCEL

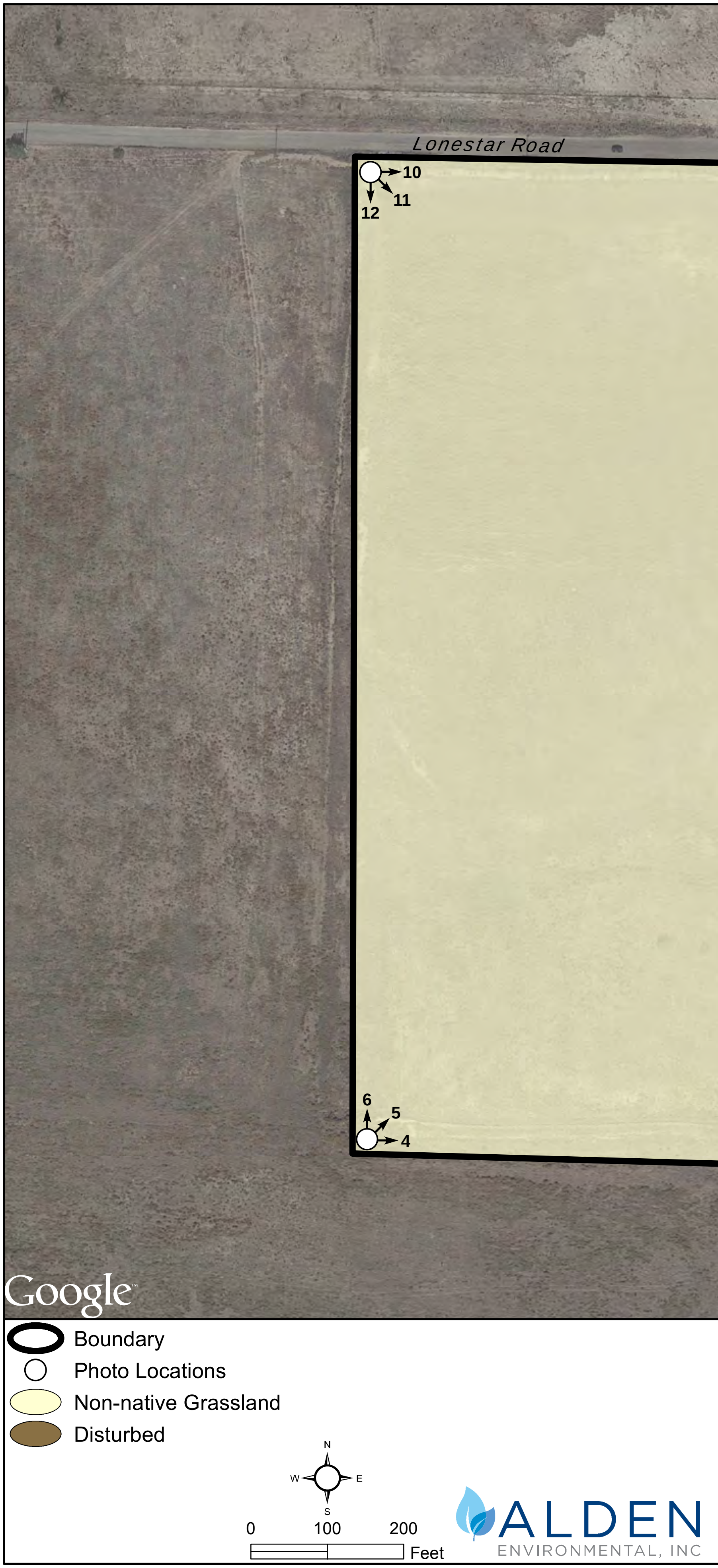

Figure 3

Biological Resources

SUNROAD HARVEST ROAD PARCEL

Representative Photographs

Photo Point 1. 02/09/17

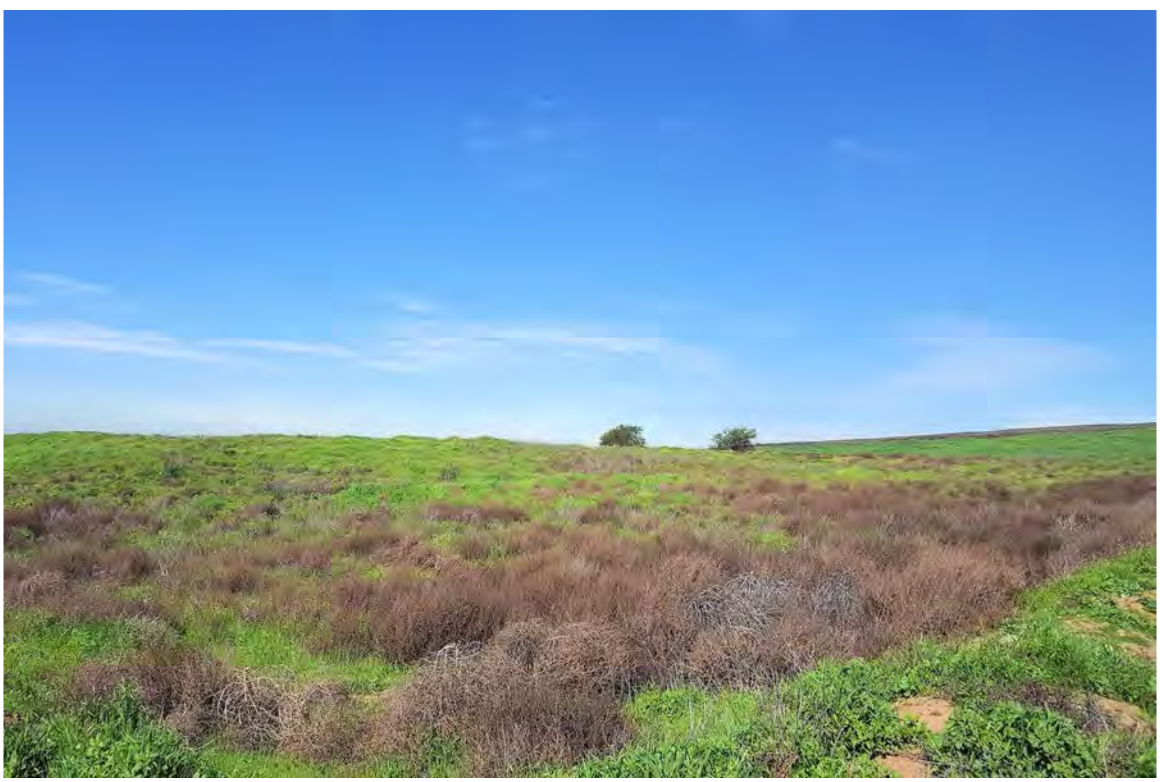

Photo Point 2. 02/09/17

Photo Point 3. 02/09/17

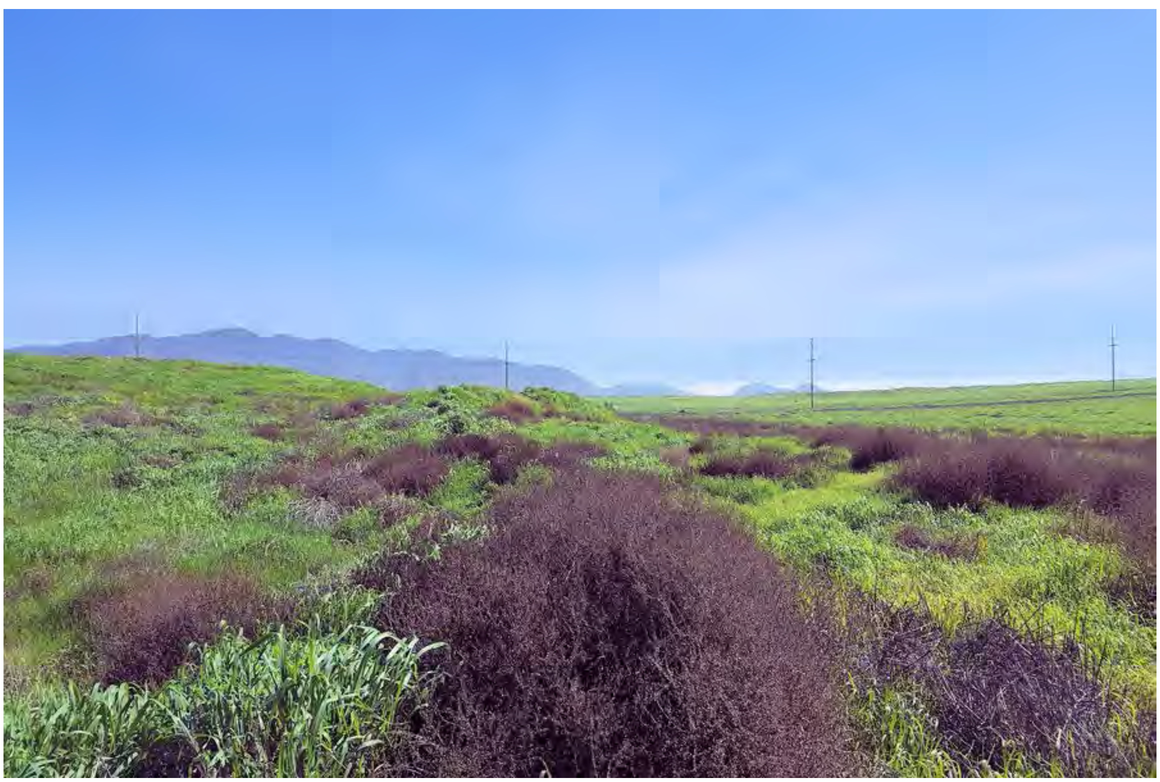

Photo Point 4. 02/09/17

Photo Point 5. 02/09/17

Photo Point 6. 02/09/17

Photo Point 7. 02/09/17

Photo Point 8. 02/09/17

Photo Point 9. 02/09/17

Photo Point 10. 02/09/17

Photo Point 11. 02/09/17

Photo Point 12. 02/09/17

Appendix H

Turecek Resource Management Plan

Resource Management Plan for the Turecek Off-site Mitigation Parcel for the Sunroad Otay Project

(Project Number 538140)

January 12, 2019

Prepared for:

Sunroad Enterprises
4445 Eastgate Mall
Suite 400
San Diego, CA 92121

Prepared by:

Alden Environmental, Inc.
3245 University Avenue, #1188
San Diego, CA 92104

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Resource Management Plan
for the Turecek Off-site Mitigation Parcel
for the Sunroad Otay Project

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1.0 INTRODUCTION

This Resource Management Plan (RMP) has been prepared for the proposed 18.75-acre Turecek parcel in accordance with mitigation requirements identified in the Biological Technical Report for the Sunroad Otay Project (Alden Environmental, Inc. [Alden] 2018). This RMP provides direction for the permanent preservation, enhancement, and management of the parcel in accordance with City of San Diego (City) requirements.

1.1 PURPOSE OF RESOURCE MANAGEMENT PLAN

The habitat mitigation that would occur on the Turecek parcel (Figures 1 & 2) supports non-native grassland (NNG) and has the potential to support the burrowing owl (BUOW; *Athene cunicularia*). The purpose of this RMP is to provide measures and conditions to help establish and maintain a self-sustaining colony of California ground squirrels (*Spermophilus beecheyi*) as a means to provide suitable habitat for year-round occupation by the BUOW.

1.1.1 Conditions and/or Mitigation Measures that Require an RMP

The Sunroad Otay Project would permanently impact the entire 49.1 acre project site. An additional 1.8 acres off site, along Otay Mesa Road and La Media Road, also would be permanently impacted by the project. A total of 47.0 acres of non-native grassland, 3.8 acres of disturbed land, and 0.1 acre of developed land would be impacted. The impacts to non-native grassland are significant and require mitigation.

The project would not directly impact any known burrowing owl (*Athene cunicularia*; State Species of Special Concern and City Multiple Species Conservation Program [MSCP] Covered Species) burrow, but it would impact 47.0 acres of burrowing owl-occupied (foraging) non-native grassland habitat. This impact is considered significant, and mitigation is required.

Mitigation for impacts to 47.0 acres of burrowing owl-occupied non-native grassland from the project (at a 0.5:1 ratio) will occur, in part, through the preservation and enhancement of 18.75-acres at Turecek parcel. The remaining 4.75 acres of non-native grassland mitigation will be satisfied through acquisition of non-native grassland credits from the Ramona Grasslands Preserve in San Diego County. This RMP does not address the Ramona Grasslands Preserve mitigation component.

1.1.2 Agency Review and Coordination

The RMP will be submitted to the U.S Fish and Wildlife Service, California Department of Fish and Wildlife (i.e., Wildlife Agencies), and City for approval.

2.0 IMPLEMENTATION

2.1 RESOURCE MANAGER QUALIFICATIONS AND RESPONSIBLE PARTIES

Resource Manager:

The resource manager shall be one of the following:

- Conservancy group
- Natural resources land manager
- Natural resources consultant
- Federal or State Wildlife Agency
- Federal Land Manager such as Bureau of Land Management
- City Land Managers, including but not limited to Department of Parks and Recreation, Watershed Management or Department of Public Works.

The resource manager shall be approved by the City and Wildlife Agencies. Any change in the designated resource manager shall also be approved by the City and Wildlife Agencies. Appropriate qualifications for resource managers include, but are not limited to:

- Demonstrated ability to carry out habitat monitoring or mitigation activities including a minimum of 2 years of experience in field biology in southern California (preferably San Diego County).
- Fiscal stability including preparation of an operational budget (using an appropriate analysis technique for the management of the RMP).
- Resource Manager shall have a minimum of a B.S. or B.A. in biological, ecological, or wildlife management degree.
- Experience with habitat management in southern California (with experience maintaining habitat conditions suitable for BUOW).

The Resource Manager (1) will be responsible for the implementation of this RMP; and (2) will carry out the RMP's requirements and objectives. The Resource Manager's primary responsibility will be to maintain the integrity of all preserved and restored habitats. In order to fulfill that responsibility, the Habitat Manager shall:

- Be an advocate of the preserved open space and its protection.
- Be familiar with this RMP, its appendices, and supporting documentation.
- Be familiar with requirements and restrictions of any Conservation and/or Open Space Easement(s) that may be recorded over the mitigation area.
- Be responsible for all points noted in this RMP, as discussed in applicable sections of this document.
- Maintain all documents transferred by the project proponent, and be knowledgeable about the resources addressed in these reports.
- Educate the surrounding community about the presence and need for the open space and be responsive to any community concerns or problems regarding the open space.
- Document all field visits, and notify the City in a timely manner of all concerns, problems, and suggested solutions.

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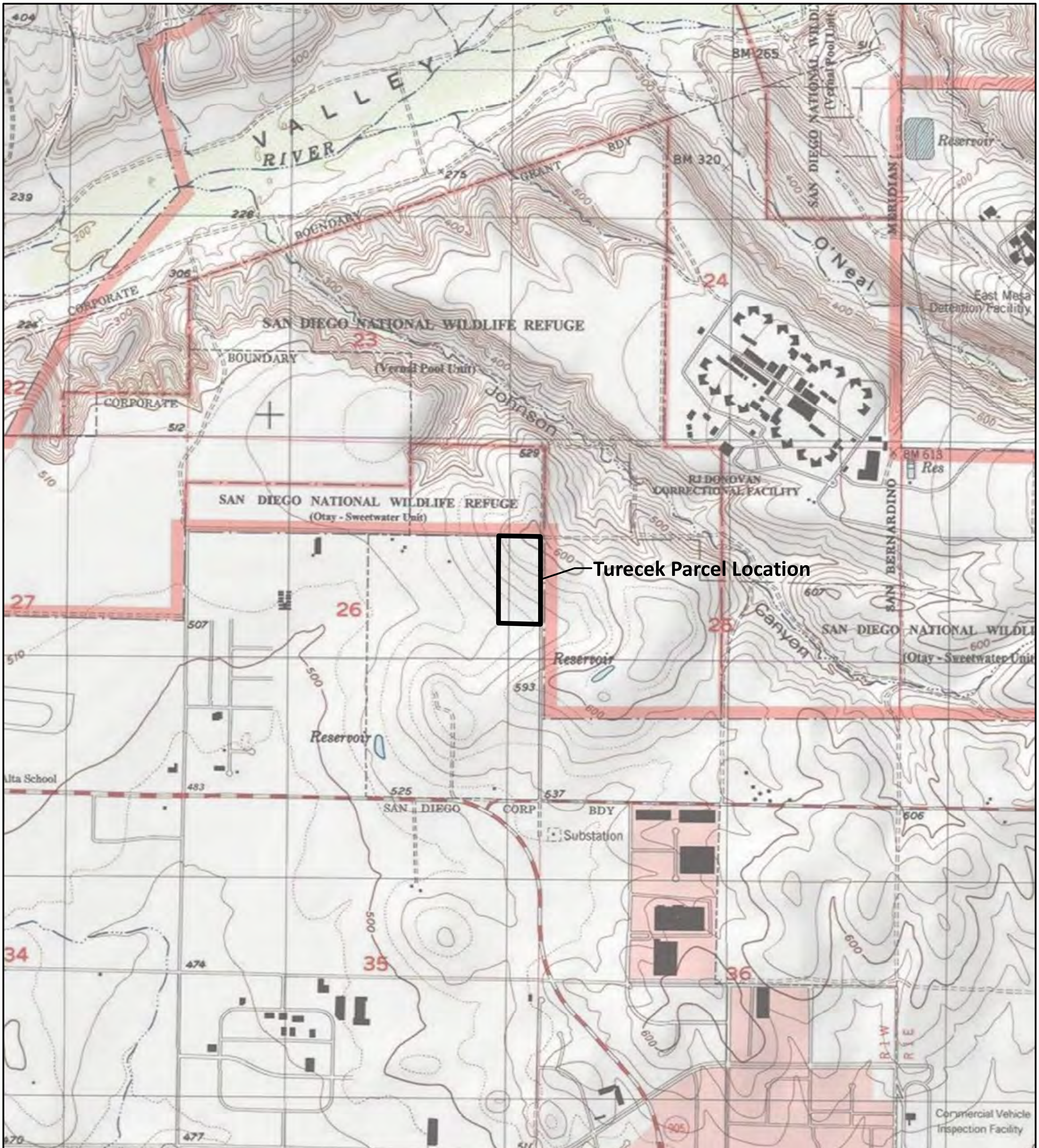
Figure 1

Regional Location

SUNROAD OTAY PROJECT
OFF-SITE TURECEK MITIGATION PARCEL



USGS 7.5' Quadrangle: Otay Mesa

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Figure 2

Turecek Parcel Location

SUNROAD OTAY PROJECT
OFF-SITE TURECEK MITIGATION PARCEL

- Forward all applicable monitoring and management data to the City for incorporation into the MSCP database and annual report.
- Coordinate with the manager(s) of adjacent preserves/open space areas on management practices and tasks related to preservation and maintenance of the regional open space system and apply pertinent adaptive management recommendations received from the regional monitoring source.
- Coordinate with and allow for on-site management actions (as identified by regional stakeholders) to foster greater occupation of the site by the BUOW.

Proposed Land Owner:

Fee title of the parcel may be maintained by the project applicant or transferred to the Resource Manager or other appropriate landowner (e.g., land trust, conservancy, or public agency).

Proposed Easement Holder:

If the land is transferred in fee title to a non-governmental entity or retained by the current landowner, a Biological Open Space Easement or Conservation Easement must be recorded, prior to initiation of Sunroad Otay Project impacts (grading). This easement should be dedicated to the City but also will include the Wildlife Agencies as grantees or third-party beneficiaries. The proposed easement limits are included in Appendix A.

If title to the land is transferred in fee title to a public governmental agency (e.g. City of San Diego) then that agency shall determine the need for, and type of protective easement that would be required. Any easement or protective document will include an enforcement mechanism to ensure that the management requirements are being carried out as required in this RMP. It is anticipated that the enforcement mechanism will be through the City and Wildlife Agencies and be connected to the entity holding the endowment.

Habitat Enhancement Entity:

Management responsibility for the initial habitat enhancement shall remain with the Resource Manager.

2.2 FINANCIAL RESPONSIBILITY/MECHANISM

The project applicant will fund this RMP. Said funds will be tied to the property, to be used by the resource manager to implement the RMP. The San Diego Foundation (or other approved entity) will hold and manage the endowment. The resource manager will request annual funding from the San Diego Foundation (or other approved entity) to implement the coming year tasks based on an annual work plan.

The project applicant is responsible for all RMP funding requirements, including direct funds to support the RMP initial activities as well as either an on-going funding source, or a one-time non-wasting endowment, which is tied to the property to fund long-term RMP implementation. It is currently anticipated that long-term management funding will be provided through an endowment provided by the project applicant. RMP initial and long-term tasks/activities are presented in Section 4.0.

Long-term tasks involve the management and maintenance of the parcel in perpetuity including mowing, focused weed removal, fencing maintenance, and general monitoring and reporting.

2.3 CONCEPTUAL COST ESTIMATE

A Property Analysis Record (PAR) or similar cost estimate for the resource management activities will be prepared for the 18.75-acre preserve when a Resource Manager has been identified. The PAR will include initial task funding as a separate item. Initial tasks are those that would be required at the initiation of long-term management.

2.4 REPORTING REQUIREMENTS

An RMP Annual Report as well as a Work Plan for the upcoming year shall be submitted to the City and Wildlife Agencies. The Annual Report shall provide a summary of management and monitoring activities, identify new issues, and address management successes and failures. An accounting of funds used for management that year, a proposed budget for management in the coming year, and a summary statement of the status of the endowment fund shall also be included.

The report shall include a summary of changes from baseline or previous year conditions for species and communities and address any monitoring and management limitations, including weather. The report shall also address any adaptive management resulting from previous monitoring results and provide methods for measuring the success of adaptive management. The report will be prepared at the end of each calendar year and will be submitted to both the City and the Wildlife Agencies by December 1.

The Annual Report shall also include copies of California Natural Diversity Data Base (CNDDB) forms that were submitted to the State for any new sensitive species observations or significant changes to species previously reported. In addition, copies of invasive plant species forms submitted to the State or City must be included in the report.

The Land Manager shall also prepare and submit an annual workplan that spells out the specific tasks that will be implemented in the coming year to achieve the recommendations outlined in the annual report. The workplan may be included in an appendix to the annual report.

3.0 PROPERTY DESCRIPTION

3.1 LEGAL AND GEOGRAPHICAL DESCRIPTION

The 18.75 acres of off-site mitigation for the Sunroad Otay Project is at the Turecek parcel located at the corner of Harvest Road and Lonestar Road in East Otay Mesa in the County (Figure 1). The parcel is within the County's MSCP Minor Amendment Area. County MSCP Hardline Preserve is immediately north of the parcel; the Lonestar Ridge Biological Open Space and State Route 125 Dedicated Preserve Lands are located approximately 1,200 feet to the northwest of the Turecek parcel. The parcel occupies portions of Sections 26 in Township 18 South, Range 1 West of the U.S. Geological Survey 7.5-minute Otay Mesa quadrangle (Figure 2). The Assessor's Parcel Number is 64607023. A Record of Survey figure is included as Appendix A.

The site is on a relatively flat mesa that slopes to the southwest. Johnson Canyon occurs to the east and the Otay River Valley beyond to the north (Figure 2). Elevations range from approximately 550 feet above mean sea level (AMSL) to approximately 610 feet AMSL.

3.2 ENVIRONMENTAL SETTING

The parcel has been used for agricultural and materials stockpiling purposes in the past. Land uses in the surrounding area include Brown Field Airport to the southwest; industrial uses and State Route 125 to the west; and the R.J. Donovan State Prison and George F. Bailey County Correctional Facility to the northeast.

Soil on the parcel is mapped as Diablo clay (Bowman 1973). As noted later in Section 4.1.1 of this RMP, non-native grassland characteristically occurs on gradual slopes with deep, fine-textured, usually clay soils (Oberbauer et al. 2008). Therefore, the existing non-native grassland on site is expected to continue to support non-native grassland vegetation. The disturbed area on site is anticipated to become non-native grassland following enhancement activities as part of this RMP, of which one activity is to fence the site and prevent vehicles from impacting the area and causing its disturbed nature.

While clay soil may not be highly suitable for fossorial mammal burrows, particularly California ground squirrel (*Otospermophilus beecheyi*) whose burrows are typically used by the burrowing owl, both California ground squirrels and Botta's pocket gophers (*Thomomys bottae*) have created numerous burrows on site, principally on the berms along the edges of the parcel. These burrows have potential to be used by burrowing owls, and a population of burrowing owls is known to occur on preserved land just north of the site, across Lonestar Road. It is expected that the owls in that area are currently using the Turecek parcel as foraging habitat.

The climate in San Diego County is generally mild and arid. Temperatures in Otay Mesa are generally highest in September (mean high temperatures are 79˚F) and lowest in December (mean low temperatures are 45˚F). Average annual precipitation in the Otay Mesa is approximately 9.9 inches, with the highest average rainfall totals occurring in January and February (1.99 inches) and March (2.07 inches). The driest months are June, July, and August with approximately 0.08, 0.03, and 0.08 inch of rainfall per month, respectively (Weather.com 2008). The parcel is located within the Otay Valley Hydrologic Area of the Otay Hydrologic Unit. No drainages occur on the parcel.

3.3 USES OF PLAN AREA

The parcel would be used solely as mitigation for the Sunroad Otay Project. No public facilities are proposed on the parcel, and no trails are proposed.

4.0 BIOLOGICAL RESOURCES – FUNCTIONS AND VALUES

4.1 VEGETATION COMMUNITIES

The site is composed almost entirely of non-native grassland, with a small amount of disturbed land (Figure 3). The disturbed area is anticipated to become non-native grassland following site fencing and initial enhancement activities. The entire area will be preserved and enhanced for the burrowing owl as mitigation for the Sunroad Otay Project.

4.1.1 <u>Non-native Grassland</u>

Non-native grassland occurs as a dense to sparse cover of non-native grasses, sometimes associated with species of showy-flowered, native, annual forbs. This community characteristically occurs on gradual slopes with deep, fine-textured, usually clay soils (Oberbauer et al. 2008). Dominant grass species include wild oats (*Avena barbata*), red brome (*Bromus madritensis* ssp. *rubens*), ripgut grass (*Bromus diandrus*), barley (*Hordeum murinum*), and Bermuda grass (*Cynodon dactylon*). Other species occurring throughout the parcel include garland daisy (*Glebionis coronarium*), black mustard (*Brassica nigra*), and Russian thistle (*Salsola tragus*). Most of the annual, introduced species that comprise the majority of the species and biomass within non-native grassland originated from the Mediterranean region, an area with a long history of agriculture and a climate similar to California's. These two factors, in addition to intensive grazing and agricultural practices in conjunction with severe droughts, contributed to the successful invasion and establishment of these species and the replacement of native grasses with an annual-dominated, non-native grassland (Jackson 1985). These grasslands are common throughout San Diego County and serve as valuable raptor foraging habitat. This habitat on site meets both the County's and City's criteria for non-native grassland.

4.1.2 <u>Disturbed Land</u>

Disturbed land includes land cleared of vegetation, land containing a preponderance of non-native plant species, or land showing signs of past or present usage that reduces its capability of providing viable wildlife habitat. Less than 0.1 acre of disturbed land is present in the northeastern corner of the parcel at the corner of Harvest Road and Lonestar Road. This area is disturbed by vehicular traffic turning right from Lonestar Road on to Harvest Road. This habitat is not considered sensitive. If the vehicular traffic were precluded from this area it is anticipated that non-native grassland would become established over time.

4.2 Plant Species

No sensitive plants were observed on the parcel, and none have been reported to the CNDDB for the parcel. The overall potential for sensitive plants to occur on site is considered to be low.

In addition to the non-native grasses on the parcel, several invasive species are present and pose a potential management issue: garland daisy, black mustard, and Russian thistle.

Figure 3

Biological Resources

SUNROAD OTAY PROJECT
OFF-SITE TURECEK MITIGATION PARCEL

4.3 WILDLIFE SPECIES

No sensitive animals were observed on the parcel. The parcel does, however, support numerous habitat components that make it potentially suitable for burrowing owls. California ground squirrels and Botta's pocket gophers have created numerous burrows, principally on the berms along the edges of the parcel, which could be used by burrowing owls. In addition, a population of burrowing owls is known to occur on preserved land just north of the site, across Lonestar Road. It is likely that the owls in this area are currently using the site as foraging habitat.

4.4 OVERALL BIOLOGICAL AND CONSERVATION VALUE

The East Otay Mesa/Otay Mesa area is currently the primary location of burrowing owls in San Diego County (County of San Diego 2010). The Turecek parcel is located in East Otay Mesa. The goals and objectives for burrowing owls in East Otay Mesa emphasize long-term habitat conservation, habitat improvement, and creation and maintenance of as much native and naturalized habitat as possible for burrowing owls. One of the goals for burrowing owls in East Otay Mesa is to preserve grasslands. Another goal is to establish two burrowing owl nodes of at least 150 acres each in East Otay Mesa. A node is a generalized area identified by the Wildlife Agencies, the County, and the City as an area in which to concentrate preservation and restoration/enhancement of burrowing owl habitat. The Turecek parcel is located just southeast of one of the East Otay Mesa nodes and, therefore, would contribute to the establishment and enlargement of that node (Figure 4). Preservation and enhancement of squirrel and burrowing owl habitat on the parcel would further contribute toward meeting the node goal.

4.5 ENHANCEMENT OPPORTUNITIES

As stated previously, 18.75 acres of habitat will be preserved for the burrowing owl. The parcel presents an excellent opportunity to enhance the parcel for the burrowing owl and contribute toward meeting the node goal described in Section 4.4 of this RMP. The following enhancement efforts would be conducted:

- Focused weed removal of targeted non-grass invasive species
- Soil ripping/decompaction
- Hole auguring to create starter burrows
- Soil berming/mounding
- Mowing to reduce vegetation height across the site where needed
- Dethatching
- Establishment of brush piles placed approximately 100 - 200 feet apart to provide initial cover for ground squirrels

Furthermore, the installation of fencing along the project perimeter will prevent vehicles from impacting the northeastern corner of the site resulting in disturbed land. With the preclusion of vehicles from this area due to installed fencing, it is anticipated that non-native grassland would become established in the area over time.

5.0 BIOLOGICAL ELEMENT GOALS

The ultimate goal of this RMP is to detail the methods to preserve and manage lands to the benefit of the flora, fauna, and native ecosystem functions reflected in the natural communities occurring within the RMP land. In addition, this RMP establishes the following goals with regard to biological resources:

Goal 1: Preserve and manage lands to the benefit of the flora, fauna, and native ecosystem functions reflected in the natural communities occurring within the open space. More specifically, the vegetative condition desired is to achieve a relatively low growing, moderately open mix of grasses and forbs to support California ground squirrels and BUOW. Occasional scattered shrubs are also compatible with this habitat condition.

Goal 2: To the extent compatible with Goal 1, reduce, control, and where feasible, eradicate non-native, invasive flora and/or fauna known to be detrimental to native species and/or the local ecosystem. This may include the on-going eradication of target non-native invasive species as deemed necessary by the resource manager.

Goal 3: Manage the land for the benefit of sensitive species, MSCP Covered Species, and existing natural communities, without substantive efforts to alter or restrict the natural course of habitat development and dynamics.

Goal 4: Provide program administration through planning and reporting on the RMP implementation in a consistent and efficient manner.

5.1 INITIAL TASKS

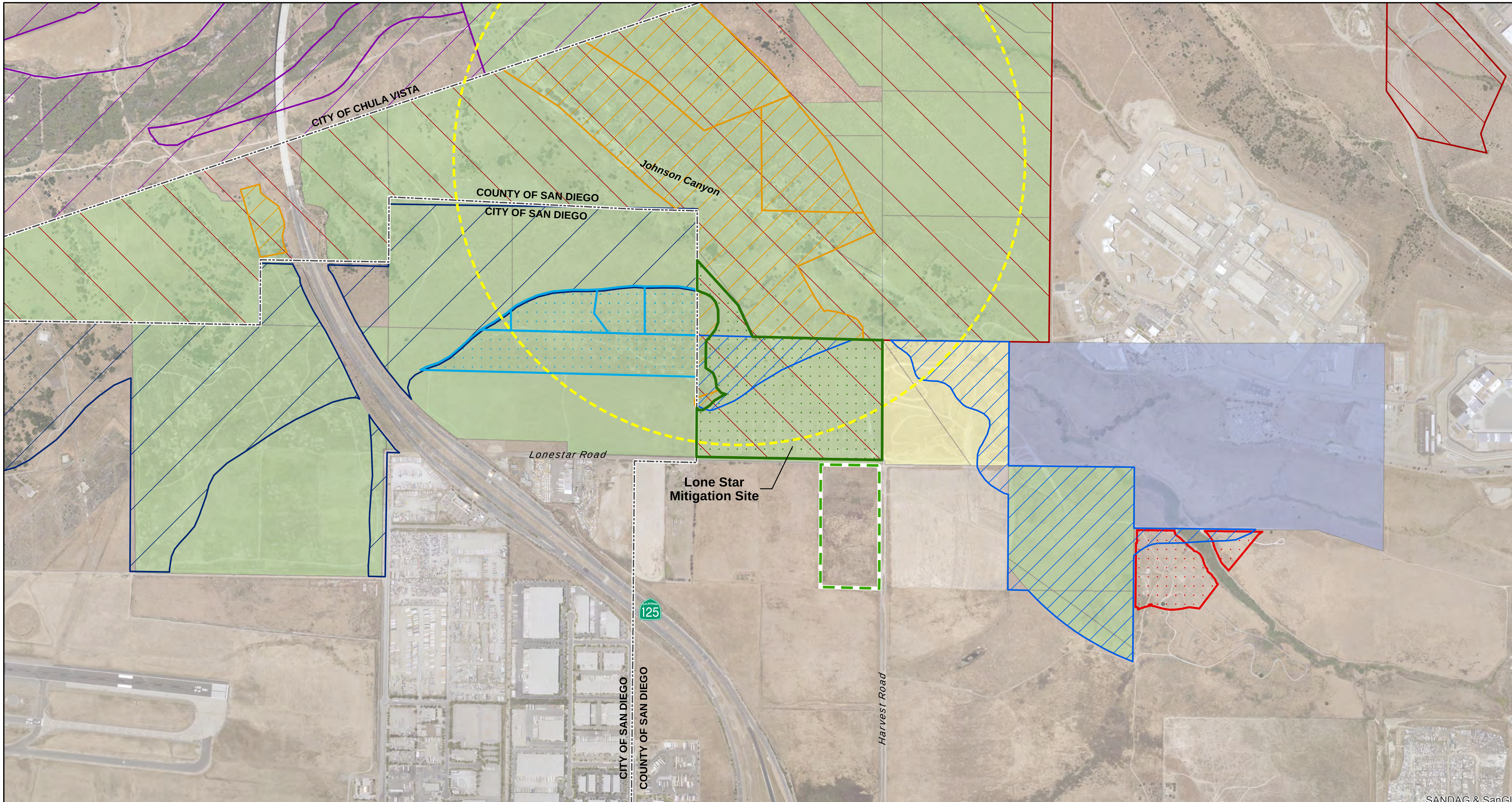
The following tasks would be completed to the satisfaction of the City and wildlife agencies prior to initiation of the long-term management of the site. The project budget/PAR will include the costs associated with the initial activities separately from the long-term endowment cost. A list of all management tasks is presented in Table 2.

5.1.1 Initial Fencing/Access Control

To prevent human-induced degradation of the parcel due to illegal occupancy, trespassing (off-highway vehicle activity), removal of resources, or dumping of trash or debris, the Resource Manager will restrict access to the parcel. Permanent three strand barbless fencing will be installed around the entire parcel. Permanent signage will be installed along the perimeter of the preserve area (table
5). All signs will be corrosion-resistant (e.g., constructed of steel), measure at minimum six by nine inches in size, be posted on a metal post at least three feet above ground level, and provide notice in both English and Spanish that the area is an ecological preserve with trespassing prohibited. The fences and signs will be installed prior to initiation of the long-term management.

5.1.2 Initial Trash/Debris Removal

Trash and debris located on the site will be removed prior to initiation of the long-term management. All materials will be removed from the site and disposed of in a legal manner.



- Limits of Preserve Area
- Lone Star Mitigation Site
- County MSCP Preserve Area
- City of San Diego MHPA
- City of Chula Vista MSCP Preserve
- SDG&E
- State of California
- Conserved Lands (SANDAG)
- USFWS Refuge
- East Otay Mesa Specific Plan Conservation/Limited Use
- SR 125 Mitigation Site
- Proposed TM 5549 Preserve
- Burrowing Owl Node

N S E W

0 500 1,000 Feet

ALDEN ENVIRONMENTAL, INC

Figure 4

Regional Preserve Context

SUNROAD OTAY PROJECT
OFF-SITE TURECEK MITIGATION PARCEL

Turecek Parcel Boundary
Artificial Berm
Refugia Pipes
Pilot Holes
Brush Piles

N W E S

0 100 200 Feet

ALDEN ENVIRONMENTAL, INC

Figure 5

Initial Enhancement Activities

SUNROAD OTAY PROJECT
OFF-SITE TURECEK MITIGATION PARCEL

5.1.3 Initial Mowing

Mowing is the primary technique employed to reduce the height and density of non-native grasses on the site. An initial mowing of the site will be conducted prior to initiation of long-term management. The target habitat is NNG that is generally less than 1 foot in height and suitable for ground squirrels and the BUOW. The goal of the initial mowing will be to cut and remove vegetation that is above 4-6 inches in height over at least 75% of the site. Line trimmers and mechanical mowers will be used to carry out this effort.

5.1.4 Initial Dethatching

An initial task will be to dethatch the site prior to initiation of the long-term management. Dethatching will involve raking and removal of dead vegetative material from the ground surface. This effort may be conducted with the use of hand tools and machinery (tractor and gannon, rake tynes, etc.), as deemed appropriate by the Resource Manager. Collected material will be removed from the site and disposed of in a legal manner. Some thatch may be left if it is determined by the Resource Manager that its removal is unnecessary or would be too damaging to the site.

5.1.5 Initial Weed Removal

Initial removal of target invasive plant species will be conducted through hand removal, mechanical means, and focused application of herbicides. Since NNG is a naturalized habitat type and is important for owls and raptors, removal of non-native grass species is not included. Several species of weeds are particularly problematic in the vicinity of the site. The initial target weed species are provided in Table 1. This list will be reevaluated by the Resource Manager and will be adapted as necessary to reflect site conditions. Control of these target, invasive, site specific weed species shall be conducted such that they do not diminish the suitability of the site for ground squirrels and the BUOW. Prior to initiation of long term management, all of the target species on the site will have received at least a single round of treatment (to include the specific methods identified above as well as the overall site mowing). It is not anticipated that any of the target species will be "under control" or eradicated following this initial effort as they are tenacious invasive species and there is an extant seed bank in the soils on site.

Table 1
TARGET INVASIVE SPECIES

SCIENTIFIC NAME	COMMON NAME
Atriplex semibaccata	Australian saltbush
Brassica nigra	black mustard
Cynara cardunculus	artichoke thistle
Foeniculum vulgare	fennel
Hirschfeldia incana	shortpod mustard
Salsola tragus	Russian thistle

5.1.6 Initial Berm Placement

In order to help improve site conditions for ground squirrels, 3 artificial berms will be installed on the site (Figure 5) prior to initiation of the long-term management. The berms will consist of debris free soil material that would be imported to the site. The berms will be approximately 10 – 12 feet in width and 4- 5 feet in height. The berm locations have been selected such that they will be in the flatter portions of the site and no less than 100 feet from the adjacent roadways. The soil will be compacted such that they are stable, yet still can be utilized by ground squirrels.

The berms also will incorporate plastic pipe refugia and pilot burrow holes. The plastic pipe refugia will consist of hard plastic pipe, 6 – 8" inches in diameter and 3 -4 feet in length. These pipes will be installed horizontally in the berms so that they can be accessed by owls if needed to escape predation.

The pilot burrows will consist of holes augured in to the top of the berms at regular intervals. The holes will be 6 – 8 inches in diameter and 1 – 2 feet in depth. The holes are intended to help ground squirrels begin digging burrows into the berms. The holes will be at an angle, rather than vertical, so that they do not become pitfall traps for reptiles and small rodents.

5.1.7 Initial Brush Pile Placement

Prior to initiation of the long-term management, shrub and brush material will be collected and stacked into low brush piles to provide additional cover for ground squirrels and small animals. Each pile will be approximately 4 to 6 feet in diameter and 2 to 3 feet in height, provided sufficient material is available. This can be especially beneficial during the initial stages of the effort when there will be no cover available for small animals to utilize. The brush piles will be distributed at approximately 30 feet on center throughout the higher, flatter areas of the site, within approximately 100 feet of the installed berms. The final number and size of piles will depend upon the amount of material available locally.

5.2 BIOLOGICAL MANAGEMENT ACTIVITIES

5.2.1 Adaptive Management

The Resource Manager is responsible for interpreting the results of site monitoring to determine the ongoing success of the RMP. The parcel will be inspected for changes during regular monthly, annual, and focused survey visits. Substantial changes that become apparent will be documented. Substantial changes are those that may, as determined by the Resource Manager, have a negative effect on the managed resources and/or cause the effort to not meet its stated RMP goals.

When issues are encountered, the Resource Manager shall determine the course of action to be taken, using Adaptive management techniques as necessary. Adaptive management is a systematic approach for improving resource management by learning from management outcomes. It is an iterative process driven by data collection and monitoring of management success. If it is necessary to modify the RMP between regularly scheduled updates, changes shall be submitted to the City and Wildlife Agencies for approval as required. Adaptive management would involve application of current research and information available on the BUOW to troubleshoot issues that arise during RMP implementation.

5.2.2 Baseline Inventory

Upon implementation of this RMP, the Resource Manager will be provided with existing digital files containing the vegetation and sensitive resources data mapped to date. The Resource Manager will then update this data with biological data collected during the start-up (first year) phase of the RMP. This will include the initial enhancement effort results as well as the standard monitoring tasks described in the following sections.

The data collected over the first year of management (enhancement effort, focused surveys, annual monitoring, etc.) will be compiled into a digital (GIS) database and map of the biological resources on the site. This database will serve as the baseline inventory for future management and allow the Resource Manager to measure habitat changes caused by natural and human effects and to evaluate management efforts during subsequent years. The baseline data also will be incorporated into the first annual report, which will include the results of the enhancement effort.

5.2.3 BUOW Survey

A focused BUOW breeding season survey will be conducted annually to determine the presence, number, and general status of the BUOW. The survey will follow current CDFW survey protocols, but may be altered as deemed necessary by the Resource Manager and approved by the City and Wildlife Agencies. The survey visits may coincide with other regularly scheduled site visits. During the BUOW surveys the presence of ground squirrels will be noted and the number of active and potentially suitable BUOW burrows will be noted and mapped.

5.2.4 Vegetation Monitoring

Permanent photo documentation points will be established in the first year and photos taken annually thereafter. A spring site visit will be conducted each year to evaluate the condition of the habitat (NNG) on site. Species cover and richness will be visually evaluated. Plant species observed will be recorded and an estimate of the richness (number) of species present on site can be made. This list will be further broken down into native/non-native species.

Species cover will be evaluated by visually estimating the cover of vegetation in generalized cover classes (e.g. 0-10%, 10-25%, 25-50%, and 75-100%). The goal is to provide an estimate NNG cover across the site and to identify changes over time. The site is generally homogenous and is expected to remain so (NNG habitat). The Resource Manager will collect vegetation cover data within homogenous areas of the site. For example, if there is an area dominated by Russian thistle the Resource Manager may evaluate this area separately from other portions of the site with a different species composition. Separate cover values also may be estimated for different height classes (herb, shrub, tree) if warranted.

Vegetation community mapping will be updated, as necessary, based on the results of the vegetation monitoring. Sensitive plant and animal species observed also will be recorded and mapped. Finally, the suitability of the site to support the BUOW will be evaluated and remedial measures will be identified, if deemed necessary by the Resource Manager.

5.2.5 Monthly Monitoring

Site visits will be conducted at least monthly each year. The type and purpose of each monthly visit may vary depending upon the season and site conditions. At a minimum, each visit will include an inspection of the fences, signs, and general state of the preserved habitat. Necessary repairs will be performed during the monitoring visit, if possible. If not, necessary repairs will be scheduled to be performed as soon as possible/practical. These monthly visits may be conducted in conjunction with other scheduled visits (BUOW survey, vegetation monitoring, etc.). Following each general maintenance visit the Resource Manager shall be informed of any issues that need to be addressed.

5.2.6 Annual Monitoring Report and Work Plan

An annual report will be prepared and submitted to the Wildlife Agencies and City by December 1 each year. The report will summarize the overall condition of the vegetation and sensitive species on the parcel, with particular attention to ground squirrel or BUOW activity on the site. The report would also document the progress of weed eradication efforts. The annual report would discuss the results of management activities proposed in the previous report, and based on the condition of the site, would propose management tasks for the following year.

A Work Plan also will be prepared and submitted by December 1 of each year. The Work Plan will identify remedial measures and tasks that are recommended to occur in the next year.

5.2.7 Biological Database

The Resource Manager will prepare and maintain a biological database for the site. This database will include documentation of all activities conducted, sensitive species presence, and mapping (GIS) of all biological resources. The Resource Manager also will prepare and submit CNDDB forms annually for new species observations on site.

5.2.8 Management Plan Review

This RMP will be reviewed every five years (or as needed) to determine the need for revisions or updates. Due to potentially changing conditions on site, it may be necessary to revise the tasks outlined in this plan to ensure continued success of the stated goals.

5.3 OPERATIONS, MAINTENANCE, AND ADMINISTRATION TASKS

A list of tasks such as mowing, collecting a baseline inventory of biological data, and monitoring, etc. is included in Table 2. Ongoing maintenance and administration, which will be the responsibility of the Resource Manager, will be conducted to ensure no loss of resource quality. The general maintenance and operation tasks to be conducted by the Resource Manager will include the following.

Table 2 RMP TASK SUMMARY[1]			
Task Number	**Task**	**Description**	**Frequency**
Initial Tasks			
I1	Fencing/Access Control	Permanent three strand barbless fencing and signs will be installed around the entire parcel.	Once prior to initiation of long-term management
I2	Trash/debris removal	Remove trash and debris from site.	Once prior to initiation of long-term management
I3	Access Control	Install fence and signs.	Once prior to initiation of long-term management
I4	Mowing	Mow site vegetation to a height of 4-6".	Once prior to initiation of long-term management
I5	Weed Removal	Removal of target invasive plant species through hand removal, mechanical means, and focused application of herbicides.	Once prior to initiation of long-term management
I6	Dethatch	Removal of vegetative thatch from soil surface.	Once prior to initiation of long-term management
I7	Soil Berms	Install berms to create burrow area.	Once prior to initiation of long-term management
I8	Brush Piles	Place brush piles to create refugia for wildlife.	Once prior to initiation of long-term management
Biological/Reporting Tasks			
B1	Baseline Inventory	Habitat manager will verify and update existing biological information during spring of the first year of active management.	First season following active management
B2	BUOW survey	Annually conduct surveys for breeding BUOW.	Annually, spring
B3	Vegetation Monitoring	Annually assess status of grassland habitat and modify management activities as necessary to maintain habitat for ground squirrels and BUOW.	Annually, spring
B4	Monthly Monitoring	Site visits to visually assess the condition of the site and note any problems needing attention (vandalism, trash dumping etc.).	Minimum monthly, may be in conjunction with other scheduled visits
B5	Annual Report and Work Plan	Prepare and submit an Annual Report and a Work Plan report as discussed in this RMP.	By December 1 each year
B6	Biological Database	Establish and maintain a biological database.	Update as needed, include with Annual Report by December 1 each year
B7	RMP Update	Adjust the RMP as necessary based on adaptive management to address issues identified in the annual report.	Every 5 years, or as needed
Maintenance/Operations Tasks			
M1	Mowing	Mowing of the NNG habitat to a height of 4-6" to help encourage establishment of squirrel and BUOW habitat.	Once per year (late winter/early spring) for the first 5 years, then every other year thereafter (or as needed)
M2	Fence/Sign Repair	Maintain and repair fences and signs.	As needed
M3	Weed Removal	Focused removal of target invasives.	As needed, depending on species and techniques applied
M4	Trash and debris removal	Remove trash and debris left on site.	As needed

[1]Hours and costs to be determined by Resource Manager and depicted in the PAR/ELM.

5.3.1 Mowing/Clearing

Mowing of the overall grassland area will be conducted once per year for the first five years of management, then every other year thereafter. This effort also will include limited clearing around future occupied burrows. The burrow clearing will be conducted as needed and not be limited to the mowing schedule. Line trimmers and mechanical mowers will be used to carry out this effort. The Resource Manager will determine the need and timing of mowing to be conducted as the time progresses and may change the mowing schedule. This activity should be conducted in late winter (February) before the non-native grasses go to seed and native flowering plants are emerging. Mowing also will be timed to avoid affecting nesting BUOWs during their breeding season. The goal is to reduce the cover of non-native grasses such that native plant seed that may be in the soil will have a better chance of becoming established. This effort also will help ensure that burrowing owls are able to forage and nest successfully. Additionally, the Resource Manager may identify and incorporate alternative measures to help achieve the long-term establishment of a lower statured non-native grassland habitat. The goal is to maintain at least 75% of the site as NNG habitat that is approximately 1 foot in height or less and is suitable for ground squirrels and the BUOW.

5.3.2 Fence/Sign Repair

The Resource Manager will be responsible for ensuring that the fence and signs are maintained in good condition. Necessary repair/replacement will be conducted as needed. The Resource Manager also will be responsible for altering the type and location of fencing to ensure site protection and to prohibit trespassing.

5.3.3 Weed Removal

Removal of target invasive plant species (Table 1) will be conducted through hand removal, mechanical means, and focused application of herbicides. Eradication of established invasives may require several herbicide applications per year for several years, and shall be conducted at the appropriate time of year for the targeted species based on that species' biology. Herbicides may only be applied by workers with the appropriate applicator licenses. The Resource Manager will determine the timing and techniques to be used, depending upon species presence and site conditions. The annual goal will be that the invasive weed species are maintained such that they do not inhibit or lessen the potential of the site to support ground squirrels and the BUOW, especially adjacent to established burrows.

5.3.4 Trash and Debris Removal

The Resource Manager will also conduct general trash/debris removal on the parcel during regular management site visits. Additionally, damage caused by vandalism will be repaired. Trash/debris removal and vandalism repair will occur as needed.

5.3.5 Public Use

There will be no public uses allowed on the parcel.

5.3.6 Fire Management

No specific activities for fire management are proposed on the parcel; however, the planned mowing to control vegetative height (in support of the BUOW), will reduce the wildfire risk.

5.3.7 Illegal Occupancy

Illegal occupancy is common in open space areas, although this is not anticipated to be an issue on this site because of the open nature of the habitat. The Resource Manager will monitor the parcel for evidence of illegal access concurrently with other management activities and file a report with the Sheriff, City, and regulatory agencies, if necessary.

5.3.8 Removal of Resources

Removal of any plants, animals, rocks, minerals, or other natural resources from the preserve is prohibited. The resource manager will maintain a log of illegal collecting and may report individuals caught removing natural resources from the parcel to the Wildlife Agencies, City, and/or sheriff's office.

5.3.9 Hazardous Materials Monitoring

The release of hazardous materials such as fuels, oil, vegetation clippings, trash, and landscaping related chemicals (e.g., pesticides and herbicides) has potential to affect the parcel habitat negatively. Although no specific survey will be conducted, if such hazardous materials are observed during the annual monitoring visits, remedial measures to remove the material will be taken.

5.4 MANAGEMENT CONSTRAINTS

This RMP follows the regulatory and permitting requirements of the Wildlife Agencies and City. Although it anticipates measures for most foreseeable contingencies, several external constraints remain. For example, illegal trespassing could negatively impact sensitive animal species; and environmental factors, such as prolonged drought, could have detrimental effects on vegetation.

5.5 CHANGES/AMENDMENTS

The Resource Manager will have discretion in the use of adaptive management actions deemed necessary for management under this RMP. Each annual report will identify actions taken during the previous year and specifically identify any deviations from the RMP. Additionally, each annual workplan will identify proposed management changes that would be employed in the upcoming year. Any proposed changes or amendments to the RMP (allowable uses, reporting schedules, goal revisions, etc.) would require prior approval from the City and the Wildlife Agencies.

Additionally, the City and Wildlife Agencies would be immediately notified in the event of major issues (e.g. management failure, transference of management responsibility, insufficient endowment funds, extreme landform changes, etc.) that would be outside the realm of normal land management and standard adaptive management techniques identified in the RMP.

6.0 LIST OF PREPARERS

The following individuals contributed to the preparation of this report.

Greg Mason	B.S., Natural Resources Planning & Interpretation, Humboldt State University, 1992
Deborah Clayton	B.A., Resource/Environmental Geography, San Diego State University, 1990
Justin Palmer	B.A., Geography, San Diego State University, 2001

7.0 REFERENCES

Bowman, R. 1973. Soil Survey of the San Diego Area. U.S. Department of Agriculture in cooperation with the USDI, UC Agricultural Experiment Station, Bureau of Indian Affairs, Department of the Navy, and the U.S. Marine Corps.

Jackson, L. 1985. Ecological origins of California's Mediterranean grasses. *Journal of Biogeography* 12: 349-361.

Oberbauer, Thomas, Meghan Kelly, and Jeremy Buegge. March 2008. Draft Vegetation Communities of San Diego County. Based on “Preliminary Descriptions of the Terrestrial Natural Communities of California”, Robert F. Holland, Ph.D., October 1986.

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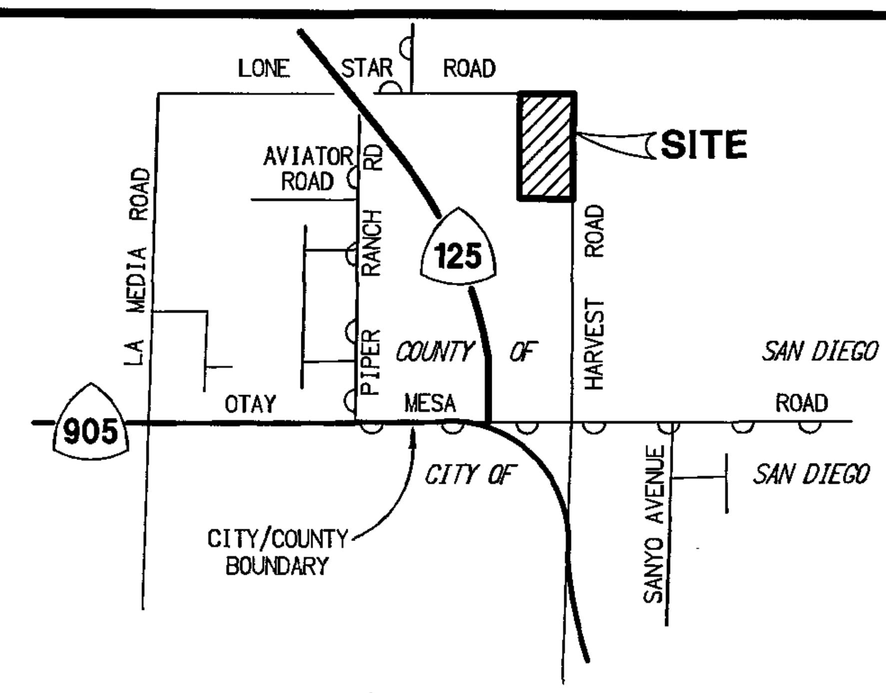
Appendix A

RECORD OF SURVEY FIGURE

R. OF S. MAP NO. 20029



VICINITY MAP

NO SCALE

RECORD OF SURVEY

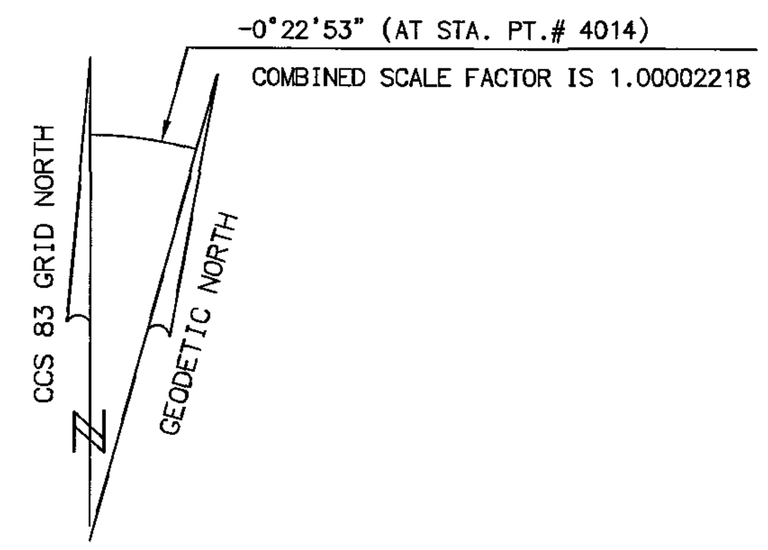
PARCEL 1 OF PARCEL MAP NO. 7808, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, SEPTEMBER 7, 1978.

BASIS OF BEARINGS

THE BASIS OF BEARINGS FOR THIS SURVEY IS THE NAD 83, ZONE 6, EPOCH 1991.35, GRID BEARING BETWEEN STATION PT.# 5109 AND STATION PT.# 4014, BOTH HAVING A CALIFORNIA COORDINATE VALUE OF FIRST ORDER ACCURACY OR BETTER, AS SAID CONTROLS ARE SHOWN IN R.O.S. 14841.
I.E., N88°52'07"W.

QUOTED BEARINGS FROM REFERENCE MAPS/DEEDS MAY OR MAY NOT BE IN TERMS OFSAID SYSTEM.

GRID DISTANCE = GROUND DISTANCE x COMBINED SCALE FACTOR



SURVEYOR'S STATEMENT

THIS MAP CORRECTLY REPRESENTS A SURVEY MADE BY ME OR UNDER MY DIRECTION IN CONFORMANCE WITH THE REQUIREMENTS OF THE PROFESSIONAL LAND SURVEYOR'S ACT AT THE REQUEST OF SUNROAD ENTERPRISES, AUGUST 20, 2007 THROUGH SEPTEMBER 28, 2007.

01-03-2008

JOSEPH G. CRESTO — DATE
PLS 8050

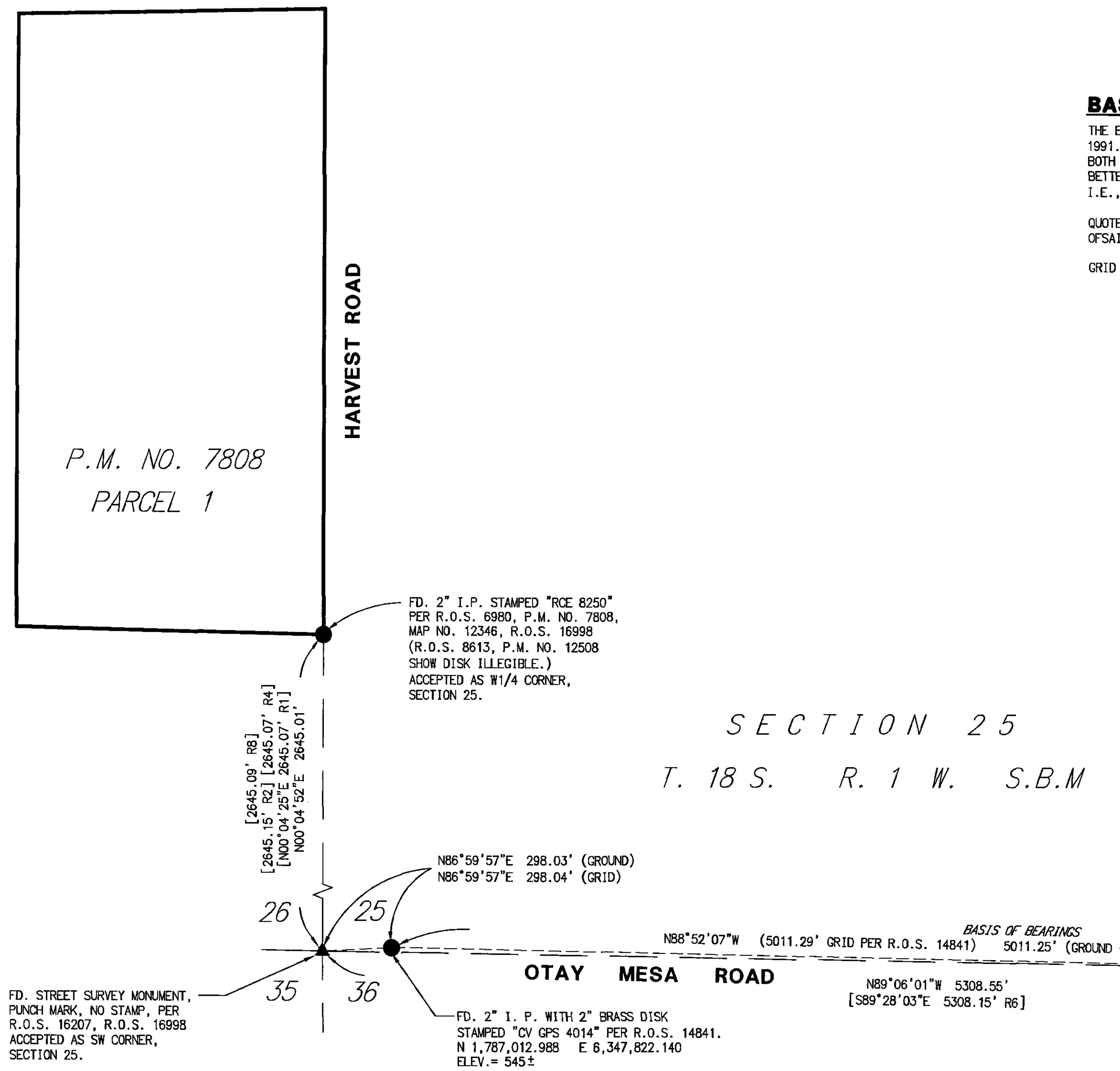
LICENSED LAND SURVEYOR JOSEPH G. CRESTO No. 8050 Exp. 12-31-09 STATE OF CALIFORNIA

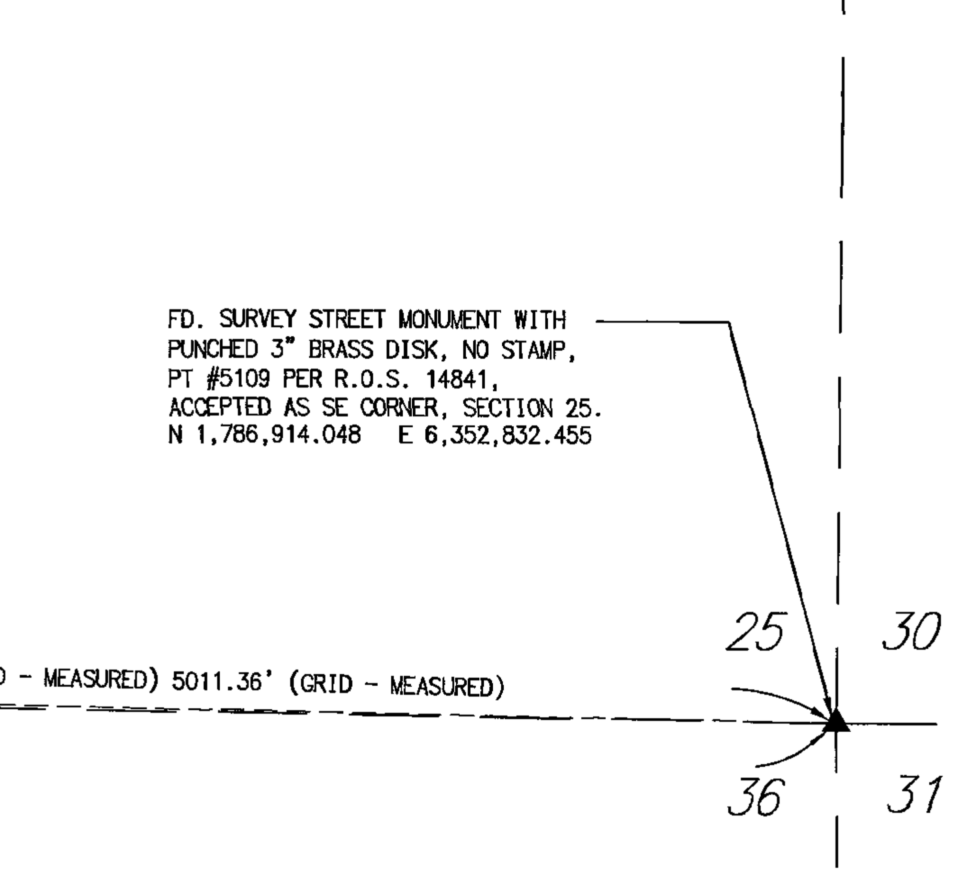
COUNTY SURVEYOR'S STATEMENT

THIS MAP HAS BEEN EXAMINED IN ACCORDANCE WITH SECTION 8766 OF THE PROFESSIONAL LAND SURVEYORS ACT, THIS 8th DAY OF JANUARY, 2008.

TERRENCE T. CONNORS
COUNTY SURVEYOR
PLS 5099

LICENSED LAND SURVEYOR TERRENCE T. CONNORS 5099 Expires 6/30/09 STATE OF CALIFORNIA





NAD83 DETAIL

RECORDER'S CERTIFICATE

FILE NO. 2008-0013512

FILED THIS 11th DAY OF January, 2008, AT 10:57 O'CLOCK A.M. IN BOOK OF RECORD OF SURVEY MAPS AT PAGE — AT THE REQUEST OF JOSEPH G. CRESTO.

GREGORY J. SMITH
COUNTY RECORDER

BY: DEPUTY COUNTY RECORDER

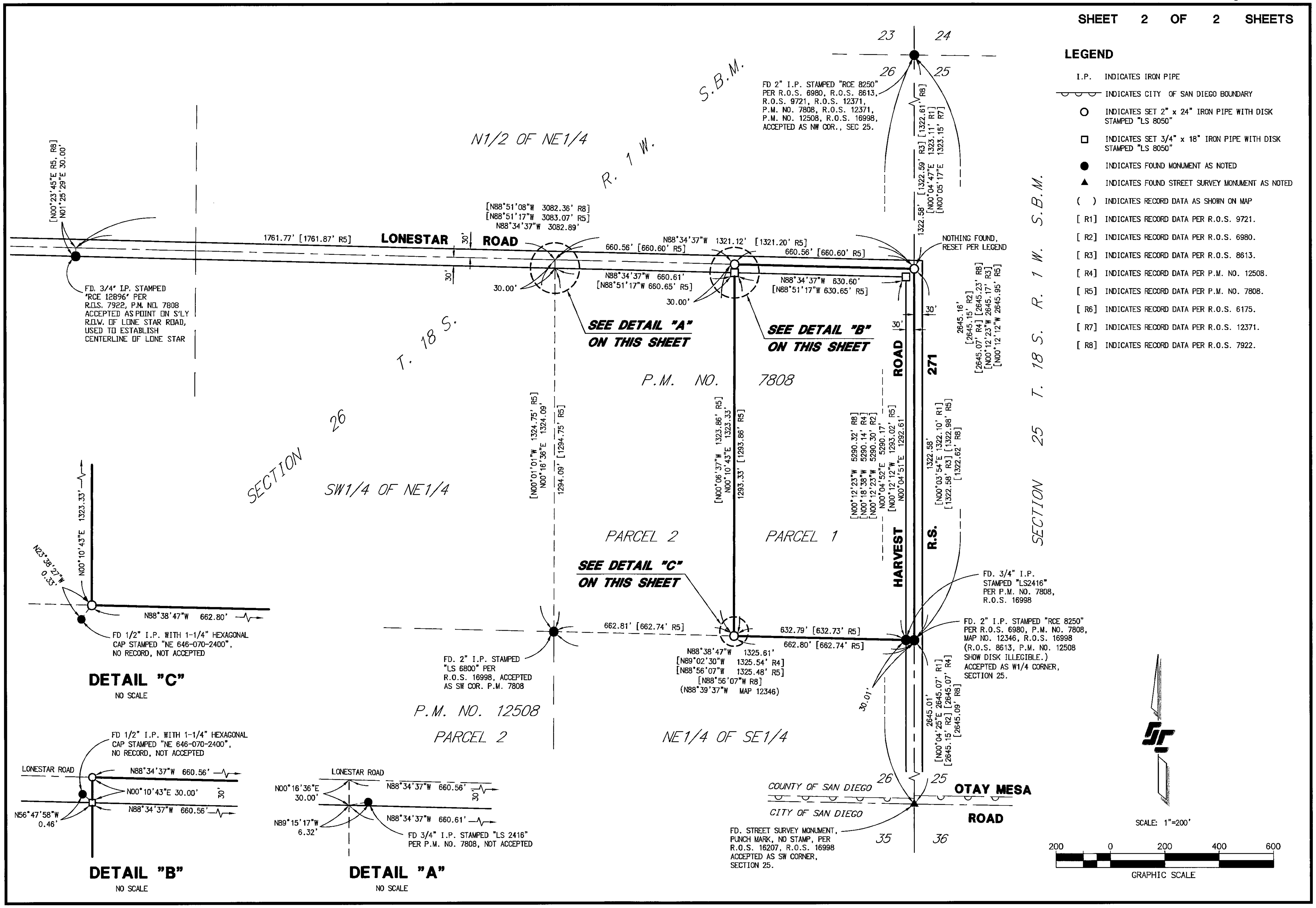
FEE: $10.00

Prepared by: STEVENS CRESTO ENGINEERING, INC.
JN 07001.03 DWG. NO.7001ros1

APN 646-070-23

CALIF.COORD.INDEX 146-1779

R. OF S. MAP NO. 20029

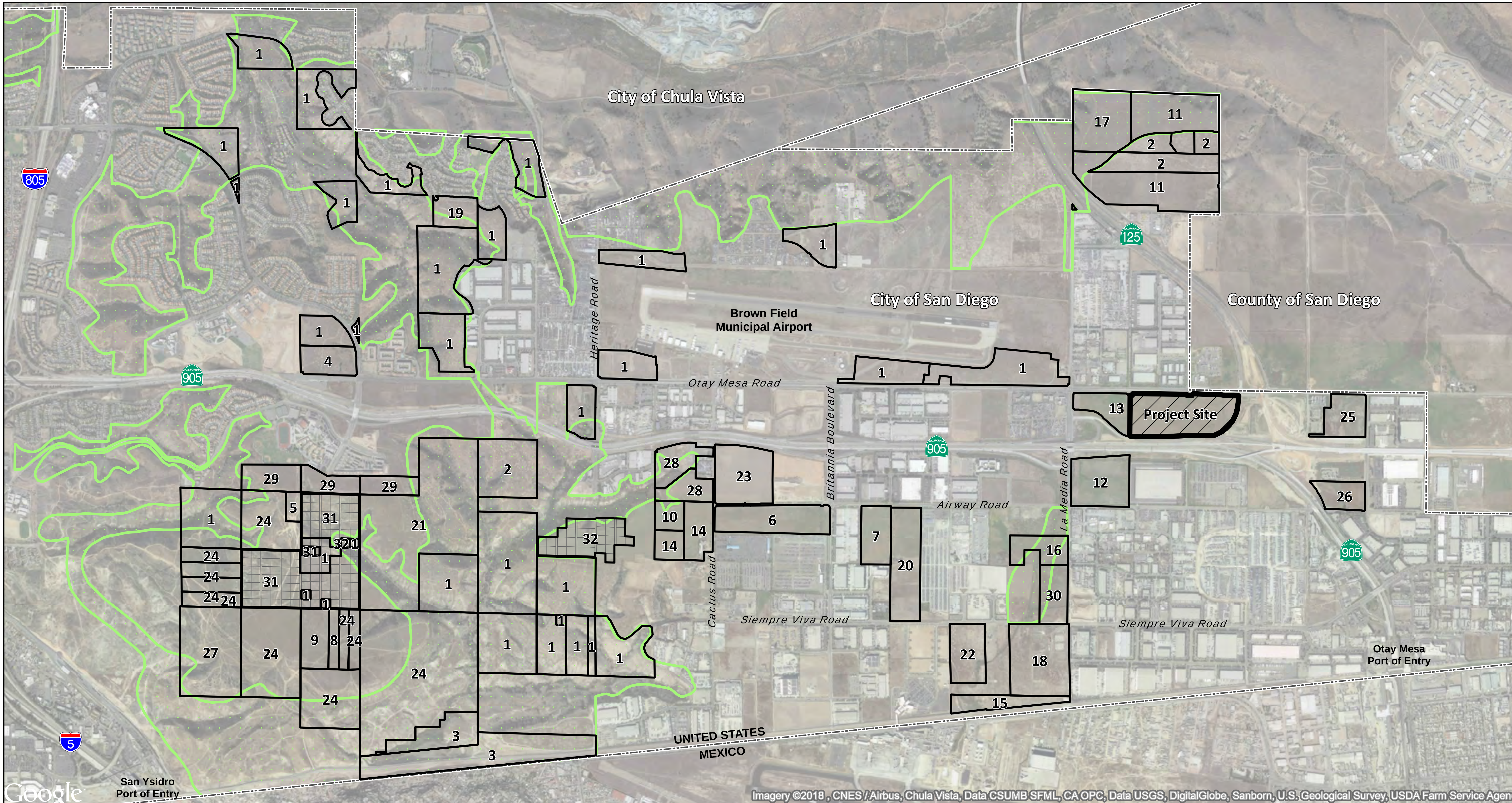


Prepared by: STEVENS CRESTO ENGINEERING, INC.
JN 07001.03 DWG. NO.7001ros2

APN 646-070-23
CALIF.COORD.INDEX 146-1779

Appendix I

Search for Mitigation Parcels



Project Site
MHPA
Municipal Boundary
Potential Mitigation Parcels

0 1,250 2,500 Feet

ALDEN ENVIRONMENTAL, INC

Potential Mitigation Parcels

SUNROAD OTAY

Sunroad Otay-50
City of San Diego/Otay Mesa NNG Mitigation Parcel Search Results

Map No.	APN	Acres	Owner	Results
1	64504050	23.9	CITY OF SAN DIEGO	Government property, unavailable for acquisition.
	64504207	20.4	CITY OF SAN DIEGO	
	64505104	20.1	CITY OF SAN DIEGO	
	64506102	58.3	CITY OF SAN DIEGO	
	64507406	1.3	CITY OF SAN DIEGO	
	64507408	1.3	CITY OF SAN DIEGO	
	64507409	1.3	CITY OF SAN DIEGO	
	64507412	1.3	CITY OF SAN DIEGO	
	64507418	1.3	CITY OF SAN DIEGO	
	64507419	1.3	CITY OF SAN DIEGO	
	64507421	1.3	CITY OF SAN DIEGO	
	64507506	1.3	CITY OF SAN DIEGO	
	64507507	1.3	CITY OF SAN DIEGO	
	64507508	1.3	CITY OF SAN DIEGO	
	64507509	1.3	CITY OF SAN DIEGO	
	64507513	1.3	CITY OF SAN DIEGO	

Sunroad Otay-50
City of San Diego/Otay Mesa NNG Mitigation Parcel Search Results

Map No.	APN	Acres	Owner	Results
1	64507520	1.3	CITY OF SAN DIEGO	Government property, unavailable for acquisition.
	64507606	1.3	CITY OF SAN DIEGO	
	64508004	55.4	CITY OF SAN DIEGO	
	64508006	55.8	CITY OF SAN DIEGO	
	64508012	97.1	CITY OF SAN DIEGO	
	64509016	23.3	CITY OF SAN DIEGO	
	64511307	32.0	CITY OF SAN DIEGO	
	64523129	35.1	CITY OF SAN DIEGO	
	64524203	23.2	CITY OF SAN DIEGO	
	64524205	28.6	CITY OF SAN DIEGO	
	64528023	37.3	CITY OF SAN DIEGO	
	64529101	26.5	CITY OF SAN DIEGO	
	64538011	72.6	CITY OF SAN DIEGO	
	64605010	25.6	CITY OF SAN DIEGO	
	64605015	29.3	CITY OF SAN DIEGO	
	64605017	55.7	CITY OF SAN DIEGO	

Sunroad Otay-50
City of San Diego/Otay Mesa NNG Mitigation Parcel Search Results

Map No.	APN	Acres	Owner	Results
1	64605021	22.5	CITY OF SAN DIEGO	Government property, unavailable for acquisition.
	64605025	23.4	CITY OF SAN DIEGO	
	66704002	57.2	CITY OF SAN DIEGO	
	66704003	27.2	CITY OF SAN DIEGO	
	66704004	1.6	CITY OF SAN DIEGO	
	66704005	21.4	CITY OF SAN DIEGO	
	66704006	7.1	CITY OF SAN DIEGO	
	66705066	44.1	CITY OF SAN DIEGO	
2	64509024	55.8	STATE OF CALIFORNIA	Government property, unavailable for acquisition.
	64603018	22.3	STATE OF CALIFORNIA	
	64607043	35.9	STATE OF CALIFORNIA	
3	66704012	96.5	UNITED STATES OF AMERICA	Government property, unavailable for acquisition.
	66704014	35.9	UNITED STATES OF AMERICA	
4	64504041	26.0	BLUE MERCED R 1414 LLC	Unavailable.
5	64506105	7.1	CANDLELIGHT PROPERTIES LLC	Unavailable. Currently pursuing development project.

Sunroad Otay-50
City of San Diego/Otay Mesa NNG Mitigation Parcel Search Results

Map No.	APN	Acres	Owner	Results
6	64610074	51.8	CHANG JAW MIN TR	Unavailable. Also not within or adjacent to the MHPA and is proposed for park and other uses as part of the community plan.
7	64611019	28.1	CROWN ENTERPRISES INC	Unavailable. Also not within or adjacent to the MHPA.
8	66701021	10.1	DEXSTAR INC	Unavailable. In addition parcel is of insufficient size for project needs and is not within or adjacent to the MHPA.
9	66701014	27.5	HANDLER TRUST 08-27-83	Unavailable. Currently pursuing development project.
10	64610021	14.1	KAY MARK INC	Unavailable. Currently pursuing development project (Lumina).
11	64603026	56.4	KEARNY PCCP OTAY 311 LLC	Unavailable for purchase. Already components of other project mitigation.
	64607038	87.2	KEARNY PCCP OTAY 311 LLC	
12	64612135	46.7	LA MEDIA&AIRWAY LLC	Unavailable. Site heavily disturbed and undergoing activities.
13	64612134	24.3	LAS VEGAS SUNSET PROPERTIES	Unavailable. Currently pursuing development project.
14	64610018	14.1	MARTINEZ AGUSTIN REVOCABLE TRUST 05-21-03	Unavailable. Currently pursuing development project (Lumina).

Sunroad Otay-50
City of San Diego/Otay Mesa NNG Mitigation Parcel Search Results

Map No.	APN	Acres	Owner	Results
14	64610020	26.1	MARTINEZ AGUSTIN REVOCABLE TRUST 05-21-03	Unavailable. Currently pursuing development project (Lumina).
15	66706028	23.4	METROPOLITAN AIRPARK LLC	Unavailable. Anticipating future development project.
16	64611008	24.0	MILLER EUGENIA V 1985 TRUST	Unavailable. Also, insufficient NNG habitat to meet project needs.
17	64603025	57.3	OTAY BUSINESS PARK LLC	Unavailable. Already component of other project mitigation.
18	66706010	69.7	OTAY FAR EAST LLC	Unavailable. Anticipating future mitigation and development project.
19	64505004	21.7	OTAY MESA CROSSING LLC	Unavailable. Already component of other project mitigation.
20	64611039	54.8	OTAY MESA DEVELOPMEMT	Unavailable. Currently processing a development project. Also, Unavailable. Also not within or adjacent to the MHPA.
21	64508003	222.0	OTAY MESA LLC	Unavailable. Currently anticipating future development project (Bachmann).
22	66706011	34.1	OTAY-T J NORTH LLC	Unavailable. Currently pursuing development project (CBX).
23	64610077	53.4	PAEZ JOSEPH JR	Unavailable. Future Bachmann project.

Sunroad Otay-50
City of San Diego/Otay Mesa NNG Mitigation Parcel Search Results

Map No.	APN	Acres	Owner	Results
24	64506104	49.3	PARDEE HOMES	Unavailable. Anticipating future development project.
	64506106	14.3	PARDEE HOMES	
	64506107	14.3	PARDEE HOMES	
	64506108	14.4	PARDEE HOMES	
	64506109	14.4	PARDEE HOMES	
	66701006	86.4	PARDEE HOMES	
	66701015	57.2	PARDEE HOMES	
	66701019	10.9	PARDEE HOMES	
	66701020	9.5	PARDEE HOMES	
	66704013	230.8	PARDEE HOMES	
25	64613056	27.7	R FAMILY PROPERTIES II LLC	Unavailable. Planning future project. Also, not within or adjacent to the MHPA.
26	64613055	21.0	SAN DIEGO DEVELOPMENT GROUP	Unavailable. Planning future project. Surrounded by development, not within or adjacent to the MHPA, insufficient NNG habitat for project needs.
27	66701022	89.1	SAN YSIDRO 96 LLC	Insufficient NNG available for project needs.

Sunroad Otay-50
City of San Diego/Otay Mesa NNG Mitigation Parcel Search Results

Map No.	APN	Acres	Owner	Results
28	64610075	25.1	SESI DECEDENTS TRUST 01-19-95	Unavailable. Insufficient NNG for project needs.
28	64610076	20.9	SESI DECEDENTS TRUST 01-19-95	Unavailable. Currently pursuing development project (Lumina).
29	64506032	25.4	SOUTHVIEW LLC	Unavailable. Currently pursuing development project (Candlelight).
	64506035	19.8	SOUTHVIEW LLC	
	64508008	18.1	SOUTHVIEW LLC	
30	64611011	26.9	ZOURA FAMILY TRUST 10-08-09	Unavailable. Owner unwilling to sell and potentially seeking development project.
31	64507101	1.2	QUINATA SUSANA A LIVING TRUST	West Otay Mesa "1-acre Parcels." Multiple owners either unavailable to contact or unwilling to sell. Unrealistic to cobble together sufficient acreage to meet project needs.
	64507102	1.2	JABLONSKI SCOTT	
	64507103	1.2	ORTIZ MARY LIVING TRUST 05-23-16	
	64507104	1.2	COASTAL CAPITAL GROUP LLC ET AL	
	64507105	1.2	BAYVIEW LOAN SERVICING LLC	
	64507106	1.2	NEIL TIMOTHY Y	
	64507107	1.2	DELRIO RICARDO&NORMA	

Sunroad Otay-50
City of San Diego/Otay Mesa NNG Mitigation Parcel Search Results

Map No.	APN	Acres	Owner	Results
31	64507108	1.2	SANDOVAL ROBERT F&AVALOS	West Otay Mesa "1-acre Parcels." Multiple owners either unavailable to contact or unwilling to sell. Unrealistic to cobble together sufficient acreage to meet project needs.
	64507109	1.2	SANDOVAL GUILLERMO F	
	64507110	1.2	VENZON FAMILY TRUST 11-20-99	
	64507111	1.2	SANDOVAL GUILLERMO F	
	64507112	1.2	ORTIZ MARY LIVING TRUST 05-23-16	
	64507113	1.2	SAWAGED SAVANNAH H	
	64507114	1.2	WOLFGRAMM FAMILY TRUST 05-01-03	
	64507201	1.2	PREACHER RONDA R	
	64507202	1.2	GUZMAN-NEVAREZ MARCO A	
	64507203	1.2	LOMELI FAMILY TRUST 03-19-99	
	64507204	1.2	ORTIZ FAMILY TRUST 12-09-96	
	64507205	1.2	ORTIZ FAMILY TRUST 12-09-96	
	64507206	1.2	OROZCO JOSE M&MARTHA E	
	64507207	1.2	GARCIA FAMILY TRUST 09-17-01	

Sunroad Otay-50
City of San Diego/Otay Mesa NNG Mitigation Parcel Search Results

Map No.	APN	Acres	Owner	Results
31	64507208	1.2	GARCIA CARLOS R&ELIZABETH	West Otay Mesa "1-acre Parcels." Multiple owners either unavailable to contact or unwilling to sell. Unrealistic to cobble together sufficient acreage to meet project needs.
	64507209	1.2	PHAM HUNG VAN&THUOC THI REVOCABLE 2006 TRUST 11-08-06	
	64507210	1.2	VELEZ BARBARA A 2016 TRUST 04-07-16	
	64507211	1.2	WHEELER JOHN F&VIVIAN REVOCABLE INTERVIVOS TRUST 05-23-83	
	64507212	1.2	RAMOON HOLDINGS LLC	
	64507213	1.2	MORENO TRUST	
	64507214	1.2	PARDEE HOMES	
	64507301	1.2	AGUILAR MIGUEL <AKA MEJIA MIGUEL>	
	64507302	1.2	SALERNO RALPH N TRUST 04-26-06	
	64507303	1.2	PARDEE HOMES	
	64507304	1.2	MERCADO PEDRO G&JOSEFINA C	

Sunroad Otay-50
City of San Diego/Otay Mesa NNG Mitigation Parcel Search Results

Map No.	APN	Acres	Owner	Results
31	64507305	1.2	PARDEE HOMES	West Otay Mesa "1-acre Parcels." Multiple owners either unavailable to contact or unwilling to sell. Unrealistic to cobble together sufficient acreage to meet project needs.
	64507306	1.2	PARDEE HOMES	
	64507307	1.2	ALGERT JAMES H LIVING TRUST 01-05-06	
	64507308	1.2	PARDEE HOMES	
	64507309	1.2	BEAVER ESSIE M	
	64507310	1.2	PARDEE HOMES	
	64507311	1.2	PARDEE HOMES	
	64507312	1.2	SALERNO RALPH N TRUST 04-26-06	
	64507313	1.2	BURROLA ERNESTINA LIVING TRUST	
	64507314	1.2	ROMERO JUAN A&PILAR C	
	64507401	1.3	ROWE CELESTE M	
	64507402	1.3	FITZGERALD JOHN D&ELAINE M FAMILY TRUST	
	64507403	1.3	ALCARAZ TERESITA L TR	

Sunroad Otay-50
City of San Diego/Otay Mesa NNG Mitigation Parcel Search Results

Map No.	APN	Acres	Owner	Results
31	64507404	1.3	PARDEE HOMES	West Otay Mesa “1-acre Parcels.” Multiple owners either unavailable to contact or unwilling to sell. Unrealistic to cobble together sufficient acreage to meet project needs.
	64507405	1.3	PARDEE HOMES	
	64507407	1.3	VALDIVIA HILARIO G&MARIA G REVOCABLE 1997 TRUST 06-13-97	
	64507410	1.3	VELEZ BARBARA A 2016 TRUST 04-07-16	
	64507411	1.3	GARCIA JOSE A&ROSA&GARCIA GUADALUPE D P	
	64507413	1.3	SHIBUYA YOSHINDO&BETTY T TRUST 06-16-82	
	64507414	1.3	NGUYEN THUAN D	
	64507415	1.3	SALAZAR SALVADOR E	
	64507416	1.3	LUNA ROBERTO A	
	64507417	1.3	SANCHEZ JOSE M	
	64507420	1.3	MANZANO FRANCISCO J A&DEAGUILAR ELENA C	
	64507422	1.3	PARDEE HOMES	

Sunroad Otay-50
City of San Diego/Otay Mesa NNG Mitigation Parcel Search Results

Map No.	APN	Acres	Owner	Results
31	64507423	1.3	PARDEE HOMES	West Otay Mesa "1-acre Parcels." Multiple owners either unavailable to contact or unwilling to sell. Unrealistic to cobble together sufficient acreage to meet project needs.
	64507424	1.3	WINANS JOHN R TR	
	64507425	1.3	HUERTA CARMEN TRUST 06-14-07	
	64507426	1.3	ARROYO FAMILY TRUST 10-06-05	
	64507501	1.3	GANEM ALBERT F LIVING TRUST 01-07-92	
	64507502	1.3	LOMELI FAMILY TRUST 02-22-07	
	64507503	1.3	PARDEE HOMES	
	64507504	1.3	PARDEE HOMES	
	64507505	1.3	PARDEE HOMES	
	64507510	1.3	CASTRO RAMON&ROSA 2017 TRUST 08-23-17	
	64507511	1.3	SHIBUYA YOSHINDO&BETTY T TRUST 06-16-82	
	64507512	1.3	PULIDO LIVING TRUST 12-12-06	
	64507514	1.3	ARELLANO BURGUENO CORP	

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City of San Diego/Otay Mesa NNG Mitigation Parcel Search Results

Map No.	APN	Acres	Owner	Results
31	64507515	1.3	LIERAS MANUEL&MARY C	West Otay Mesa "1-acre Parcels." Multiple owners either unavailable to contact or unwilling to sell. Unrealistic to cobble together sufficient acreage to meet project needs.
	64507516	1.3	RODRIGUEZ FAMILY TRUST 10-09-02	
	64507517	1.3	SALAZAR SALVADOR E	
	64507518	1.3	NDIBA SAMUEL&NGETHE TERISIA N	
	64507519	1.3	VALDIVIA LETICIA	
	64507521	1.3	PARDEE HOMES	
	64507522	1.3	BRAMBILA GUILLERMO&ROSIE	
	64507523	1.3	PARDEE HOMES	
	64507524	1.3	NELSON RICK V	
	64507525	1.3	GAMBOA MANUEL&SONIA	
	64507526	1.3	HUERTA M M TRUST 08-13-15	
	64507526	1.3	VILLAESCUSA TITO	
	64507601	1.3	FUZET MONIQUE TRUST 07-21-16	
	64507602	1.3	PARDEE HOMES	

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City of San Diego/Otay Mesa NNG Mitigation Parcel Search Results

Map No.	APN	Acres	Owner	Results
31	64507603	1.3	MUTSCHLER JOAN <AKA HOLTEL MARY J>	West Otay Mesa “1-acre Parcels.” Multiple owners either unavailable to contact or unwilling to sell. Unrealistic to cobble together sufficient acreage to meet project needs.
	64507604	1.3	DODD CHARLES	
	64507605	1.3	BLAS ANTONIO&BEATRIZ	
	64507607	1.3	PARDEE HOMES	
	64507608	1.3	ALVAREZ JOSE	
	64507609	1.3	SAN YSIDRO LAND TRUST 07-19-07	
	64507610	1.3	LOZANO RAYMOND S&MARTHA	
	64507611	1.3	NGUYEN NHATNAM	
	64507612	1.3	VELASQUEZ AMPARO S REVOCABLE TRUST 09-06-00	
	64507613	1.3	VELASQUEZ AMPARO S REVOCABLE TRUST 09-06-00	
	64507614	1.3	ALCARAZ TERESITA L TR	
	64507615	1.3	BENTON ANDREW W&MELISSA D	
	64507616	1.3	ORTIZ MARCELINO&TERESA	

Sunroad Otay-50
City of San Diego/Otay Mesa NNG Mitigation Parcel Search Results

Map No.	APN	Acres	Owner	Results
31	64507617	1.3	FELCO CONSTRUCTION INC	West Otay Mesa "1-acre Parcels." Multiple owners either unavailable to contact or unwilling to sell. Unrealistic to cobble together sufficient acreage to meet project needs.
	64507618	1.3	LEE MICHAEL	
	64507619	1.3	AISPURO TRUST 05-01-14	
	64507620	1.3	PARDEE HOMES	
	64507621	1.3	HATTIE DAVISSON PROPERTIES LP	
	64507622	1.3	PARDEE HOMES	
	64507623	1.3	GUTIERREZ FAMILY LIVING TRUST 06-14-17	
	64507624	1.3	GARCIA MANUEL A	
	64507625	1.3	FLORES JOSEPH V&GUADALUPE	
	64507625	1.3	LANGARICA HERIBERTO P	
	64507625	1.3	PERIMBETI PRAKASH	
	64507625	1.3	SALAZAR SALVADOR E	
	64507626	1.3	AYALA LUCIA M	
32	64510105	1.4	HATTIE DAVISSON PROPERTIES	Otay Mesa "Davisson" parcels. Unavailable. Anticipating future development project.

Sunroad Otay-50
City of San Diego/Otay Mesa NNG Mitigation Parcel Search Results

Map No.	APN	Acres	Owner	Results
32	64510106	1.4	HATTIE DAVISSON PROPERTIES	Otay Mesa "Davisson" parcels. Unavailable. Anticipating future development project.
	64510107	1.4	HATTIE DAVISSON PROPERTIES	
	64510108	1.4	HATTIE DAVISSON PROPERTIES	
	64510204	1.4	HATTIE DAVISSON PROPERTIES	
	64510205	1.4	HATTIE DAVISSON PROPERTIES	
	64510206	1.4	HATTIE DAVISSON PROPERTIES	
	64510207	1.4	HATTIE DAVISSON PROPERTIES	
	64510208	1.4	HATTIE DAVISSON PROPERTIES	
	64510209	1.4	HATTIE DAVISSON PROPERTIES	
	64510210	1.4	HATTIE DAVISSON PROPERTIES	
	64510303	1.4	HATTIE DAVISSON PROPERTIES	
	64510304	1.4	HATTIE DAVISSON PROPERTIES	
	64510305	1.4	HATTIE DAVISSON PROPERTIES	
	64510306	1.4	HATTIE DAVISSON PROPERTIES	
	64510307	1.4	HATTIE DAVISSON PROPERTIES	
	64510308	1.4	HATTIE DAVISSON PROPERTIES	

Sunroad Otay-50
City of San Diego/Otay Mesa NNG Mitigation Parcel Search Results

Map No.	APN	Acres	Owner	Results
32	64510309	1.4	HATTIE DAVISSON PROPERTIES	Otay Mesa "Davisson" parcels. Unavailable. Anticipating future development project.
	64510310	1.4	HATTIE DAVISSON PROPERTIES	
	64609105	1.3	HATTIE DAVISSON PROPERTIES	
	64609106	1.3	HATTIE DAVISSON PROPERTIES	
	64609107	1.3	CLARA DAVISSON PROPERTIES	
	64609108	1.3	CLARA DAVISSON PROPERTIES	
	64609109	1.3	CLARA DAVISSON PROPERTIES	
	64609110	1.3	CLARA DAVISSON PROPERTIES	
	64609111	1.3	HATTIE DAVISSON PROPERTIES	
	64609112	1.3	HATTIE DAVISSON PROPERTIES	
	64609114	1.3	HATTIE DAVISSON PROPERTIES	
	64609205	1.3	HATTIE DAVISSON PROPERTIES	
	64609208	1.3	HATTIE DAVISSON PROPERTIES	
	64609209	1.3	CLARA DAVISSON PROPERTIES	
	64609210	1.3	HATTIE DAVISSON PROPERTIES	

February 27, 2018
Project No: 17-04057

Karen Ruggels
President
KLR Planning
926 Camino De La Reina
San Diego, California 92108-3253
Via email: karen@klrplanning.com

Subject: Field Results for Cultural Resources Survey for the Sunroad Otay Plaza Project, Otay Mesa, San Diego, California

Dear Ms. Ruggels:

This technical memo has been prepared to summarize the results of a cultural resources study of the Sunroad Otay Plaza Project, situated on Otay Mesa within the City of San Diego, California. The study was designed for compliance with the City's Historical Resources Regulations and the Historical Resources Guidelines (Price and Zepeda-Herman 2013); however, dense vegetation within the study area prevented a complete pedestrian survey of the project site. As such, this memo has been prepared to summarize the existing knowledge pertaining to cultural resources that may be impacted by project development and to provide recommendations based upon that knowledge.

PREVIOUS RESEARCH

The Sunroad Otay Plaza Project (Project) is located on 49.1 acres of vacant land within the Otay Mesa area of the City of San Diego. Numerous cultural resource studies have been performed on the mesa, including surveys, site evaluations, data recovery, and archaeological monitoring. These studies have resulted in the identification of more than 260 prehistoric, historical, and multi-component archaeological and historic built environment sites. The Otay Mesa Community Plan, originally prepared in 1983, includes a summary of the prior cultural resources research performed in the region between 1983 and 2013, when the cultural resources section of the plan was updated (Price and Zepeda-Herman 2013). The cultural resources report prepared for the Community Plan Update (CPU) covered an area of 9,319 acres on top of the mesa. A total of 262 historic and prehistoric sites/structures have been recorded within the Community Plan area boundaries.

Native American Scoping

Rincon requested a Sacred Lands File (SLF) search with the Native American Heritage Commission (NAHC) which returned negative results for the project site (Attachment A). The NAHC also provided a list of contacts that may have knowledge of the project site. Rincon mailed letters to the individuals listed in the NAHC response.

On April 27, 2017, Rincon received a letter from Ray Terah of the Viejas Band of Kumeyaay Indians requested that a Kumeyaay cultural monitor be onsite during ground disturbing activities.

On May 8, 2017, Rincon received a letter from Ralph Goff of the Campo Band of Mission Indians requesting the site plans and any current records search information and that a survey be conducted if the site had never been surveyed before.

On May 15, 2017, Rincon received a letter from the San Pasquel Band of Mission Indians stating that the project site is outside of their reservation and they had no information for the project site regarding sacred site.

As of February 27, 2018, Rincon has not received any additional responses from the Native American contacts.

Cultural Resources Records Search

A records search performed at the South Coastal Information Center (SCIC) for the current study identified 94 previously recorded sites located within one-half mile of the Project site (Attachment A). Of these, 15 are situated adjacent to the project site and four (4) (P-37-016525, P-37-016526, CA-SDI-10735 and CA-SDI-12337) are situated within the project site itself. The four previously recorded archaeological sites located within the current project site boundaries have been subsumed under a single trinomial designation (CA-SDI-12337) by SCIC. Table 1 provides summary information for the sites.

Table 1. Previously Recorded Sites within the Sunroad Otay Plaza Project Boundary

Site Number	*Site Type*	*Recorder*	*Eligibility Status in CPU*
CA-SDI-10735	Prehistoric lithic quarry	Cook and Elling (1987)	Undetermined – subsumed under CA-SDI-12337
CA-SDI-12337	Prehistoric lithic scatter/toolstone procurement location (quarry) with ground stone, shell and fire-affected rock (FAR)	Blotner (2010) Robbins-Wade et al. (2007) Robbins-Wade et al. (2004) Robbins-Wade et al. (2006) Robbins-Wade et al. (2002) Kyle, NiGhabhlain, and Tift (1995) Gross (1993) Rosen (1989)	Not significant
P-37-0016525	Isolate (flake)	Wade (1998a)	Subsumed under CA-SDI-12337
P-37-0016526	Isolate (core)	Wade (1998b)	Subsumed under CA-SDI-12337

Previous Studies of CA-SDI-12237

CA-SDI-12237, also known as the Lonestar Site, is a large prehistoric lithic scatter or lithic procurement location (toolstone quarry) with associated ground stone, shell and fire-affected rock (FAR) that covers more than 700 acres on Otay Mesa. Originally recorded as seven individual resources (five prehistoric sites and two prehistoric isolates), CA-SDI-12337 has been documented and portions of it subjected to archaeological testing (Byrd et. al. 1994, Kyle et al. 1996, Cook and Elling 1997, Cupples and Eidness 1978, Kyle and Gallegos 1992a-e). Through various survey and testing efforts, it has been determined that these individual resources represent a single, expansive lithic scatter or quarry site covering the mesa top. Testing has determined that CA-SDI-12337 represents a predominantly surface manifestation with limited, discrete pockets of intact subsurface cultural deposits.

Site CA-SDI-12337 was originally documented by Rosen (1989) as CA-SDI-10072, CA-SDI-5352, CA-SDI-9974 and CA-SDI-10735. Each of these sites was populated by flakes, cores, tools, ground stone, marine shell, and FAR. Rosen measured the total area for CA-SDI-12337 as covering an area of more than 6 million square meters (or roughly 625 hectares) and stated that the actual size of the site may exceed that figure. Documentation for both CA-SDI-10072 and CA-SDI-12237 was updated by Gross in 1989 and 1993, respectively. The portion of CA-SDI-10072 near the intersection of Otay Mesa Road and Harvest Road was found to be negative for artifacts (Kyle et al. 1996). The portion of CA-SDI-12337 at the intersection of Harvest Road and Otay Mesa Road was surveyed in 1993 and also found to be negative for artifacts.

Later, CA-SDI-12337 was updated in 1995 by Kyle et al. (1996) as a large lithic scatter with localized lithic concentrations and habitation debris covering an area of more than 6 million square meters. Subsurface archaeological testing of two loci identified during Kyle's survey resulted in the identification of limited subsurface archaeological deposits to a maximum depth of 70 centimeters and historical deposits to a maximum depth of 40 centimeters below the ground surface (cmbs).

Robbins-Wade et al. conducted survey on Otay Mesa in 2002. The survey resulted in the preparation of a site update for CA-SDI-12337 to include an 80-acre previously recorded site (the Lin Site) located in the northern half of Section 35 on the Otay Mesa 1955 USGS 1:24,000-scale USGS quadrangle. It does not appear that the Lin Site had a stand-alone trinomial designation or primary number before being subsumed within the boundaries of CA-SDI-12337. Robbins-Wade updated the documentation for CA-SDI-12337 again in 2006 to include a newly identified component composed of cores, a hammerstone, and 16 flakes. Robbins-Wade's 2006 update also includes a statement that previous testing of CA-SDI-12337 has exhausted the resource's research potential. In addition, Robbins-Wade prepared a site form update to incorporate CA-SDI-17105, a lithic scatter, into CA-SDI-12337. Portions of CA-SDI-12337 were encountered again during a survey for the California Crossings Project (Robbins-Wade 2007); no additional information about CA-SDI-12337 was obtained during this study.

The most recent site form update for CA-SDI-12337 was prepared by Blotner (2010) during a cultural resources assessment to support San Diego Gas & Electric maintenance to Tie Line 649 on Otay Mesa. Additional artifacts were identified by Blotner outside of the previously recorded boundaries for CA-SDI-12337 and the site form was updated to include the expanded site area.

Numerous subsurface testing studies have been performed of CA-SDI-12237, all of which have determined the site to be predominantly a surface manifestation of prehistoric quarrying activity. Eligibility evaluations performed within the 700-acre site area have identified little subsurface deposition. Testing programs have been completed by Cupples and Eidness (1978), Kyle and Gallegos (1992a-e), and Byrd et al. (1994). Testing by Kyle et al. (1996) identified subsurface cultural deposits in a portion of CA-SDI-12337 located to the east of the current project. Artifacts were identified up to a maximum of 70 cmbs and historic debris to a depth of 40 cmbs (Kyle et al. 1996). Kyle et al. recommended the site as ineligible and stated no further work was required.

The Byrd et al. study tested approximately 400 acres of the site in 1994 prior to the development of State Route 125. Byrd's testing program yielded a paucity of artifacts with limited subsurface deposits located up 60 cmbs. Byrd determined CA-SDI-12337 not eligible for listing in the National Register of Historic Places (NRHP). CA-SDI-12337 is listed as not significant in the CPU.

RESULTS OF CURRENT FIELDWORK

On April 4, 2017, a Rincon archaeologist and Native American monitor attempted to conduct a pedestrian survey of the Project site. Vegetation on the project site was noted to be very thick (90%+) and tall, preventing standard survey transects from being completed. The survey crew then shifted its strategy to inspect the project site for any exposed surfaces with greater ground visibility. Figures 1 and 2 display the dense vegetation noted at the project site. Only small voids were noted in the vegetation. No evidence of site CA-SDI-12337 or any other cultural resources could be seen within the dense vegetation covering the project site.

Figure 1. Vegetation cover on the Sunroad 50 Clearance Project, view to north

Figure 2. Vegetation cover on the Sunroad 50 Clearance Project with Otay Mesa Road along right side of frame, view to east

RECOMMENDATIONS

Previous studies of CA-SDI-12337 have determined this expansive archaeological site represents a surface manifestation of artifacts and not eligible for the NRHP or the California Register of Historical Resources (CRHR) (Gallegos et al. 1998, Castells & Becker 2016). The Otay Mesa CPU notes that the site is not significant and recommends no further study of this resource. Per the CPU:

> Resources found to be non-significant as a result of a survey and/or assessment will require no further work beyond documentation of the resources on the appropriate Department of Parks and Recreation (DPR) site forms and inclusion of results in the survey and/or assessment report.

Based upon the results of previous research at CA-SDI-12337, Rincon concurs that the data potential for CA-SDI-12337 has been exhausted. It should be noted that site CA-SDI-12337 covers multiple parcels and the conclusions of significance presented in the Otay Mesa CPU pertain to the portion of CA-SDI-12337 within the current project site. As such, no site testing or mitigation (data recovery or monitoring) at CA-SDI-12337 are recommended for the current project. Based on the previous NRHP/CRHR eligibility determination of site CA-SDI-12337, Rincon recommends a finding of ***no impact to historical resources*** under CEQA for the current project. The following measures are recommended in the case of unanticipated discoveries during project execution.

Unanticipated Discovery of Cultural Resources

If cultural resources are encountered during ground-disturbing activities, work in the immediate area must halt and an archaeologist meeting the Secretary of the Interior's Professional Qualifications Standards for archaeology (National Park Service 1983) should be contacted immediately to evaluate the find. If the discovery proves to be significant under NHPA, additional work such as data recovery excavation may be warranted.

Unanticipated Discovery of Human Remains

If human remains are found, State of California Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the county coroner has made a determination of origin and disposition pursuant to Public Resources Code Section 5097.98. In accordance with this code, in the event of an unanticipated discovery of human remains, the San Diego County Coroner would be notified immediately. If the human remains are determined to be prehistoric, the Coroner will notify the Native American Heritage Commission, which will determine and notify a most likely descendant (MLD). The MLD would complete the inspection of the APE within 48 hours of notification and may recommend scientific removal and nondestructive analysis of human remains and items associated with Native American burials.

If you have any questions regarding the current archaeological study or the recommendations provided herein, please do not hesitate to contact us.

Sincerely,
Rincon Consultants, Inc.

Catherine A. Wright
Senior Archaeologist

Christopher Duran, M.A., RPA
Principal Investigator

REFERENCES

Blotner, N.
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Wade, Sue Ann

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1998b Site form for P-37-016526. Prepared for the City of San Diego, CA. Unpublished site form on file with the South Coastal Information Center, San Diego State University, San Diego, CA.

Attachment A

Native American Heritage Commission Letter
South Coastal Information Center Records Search Confirmation

NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691
(916) 373-3710
Fax (916) 373-5471

April 12, 2017

Daphne Douglas
Rincon Consultants, Inc.

Sent by E-mail: ddouglas@rinconconsultants.com

RE: Proposed Sunroad Otay 50 Project, Community of Otay Mesa; Otay Mesa USGS Quadrangle, San Diego County, California

Dear Ms. Douglas:

A record search of the Native American Heritage Commission (NAHC) *Sacred Lands File* was completed for the area of potential project effect (APE) referenced above with negative results. Please note that the absence of specific site information in the *Sacred Lands File* does not indicate the absence of Native American cultural resources in any APE.

Attached is a list of tribes culturally affiliated to the project area. I suggest you contact all of the listed Tribes. If they cannot supply information, they might recommend others with specific knowledge. The list should provide a starting place to locate areas of potential adverse impact within the APE. By contacting all those on the list, your organization will be better able to respond to claims of failure to consult. If a response has not been received within two weeks of notification, the NAHC requests that you follow-up with a telephone call to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from any of these individuals or groups, please notify me. With your assistance we are able to assure that our lists contain current information. If you have any questions or need additional information, please contact via email: gayle.totton@nahc.ca.gov.

Sincerely,

Gayle Totton

Gayle Totton, M.A., PhD.
Associate Governmental Program Analyst

Native American Heritage Commission
Native American Contact List
San Diego County
4/12/2017

Barona Group of the Capitan Grande
Clifford LaChappa, Chairperson
1095 Barona Road — Kumeyaay
Lakeside, CA, 92040
Phone: (619) 443 - 6612
Fax: (619) 443-0681
cloyd@barona-nsn.gov

Campo Kumeyaay Nation
Ralph Goff, Chairperson
36190 Church Road, Suite 1 — Kumeyaay
Campo, CA, 91906
Phone: (619)478-9046
Fax: (619)478-5818
rgoff@campo-nsn.gov

Ewiiaapaayp Band of Kumeyaay Indians
Robert Pinto, Chairperson
4054 Willows Road — Kumeyaay
Alpine, CA, 91901
Phone: (619)445-6315
Fax: (619)445-9126

Ewiiaapaayp Band of Kumeyaay Indians
Michael Garcia, Vice Chairperson
4054 Willows Road — Kumeyaay
Alpine, CA, 91901
Phone: (619) 445 - 6315
Fax: (619) 445-9126
michaelg@leaningrock.net

Iipay Nation of Santa Ysabel
Virgil Perez, Chairperson
P.O. Box 130 — Kumeyaay
Santa Ysabel, CA, 92070
Phone: (760)765-0845
Fax: (760)765-0320

Iipay Nation of Santa Ysabel
Clint Linton, Director of Cultural Resources
P.O. Box 507 — Kumeyaay
Santa Ysabel, CA, 92070
Phone: (760) 803 - 5694
cjlinton73@aol.com

Inaja Band of Mission Indians
Rebecca Osuna, Chairperson
2005 S. Escondido Blvd. — Kumeyaay
Escondido, CA, 92025
Phone: (760)737-7628
Fax: (760)747-8568

Jamul Indian Village of California
Erica Pinto, Chairperson
P.O. Box 612 — Kumeyaay
Jamul, CA, 91935
Phone: (619)669-4785
Fax: (619)669-4817

Kwaaymii Laguna Band of Mission Indians
Carmen Lucas,
P.O. Box 775 — Kumeyaay
Pine Valley, CA, 91962
Phone: (619)709-4207

La Posta Band of Diegueno Mission Indians
Gwendolyn Parada, Chairperson
8 Crestwood Road — Kumeyaay
Boulevard, CA, 91905
Phone: (619)478-2113
Fax: (619)478-2125
LP13boots@aol.com

La Posta Band of Diegueno Mission Indians
Javaughn Miller, Tribal Administrator
8 Crestwood Road — Kumeyaay
Boulevard, CA, 91905
Phone: (619) 478 - 2113
Fax: (619) 478-2125
jmiller@LPtribe.net

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed Sunroad Otay 50 Project, San Diego County.

Native American Heritage Commission
Native American Contact List
San Diego County
4/12/2017

Manzanita Band of the Kumeyaay Nation
Angela Elliott Santos, Chairperson
P.O. Box 1302 — Kumeyaay
Boulevard, CA, 91905
Phone: (619) 766 - 4930
Fax: (619) 766-4957

Manzanita Band of the Kumeyaay Nation
Nick Elliott, Cultural Resources Coordinator
P. O. Box 1302 — Kumeyaay
Boulevard, CA, 91905
Phone: (619) 766 - 4930
Fax: (619) 766-4957
nickmepa@yahoo.com

Mesa Grande Band of Mission Indians
Virgil Oyos, Chairperson
P.O Box 270 — Kumeyaay
Santa Ysabel, CA, 92070
Phone: (760)782-3818
Fax: (760)782-9092
mesagrandeband@msn.com

San Pasqual Band of Mission Indians
Allen E. Lawson, Chairperson
P.O. Box 365 — Kumeyaay
Valley Center, CA, 92082
Phone: (760)749-3200
Fax: (760)749-3876
allenl@sanpasqualtribe.org

San Pasqual Band of Mission Indians
John Flores, Environmental Coordinator
P. O. Box 365 — Kumeyaay
Valley Center, CA, 92082
Phone: (760) 749 - 3200
Fax: (760) 749-3876
johnf@sanpasqualtribe.org

Sycuan Band of the Kumeyaay Nation
Lisa Haws, Cultural Resources Manager
1 Kwaaypaay Court — Kumeyaay
El Cajon, CA, 92019
Phone: (619) 312 - 1935

Sycuan Band of the Kumeyaay Nation
Cody J. Martinez, Chairperson
1 Kwaaypaay Court — Kumeyaay
El Cajon, CA, 92019
Phone: (619)445-2613
Fax: (619)445-1927
ssilva@sycuan-nsn.gov

Viejas Band of Kumeyaay Indians
Julie Hagen,
1 Viejas Grade Road — Kumeyaay
Alpine, CA, 91901
Phone: (619) 445 - 3810
Fax: (619) 445-5337
jhagen@viejas-nsn.gov

Viejas Band of Kumeyaay Indians
Robert J. Welch, Chairperson
1 Viejas Grade Road — Kumeyaay
Alpine, CA, 91901
Phone: (619)445-3810
Fax: (619)445-5337
jhagen@viejas-nsn.gov

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed Sunroad Otay 50 Project, San Diego County.

South Coastal Information Center
San Diego State University
5500 Campanile Drive
San Diego, CA 92182-5320
Office: (619) 594-5682
www.scic.org
scic@mail.sdsu.edu

CALIFORNIA HISTORICAL RESOURCES INFORMATION SYSTEM
CLIENT IN-HOUSE RECORDS SEARCH

Company: Rincon

Company Representative: Daphne Douglas

Date: 4/5/2017

Project Identification: 17-04057 Sunroad 50 CEQA

Search Radius: 1/2 mile

Historical Resources: SELF

Trinomial and Primary site maps have been reviewed. All sites within the project boundaries and the specified radius of the project area have been plotted. Copies of the site record forms have been included for all recorded sites.

Previous Survey Report Boundaries: SELF

Project boundary maps have been reviewed. National Archaeological Database (NADB) citations for reports within the project boundaries and within the specified radius of the project area have been included.

Historic Addresses: SELF

A map and database of historic properties (formerly Geofinder) has been included.

Historic Maps: SELF

The historic maps on file at the South Coastal Information Center have been reviewed, and copies have been included.

Copies: 90

Hours: 5.5

This is not an invoice. Please pay from the monthly billing statement

The City of San Diego

PRIORITY DEVELOPMENT PROJECT (PDP) STORM WATER QUALITY MANAGEMENT PLAN (SWQMP) FOR

Sunroad Otay
Insert Permit Application Numbers
Drawing Number (If Applicable) & Internal Order Number (If Applicable)

ENGINEER OF WORK:

Nicholas Roberts, P.E. , 76010
Provide Wet Signature and Stamp Above Line

PREPARED FOR:

Sunroad Otay Partners, L.P.
4445 Eastgate Mall, Suite 400
San Diego, CA 92121
(858) 362-8500

PREPARED BY:

Kimley-Horn
401 B Street, Suite 600
San Diego, CA 92101
(619) 234-9411

DATE:

October 6, 2017

Approved by: City of San Diego Date

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TABLE OF CONTENTS

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ACRONYMS

APN	Assessor's Parcel Number
ASBS	Area of Special Biological Significance
BMP	Best Management Practice
CEQA	California Environmental Quality Act
CGP	Construction General Permit
DCV	Design Capture Volume
DMA	Drainage Management Areas
ESA	Environmentally Sensitive Area
GLU	Geomorphic Landscape Unit
GW	Ground Water
HMP	Hydromodification Management Plan
HSG	Hydrologic Soil Group
HU	Harvest and Use
INF	Infiltration
LID	Low Impact Development
LUP	Linear Underground/Overhead Projects
MS4	Municipal Separate Storm Sewer System
N/A	Not Applicable
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
PDP	Priority Development Project
PE	Professional Engineer
POC	Pollutant of Concern
SC	Source Control
SD	Site Design
SDRWQCB	San Diego Regional Water Quality Control Board
SIC	Standard Industrial Classification
SWPPP	Stormwater Pollutant Protection Plan
SWQMP	Storm Water Quality Management Plan
TMDL	Total Maximum Daily Load
WMAA	Watershed Management Area Analysis
WPCP	Water Pollution Control Program
WQIP	Water Quality Improvement Plan

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CERTIFICATION PAGE

Project Name: Sunroad Otay
Permit Application Number: Insert Permit Application Number

I hereby declare that I am the Engineer in Responsible Charge of design of storm water BMPs for this project, and that I have exercised responsible charge over the design of the project as defined in Section 6703 of the Business and Professions Code, and that the design is consistent with the requirements of the Storm Water Standards, which is based on the requirements of SDRWQCB Order No. R9-2013-0001 as amended by R9-2015-0001 and R9-2015-0100 (MS4 Permit).

I have read and understand that the City Engineer has adopted minimum requirements for managing urban runoff, including storm water, from land development activities, as described in the Storm Water Standards. I certify that this PDP SWQMP has been completed to the best of my ability and accurately reflects the project being proposed and the applicable source control and site design BMPs proposed to minimize the potentially negative impacts of this project's land development activities on water quality. I understand and acknowledge that the plan check review of this PDP SWQMP by the City Engineer is confined to a review and does not relieve me, as the Engineer in Responsible Charge of design of storm water BMPs for this project, of my responsibilities for project design.

Engineer of Work's Signature, PE Number & Expiration Date

Nicholas Roberts, P.E.
Print Name

Kimley-Horn and Associates, Inc.
Company

June 23, 2017
Date

Engineer's Stamp

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Project Name: **Sunroad Otay**

SUBMITTAL RECORD

Use this Table to keep a record of submittals of this PDP SWQMP. Each time the PDP SWQMP is re-submitted, provide the date and status of the project. In last column indicate changes that have been made or indicate if response to plancheck comments is included. When applicable, insert response to plancheck comments.

Submittal Number	Date	Project Status	Changes
1	2/17/17	◉ Preliminary Design/Planning/CEQA ○ Final Design	Initial Submittal
2	5/25/17	◉ Preliminary Design/Planning/CEQA ○ Final Design	Re-submittal
3	6/23/17	◉ Preliminary Design/Planning/CEQA ○ Final Design	Re-submittal
4	Enter a date.	◉ Preliminary Design/Planning/CEQA ○ Final Design	Click here to enter text.

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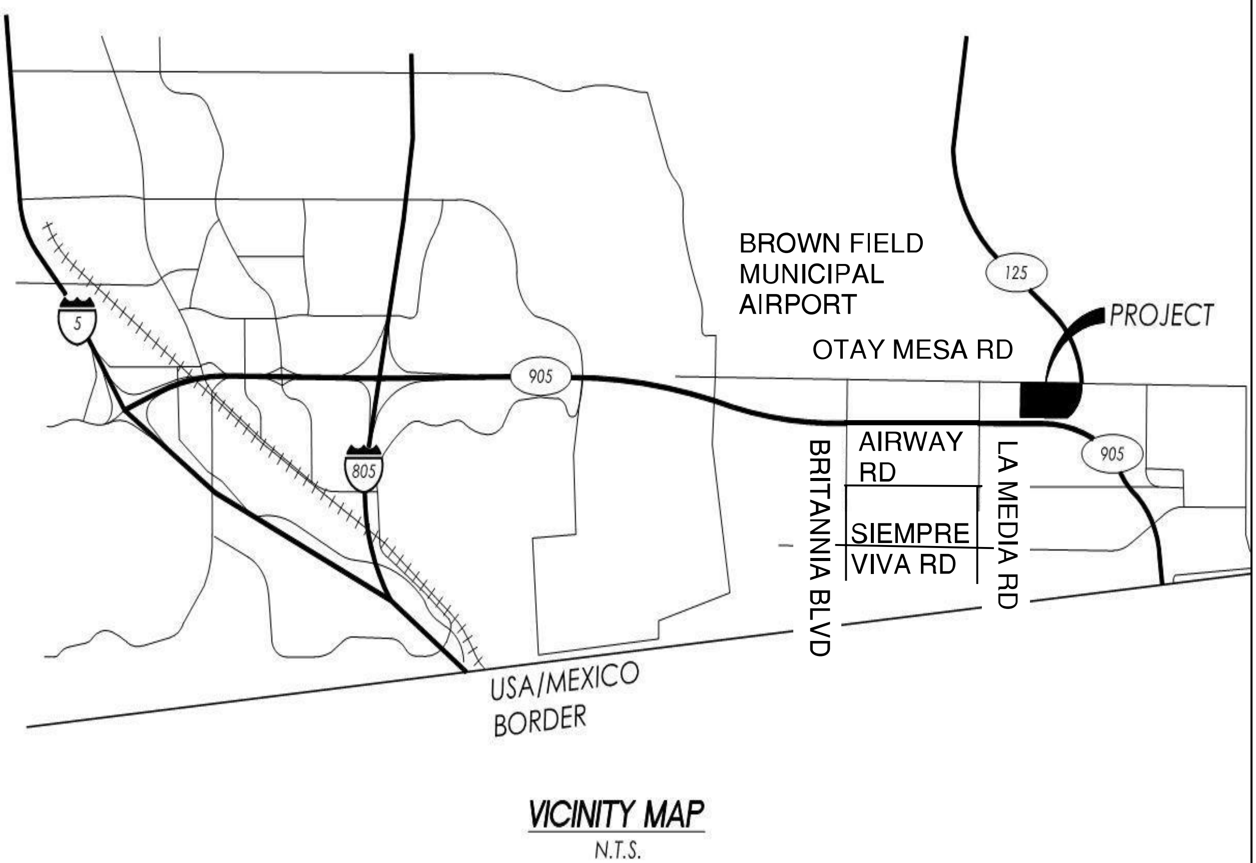
PROJECT VICINITY MAP

Project Name: Sunroad Otay
Permit Application Number: Insert Application Number.



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Project Name: Sunroad Otay

THE CITY OF SAN DIEGO	City of San Diego **Development Services** 1222 First Ave., MD-302 San Diego, CA 92101 (619) 446-5000	**Storm Water Requirements Applicability Checklist**	FORM **DS-560** February 2016

Project Address: Otay Mesa Rd., at Piper Ranch Rd San Diego, CA 92154	Project Number *(for the City Use Only)*: 538140

SECTION 1. Construction Storm Water BMP Requirements:

All construction sites are required to implement construction BMPs in accordance with the performance standards in the Storm Water Standards Manual. Some sites are additionally required to obtain coverage under the State Construction General Permit (CGP)[1], which is administrated by the State Water Resources Control Board.

For all projects complete PART A: If project is required to submit a SWPPP or WPCP, continue to PART B.

PART A: Determine Construction Phase Storm Water Requirements.

1. Is the project subject to California's statewide General NPDES permit for Storm Water Discharges Associated with construction activities, also known as the State Construction General Permit (CGP)? (Typically projects with land disturbance greater than or equal to 1 acre.)

   ◉ Yes; SWPPP required, skip questions 2-4 ○ No; next question

2. Does the project propose construction or demolition activity, including but not limited to, clearing, grading, grubbing, excavation, or any other activity that results in ground disturbance and contact with storm water runoff?

   ○ Yes; WPCP required, skip questions 3-4 ○ No; next question

3. Does the project propose routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of the facility? (projects such as pipeline/utility replacement)

   ○ Yes; WPCP required, skip questions 4 ○ No; next question

4. Does the project only include the following Permit types listed below?
   - Electrical Permit, Fire Alarm Permit, Fire Sprinkler Permit, Plumbing Permit, Sign Permit, Mechanical Permit, Spa Permit.
   - Individual Right of Way Permits that exclusively include one of the following activities and associated curb/ sidewalk repair: water services, sewer lateral, storm drain lateral, or dry utility service.
   - Right of Way Permits with a project footprint less than 150 linear feet that exclusively include only ONE of the following activities: curb ramp, sidewalk and driveway apron replacement, curb and gutter replacement, and retaining wall encroachments.

   ☐ Yes; no document required

Check one of the boxes to the right, and continue to PART B:

☒ If you checked "Yes" for question 1,
a SWPPP is REQUIRED. Continue to PART B

☐ If you checked "No" for question 1, and checked "Yes" for question 2 or 3,
a WPCP is REQUIRED. If the project processes less than 5,000 square feet of ground disturbance AND has less than a 5-foot elevation change over the entire project area, a Minor WPCP may be required instead. **Continue to PART B.**

☐ If you checked "No" for all question 1-3, and checked "Yes" for question 4
PART B **does not apply and no document is required. Continue to Section 2.**

More information on the City's construction BMP requirements as well as CGP requirements can be found at:
www.sandiego.gov/stormwater/regulations/swguide/constructing.shtml

PART B: Determine Construction Site Priority.
This prioritization must be completed within this form, noted on the plans, and included in the SWPPP or WPCP. The city reserves the right to adjust the priority of projects both before and after construction. Construction projects are assigned an inspection frequency based on if the project has a "high threat to water quality." The City has aligned the local definition of "high threat to water quality" to the risk. Determination approach of the Stat e Construction General Permit (CGP). The CGP determines risk level based on project specific sediment risk and receiving water risk. Additional inspection is required for projects within the Areas of Special Biological Significance (ASBS) watershed. **NOTE:** The construction priority does **NOT** change construction BMP requirements that apply to projects; rather, it determines the frequency of inspections that will be conducted by city staff.

Complete PART B and continued to Section 2

1. ☐ **ASBS**
   a. Projects located in the ASBS watershed. A map of the ASBS watershed can he found here *<placeholder for ASBS map link>*

2. ☒ **High Priority**
   a. Projects 1 acre or more determined to be Risk Level 2 or Risk Level 3 per the Construction General Permit and not located in the ASBS watershed.
   b. Projects 1 acre or more determined to be LUP Type 2 or LUP Type 3 per the Construction General Permit and not located in the ASBS watershed.

3. ☐ **Medium Priority**
   a. Projects 1 acre or more but not subject to an ASBS or high priority designation.
   b. Projects determined to be Risk Level 1 or LUP Type 1 per the Construction General Permit and not located in the ASBS watershed.

4. ☐ **Low Priority**
   a. Projects not subject to ASBS, high or medium priority designation.

SECTION 2. Permanent Storm Water BMP Requirements.

Additional information for determining the requirements is found in the Storm Water Standards Manual.

PART C: Determine if Not Subject to Permanent Storm Water Requirements.
Projects that are considered maintenance, or otherwise not categorized as "new development projects" or "redevelopment projects" according to the Storm Water Standards Manual are not subject to Permanent Storm Water BMPs.

If "yes" is checked for any number in Part C, proceed to Part F and check "Not Subject to Permanent Storm Water BMP Requirements".

If "no" is checked for all of the numbers in Part C continue to Part D.

1. Does the project only include interior remodels and/or is the project entirely within an existing enclosed structure and does not have the potential to contact storm water?	○ Yes ◉ No
2. Does the project only include the construction of overhead or underground utilities without creating new impervious surfaces?	○ Yes ◉ No
3. Does the project fall under routine maintenance? Examples include, but are not limited to: roof or exterior structure surface replacement, resurfacing or reconfiguring surface parking lots or existing roadways without expanding the impervious footprint, and routine replacement of damaged pavement (grinding, overlay, and pothole repair).	○ Yes ◉ No

PART D: PDP Exempt Requirements.

PDP Exempt projects are required to implement site design and source control BMPs.

If "yes" was checked for any questions in Part D, continue to Part F and check the box labeled "PDP Exempt."
If "no" was checked for all questions in Part D, continue to Part E.

1. Does the project ONLY include new or retrofit sidewalks, bicycle lanes, or trails that:

   • Are designed and constructed to direct storm water runoff to adjacent vegetated areas, or other non-erodible permeable areas? Or;
   • Are designed and constructed to be hydraulically disconnected from paved streets and roads? Or;
   • Are designed and constructed with permeable pavements or surfaces in accordance with the Green Streets guidance in the City's Storm Water Standards manual?

   ○ Yes; PDP exempt requirements apply ⦿ No; next question

2. Does the project ONLY include retrofitting or redeveloping existing paved alleys, streets or roads designed and constructed in accordance with the Green Streets guidance in the City's Storm Water Standards Manual?

   ○ Yes; PDP exempt requirements apply ⦿ No; PDP not exempt. PDP requirements apply.

PART E: Determine if Project is a Priority Development Project (PDP). Projects that match one of the definitions below are subject to additional requirements including preparation of a Storm Water Quality Management Plan (SWQMP).

If "yes" is checked for any number in PART E, continue to PART F and check the box labeled "Priority Development Project".
If "no" is checked for every number in PART E, continue to PART F and check the box labeled "Standard Project".

1.	**New Development that creates 10,000 square feet or more of impervious surfaces collectively over the project site.** This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.	⦿ Yes ○ No
2.	**Redevelopment project that creates and/or replaces 5,000 square feet or more of impervious surfaces on an existing site of 10,000 square feet or more of impervious surfaces.** This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.	○ Yes ⦿ No
3.	**New development or redevelopment of a restaurant.** Facilities that sell prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC 5812), and where the land development creates and/or replace 5,000 square feet or more of impervious surface.	○ Yes ⦿ No
4.	**New development or redevelopment on a hillside.** The project creates and/or replaces 5,000 square feet or more of impervious surface (collectively over the project site) and where the development will grade on any natural slope that is twenty-five percent or greater.	○ Yes ⦿ No

Project Name: Sunroad Otay

5.	**New development or redevelopment of a parking lot that creates and/or replaces 5,000 square feet or more of impervious surface (collectively over the project site).**	○ Yes ◉ No
6.	**New development or redevelopment of streets, roads, highways, freeways, and driveways.** The project creates and/or replaces 5,000 square feet or more of impervious surface (collectively over the project site).	○ Yes ◉ No
7.	**New development or redevelopment discharging directly to an Environmentally Sensitive Area.** The project creates and/or replaces 2,500 square feet of impervious surface (collectively over project site), and discharges directly to an Environmentally Sensitive Area (ESA). "Discharging- directly to" includes flow that is conveyed overland a distance of 200 feet or less from the project to the ESA, or conveyed in a pipe or open channel any distance as an isolated flow from the project to the ESA (i.e. not commingled with flows from adjacent lands).	○ Yes ◉ No
8.	**New development or redevelopment projects of a retail gasoline outlet that creates and/or replaces 5,000 square feet of impervious surface.** The development project meets the following criteria: (a) 5,000 square feet or more or (b) has a projected Average Daily Traffic of 100 or more vehicles per day.	○ Yes ◉ No
9.	**New development or redevelopment projects of an automotive repair shops that creates and/or replaces 5,000 square feet or more of impervious surfaces.** Development projects categorized in any one of Standard Industrial Classification (SIC) codes 5013, 5014, 5541, 7532-7534, or 7536-7539.	○ Yes ◉ No
10.	**Other Pollutant Generating Project.** The project is not covered in the categories above, results in the disturbance of one or more acres of land and is expected to generate pollutants post construction, such as fertilizers and pesticides. This does not include projects creating less than 5,000 sf of impervious surface and where added landscaping does not require regular use of pesticides and fertilizers, such as slope stabilization using native plants. Calculation of the square footage of impervious surface need not include linear pathways that are for infrequent vehicle use, such as emergency maintenance access or bicycle pedestrian use, if they are built with pervious surfaces of if they sheet flow to surrounding pervious surfaces.	○ Yes ◉ No

PART F: Select the appropriate category based on the outcomes of PART C through PART E.

1.	The project is **NOT SUBJECT TO STORM WATER REQUIREMENTS**.	☐
2.	The project is a **STANDARD PROJECT**. Site design and source control BMP requirements apply. See the Storm Water Standards Manual for guidance.	☐
3.	The project is **PDP EXEMPT**. Site design and source control BMP requirements apply. See the Storm Water Standards Manual for guidance.	☐
4.	The project is a **PRIORITY DEVELOPMENT PROJECT**. Site design, source control, and structural pollutant control BMP requirements apply. See the Storm Water Standards Manual for guidance on determining if project requires hydromodification management.	☒

Name of Owner or Agent *(Please Print)*: Click here to enter name.	Title: Click here to enter title
Signature:	Date: Insert Date

Applicability of Permanent, Post-Construction Storm Water BMP Requirements (Storm Water Intake Form for all Development Permit Applications)			**Form I-1**
Project Identification			
Project Name: Sunroad Otay			
Permit Application Number: Insert Application Number.			Date: 6/23/17
Determination of Requirements			
The purpose of this form is to identify permanent, post-construction requirements that apply to the project. This form serves as a short summary of applicable requirements, in some cases referencing separate forms that will serve as the backup for the determination of requirements. Answer each step below, starting with Step 1 and progressing through each step until reaching "Stop". Refer to Part 1 of Storm Water Standards sections and/or separate forms referenced in each step below.			
Step	Answer	Progression	
Step 1: Is the project a "development project"? See Section 1.3 of the BMP Design Manual (Part 1 of Storm Water Standards) for guidance.	◉ Yes	Go to Step 2.	
	○ No	Stop. Permanent BMP requirements do not apply. No SWQMP will be required. Provide discussion below.	
Discussion / justification if the project is not a "development project" (e.g., the project includes only interior remodels within an existing building): Click or tap here to enter text.			
Step 2: Is the project a Standard Project, Priority Development Project (PDP), or exception to PDP definitions? To answer this item, see Section 1.4 of the BMP Design Manual (Part 1 of Storm Water Standards) in its entirety for guidance, AND complete Storm Water Requirements Applicability Checklist.	○ Standard Project	Stop. Standard Project requirements apply.	
	◉ PDP	PDP requirements apply, including PDP SWQMP. Go to Step 3.	
	○ PDP Exempt	Stop. Standard Project requirements apply. Provide discussion and list any additional requirements below.	
Discussion / justification, and additional requirements for exceptions to PDP definitions, if applicable: Click or tap here to enter text.			

Form I-1 Page 2		
Step	Answer	Progression
Step 3. Is the project subject to earlier PDP requirements due to a prior lawful approval? See Section 1.10 of the BMP Design Manual (Part 1 of Storm Water Standards) for guidance.	○ Yes	Consult the City Engineer to determine requirements. Provide discussion and identify requirements below. Go to Step 4.
	◉ No	BMP Design Manual PDP requirements apply. Go to Step 4.
Discussion / justification of prior lawful approval, and identify requirements (not required if prior lawful approval does not apply): Click or tap here to enter text.		
Step 4. Do hydromodification control requirements apply? See Section 1.6 of the BMP Design Manual (Part 1 of Storm Water Standards) for guidance.	◉ Yes	PDP structural BMPs required for pollutant control (Chapter 5) and hydromodification control (Chapter 6). Go to Step 5.
	○ No	Stop. PDP structural BMPs required for pollutant control (Chapter 5) only. Provide brief discussion of exemption to hydromodification control below.
Discussion / justification if hydromodification control requirements do not apply: Click or tap here to enter text.		
Step 5. Does protection of critical coarse sediment yield areas apply? See Section 6.2 of the BMP Design Manual (Part 1 of Storm Water Standards) for guidance.	○ Yes	Management measures required for protection of critical coarse sediment yield areas (Chapter 6.2). Stop.
	◉ No	Management measures not required for protection of critical coarse sediment yield areas. Provide brief discussion below. Stop.
Discussion / justification if protection of critical coarse sediment yield areas does not apply: There is no CCSYA onsite or upstream.		

Project Name: **Sunroad Otay**

Site Information Checklist For PDPs	Form I-3B
Project Summary Information	
Project Name	Sunroad Otay
Project Address	Otay Mesa Road at Piper Ranch Road San Diego, CA 92154
Assessor's Parcel Number(s) (APN(s))	**646-290-04, 646-290-08, 646-290-17, 646-290-18, 646-290-19, 646-290-24, 646-290-25, 646-290-26, 646-290-27, 646-290-29, 646-290-31**
Permit Application Number	Click here to enter text.
Project Watershed	Select One: ○ San Dieguito River ○ Penasquitos ○ Mission Bay ○ San Diego River ○ San Diego Bay ◉ Tijuana River
Hydrologic subarea name with Numeric Identifier up to two decimal paces (9XX.XX)	Hydrologic Unit Tijuana 911, Subarea Tijuana Valley 911.1
Project Area (total area of Assessor's Parcel(s) associated with the project or total area of the right-of-way)	49.1 Acres (2,138,800 Square Feet)
Area to be disturbed by the project (Project Footprint)	53.3 Acres (2,320,440 Square Feet)
Project Proposed Impervious Area (subset of Project Footprint)	38.4 Acres (1,673,260 Square Feet)
Project Proposed Pervious Area (subset of Project Footprint)	10.7 Acres (465,540 Square Feet)
Note: Proposed Impervious Area + Proposed Pervious Area = Area to be Disturbed by the Project. This may be less than the Project Area.	
The proposed increase or decrease in impervious area in the proposed condition as compared to the pre-project condition.	821 %

Form I-3B Page 2 of 11
Description of Existing Site Condition and Drainage Patterns
Current Status of the Site (select all that apply): ☐ Existing development ☐ Previously graded but not built out ☐ Agricultural or other non-impervious use ☒ Vacant, undeveloped/natural Description / Additional Information: Click or tap here to enter text.
Existing Land Cover Includes (select all that apply): ☒ Vegetative Cover ☐ Non-Vegetated Pervious Areas ☒ Impervious Areas Description / Additional Information: Impervious areas compose of sidewalk and roadway along Otay Mesa Road.
Underlying Soil belongs to Hydrologic Soil Group (select all that apply): ☐ NRCS Type A ☐ NRCS Type B ☐ NRCS Type C ☒ NRCS Type D
Approximate Depth to Groundwater (GW): ○ GW Depth < 5 feet ○ 5 feet < GW Depth < 10 feet ◉ 10 feet < GW Depth < 20 feet ○ GW Depth > 20 feet
Existing Natural Hydrologic Features (select all that apply): ☐ Watercourses ☐ Seeps ☐ Springs ☐ Wetlands ☒ None Description / Additional Information: Click or tap here to enter text.

Form I-3B Page 3 of 11
Description of Existing Site Topography and Drainage:
How is storm water runoff conveyed from the site? At a minimum, this description should answer: 1. Whether existing drainage conveyance is natural or urban; 2. If runoff from offsite is conveyed through the site? If yes, quantification of all offsite drainage areas, design flows, and locations where offsite flows enter the project site and summarize how such flows are conveyed through the site; 3. Provide details regarding existing project site drainage conveyance network, including storm drains, concrete channels, swales, detention facilities, storm water treatment facilities, and natural and constructed channels; 4. Identify all discharge locations from the existing project along with a summary of the conveyance system size and capacity for each of the discharge locations. Provide summary of the pre-project drainage areas and design flows to each of the existing runoff discharge locations.
Description / Additional Information:
The project site is currently undeveloped and consists of a mixture of bare land and native vegetation. The existing site slopes from the northeast corner flowing southwest from where CA Route 125 meets Otay Mesa Road then flows west from Piper Ranch Road leading to a Caltrans storm drain inlet near the corner of La Media Road and Otay Mesa Road. Runoff then enters a channel system that directs flow under Interstate 905 and discharges indirectly to the Tijuana River.

Form I-3B Page 4 of 11
Description of Proposed Site Development and Drainage Patterns
Project Description / Proposed Land Use and/or Activities: The Sunroad Industrial Park project consists of industrial distribution centers on 49.1 acres located within the Otay Mesa community of San Diego, California. The 49.1-acre property is bounded by Otay Mesa Road to the north, CA Route 125 to the east, CA Route 905 to the south, and an undeveloped lot to the west.
List/describe proposed impervious features of the project (e.g., buildings, roadways, parking lots, courtyards, athletic courts, other impervious features): The proposed impervious features of the project include four industrial distribution centers along with parking areas, loading docks, and driveways.
List/describe proposed pervious features of the project (e.g., landscape areas): The proposed pervious features of the project include three biofiltration basins located on the west and southwest extents of the property, four biofiltration basins located between buildings 1 and 2, along with landscaped islands throughout the property's parking areas.
Does the project include grading and changes to site topography? ◉ Yes ○ No Description / Additional Information: The project is proposed to drain from the northeast corner to the southwest corner of the property, most of which will be conveyed through the southernmost biofiltration basin. The building pads will be graded with a half percent slope while the driveways and parking lots will be graded to carry water flows to the south and west to the biofiltration basins.

Form I-3B Page 5 of 11
Does the project include changes to site drainage (e.g., installation of new storm water conveyance systems)? ◉ Yes ○ No If yes, provide details regarding the proposed project site drainage conveyance network, including storm drains, concrete channels, swales, detention facilities, storm water treatment facilities, natural and constructed channels, and the method for conveying offsite flows through or around the proposed project site. Identify all discharge locations from the proposed project site along with a summary of the conveyance system size and capacity for each of the discharge locations. Provide a summary of pre and post-project drainage areas and design flows to each of the runoff discharge locations. Reference the drainage study for detailed calculations. Description / Additional Information: The project is proposed to drain from the northeast corner to the southwest corner of the property, most of which will be conveyed through the southernmost biofiltration basin. Portions of Buildings 1 and 2 will convey runoff into biofiltration areas in the center of the parking area between the buildings before continuing to the southern biofiltration basin. The southern half of Otay Mesa Road running next to the project will drain into curb inlets which will be conveyed to the western biofiltration basins along with a portion of Building 1 and eventually confluencing with the flow entering the southern basin, all of which will enter an existing drainage structure located by the Route 905 off-ramp for La Media Road.

Form I-3B Page 6 of 11
Identify whether any of the following features, activities, and/or pollutant source areas will be present (select all that apply): ☒ On-site storm drain inlets ☐ Interior floor drains and elevator shaft sump pumps ☐ Interior parking garages ☒ Need for future indoor & structural pest control ☒ Landscape/Outdoor Pesticide Use ☐ Pools, spas, ponds, decorative fountains, and other water features ☐ Food service ☐ Refuse areas ☒ Industrial processes ☒ Outdoor storage of equipment or materials ☐ Vehicle and Equipment Cleaning ☐ Vehicle/Equipment Repair and Maintenance ☐ Fuel Dispensing Areas ☒ Loading Docks ☐ Fire Sprinkler Test Water ☐ Miscellaneous Drain or Wash Water ☒ Plazas, sidewalks, and parking lots ☐ Large Trash Generating Facilities ☐ Animal Facilities ☐ Plant Nurseries and Garden Centers ☐ Automotive-related Uses Description / Additional Information: Click or tap here to enter text.

Project Name: Sunroad Otay

Form I-3B Page 7 of 11
Identification and Narrative of Receiving Water
Narrative describing flow path from discharge location(s), through urban storm conveyance system, to receiving creeks, rivers, and lagoons and ultimate discharge location to Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable) Runoff from the project will enter the existing storm drain system located at the southwest corner of the property which indirectly discharges to the Tijuana River, leads to the Tijuana River Estuary, and discharges out to the Pacific Ocean.
Provide a summary of all beneficial uses of receiving waters downstream of the project discharge locations. Industrial service supply, contact water recreation, non-contact water recreation, preservation of biological habitats of special significance, warm freshwater habitat, wildlife habitat, rare, threatened, or endangered species, commercial and sport fishing, estuarine habitat, marine habitat, migration of aquatic organisms, spawning, reproduction, and/or early development, and shellfish harvesting.
Identify all ASBS (areas of special biological significance) receiving waters downstream of the project discharge locations. None.
Provide distance from project outfall location to impaired or sensitive receiving waters. 3.5 miles to the Tijuana River.
Sumarize information regarding the proximity of the permanent, post-construction storm water BMPs to the City's Multi-Habitat Planning Area and environmentally sensitive lands The project is about 0.5 miles from a grassland Multi-Habitat Planning Area located southwest of the project site at the corner of La Media Road and Airway Road.

Form I-3B Page 8 of 11

Identification of Receiving Water Pollutants of Concern

List any 303(d) impaired water bodies within the path of storm water from the project site to the Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable), identify the pollutant(s)/stressor(s) causing impairment, and identify any TMDLs and/or Highest Priority Pollutants from the WQIP for the impaired water bodies:

303(d) Impaired Water Body	Pollutant(s)/Stressor(s)	TMDLs/ WQIP Highest Priority Pollutant
Tijuana River	Ammonia as Nitrogen, Benthic Community Effects, Eutrophic, Indicator Bacteria, Lead, Low Dissolved Oxygen, Nickel, Pesticides, Phosphorus, Sedimentation/Siltation, Selenium, Solids, Surfactants (MBAS), Synthetic Organics, Thallium, Total Nitrogen as N, Toxicity, Trace Elements, Trash	Eutrophic, Low Dissolved Oxygen, Pesticides, Phosphorus, Sedimentation/ Siltation, Selenium, Solids, Surfactants (MBAS), Synthetic Organics, Total Nitrogen as N, Toxicity, Trace Elements, Trash
Tijuana River Estuary	Eutrophic, Indicator Bacteria, Lead, Low Dissolved Oxygen, Nickel, Pesticides, pH, Solids, Synthetic Organics, Thallium, Trash, Turbidity	Eutrophic, Lead, Low Dissolved Oxygen, Nickel, Pesticides, Thallium, Trash, Turbidity
Pacific Ocean Shoreline, Tijuana HU, at Tijuana River mouth	Enterococcus, Fecal Coliform, Total Coliform	Enterococcus, Fecal Coliform, Total Coliform

Identification of Project Site Pollutants*

*Identification of project site pollutants is only required if flow-thru treatment BMPs are implemented onsite in lieu of retention or biofiltration BMPs (note the project must also participate in an alternative compliance program unless prior lawful approval to meet earlier PDP requirements is demonstrated)

Identify pollutants anticipated from the project site based on all proposed use(s) of the site (see BMP Design Manual (Part 1 of Storm Water Standards) Appendix B.6):

Pollutant	Not Applicable to the Project Site	Anticipated from the Project Site	Also a Receiving Water Pollutant of Concern
Sediment	○	○	⦿
Nutrients	○	⦿	○
Heavy Metals	○	○	⦿
Organic Compounds	○	○	⦿
Trash & Debris	○	○	⦿
Oxygen Demanding Substances	○	⦿	○
Oil & Grease	○	○	⦿
Bacteria & Viruses	○	○	⦿
Pesticides	○	⦿	○

Form I-3B Page 9 of 11
Hydromodification Management Requirements
Do hydromodification management requirements apply (see Section 1.6 of the BMP Design Manual)? ◉ Yes, hydromodification management flow control structural BMPs required. ○ No, the project will discharge runoff directly to existing underground storm drains discharging directly to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean. ○ No, the project will discharge runoff directly to conveyance channels whose bed and bank are concrete-lined all the way from the point of discharge to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean. ○ No, the project will discharge runoff directly to an area identified as appropriate for an exemption by the WMAA for the watershed in which the project resides. Description / Additional Information (to be provided if a 'No' answer has been selected above): Click or tap here to enter text.
Critical Coarse Sediment Yield Areas* *This Section only required if hydromodification management requirements apply
Based on Section 6.2 and Appendix H does CCSYA exist on the project footprint or in the upstream area draining through the project footprint? ○ Yes ◉ No, No critical coarse sediment yield areas to be protected based on WMAA maps Discussion / Additional Information: Click or tap here to enter text.

Form I-3B Page 10 of 11
Flow Control for Post-Project Runoff* *This Section only required if hydromodification management requirements apply
List and describe point(s) of compliance (POCs) for flow control for hydromodification management (see Section 6.3.1). For each POC, provide a POC identification name or number correlating to the project's HMP Exhibit and a receiving channel identification name or number correlating to the project's HMP Exhibit. The project site has one POC located in the southwest corner of the property connecting to the existing storm drain system.
Has a geomorphic assessment been performed for the receiving channel(s)? ○ No, the low flow threshold is 0.1Q2 (default low flow threshold) ○ Yes, the result is the low flow threshold is 0.1Q2 ○ Yes, the result is the low flow threshold is 0.3Q2 ◉ Yes, the result is the low flow threshold is 0.5Q2 If a geomorphic assessment has been performed, provide title, date, and preparer: Hydromodification Screening for the Sunroad 80 Project, May 14, 2012, Chang Consultants
Discussion / Additional Information: (optional) Results from the Hydromodification Screening study indicate a low threshold for vertical and later susceptibilities to erosion for each of the three study reaches, which is consistent with the in-site conditions. Therefore, the Southern California Coastal Water Research Project (SCCWRP) analyses and critical stress calculator demonstrate that the project can be designed assuming a low susceptibility to erosion, i.e., 0.5Q2.

Form I-3B Page 11 of 11
Other Site Requirements and Constraints
When applicable, list other site requirements or constraints that will influence storm water management design, such as zoning requirements including setbacks and open space, or local codes governing minimum street width, sidewalk construction, allowable pavement types, and drainage requirements. The project is located within light industrial zone. Setback requirements are 15' minimum for the front (20' standard), 10' minimum for the sides, 15' minimum from streets (20' standard), and no minimum for the rear (15' standard).
Optional Additional Information or Continuation of Previous Sections As Needed
This space provided for additional information or continuation of information from previous sections as needed. Click or tap here to enter text.

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Project Name: Sunroad Otay

Source Control BMP Checklist for All Development Projects			Form I-4
Source Control BMPs			
All development projects must implement source control BMPs SC-1 through SC-6 where applicable and feasible. See Chapter 4 and Appendix E of the BMP Design Manual (Part 1 of the Storm Water Standards) for information to implement source control BMPs shown in this checklist. Answer each category below pursuant to the following. • "Yes" means the project will implement the source control BMP as described in Chapter 4 and/or Appendix E of the BMP Design Manual. Discussion / justification is not required. • "No" means the BMP is applicable to the project but it is not feasible to implement. Discussion / justification must be provided. • "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project has no outdoor materials storage areas). Discussion / justification may be provided.			
Source Control Requirement	Applied?		
SC-1 Prevention of Illicit Discharges into the MS4	◉ Yes	○ No	○ N/A
Discussion / justification if SC-1 not implemented: Click or tap here to enter text.			
SC-2 Storm Drain Stenciling or Signage	◉ Yes	○ No	○ N/A
Discussion / justification if SC-2 not implemented: Click or tap here to enter text.			
SC-3 Protect Outdoor Materials Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	◉ Yes	○ No	○ N/A
Discussion / justification if SC-3 not implemented: Click or tap here to enter text.			
SC-4 Protect Materials Stored in Outdoor Work Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	◉ Yes	○ No	○ N/A
Discussion / justification if SC-4 not implemented: Click or tap here to enter text.			
SC-5 Protect Trash Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	◉ Yes	○ No	○ N/A
Discussion / justification if SC-5 not implemented: Click or tap here to enter text.			

Project Name: Sunroad Otay

Form I-4 Page 2 of 2			
Source Control Requirement	Applied?		
SC-6 Additional BMPs Based on Potential Sources of Runoff Pollutants (must answer for each source listed below)			
On-site storm drain inlets	◉ Yes	○ No	○ N/A
Interior floor drains and elevator shaft sump pumps	○ Yes	○ No	◉ N/A
Interior parking garages	○ Yes	○ No	◉ N/A
Need for future indoor & structural pest control	◉ Yes	○ No	○ N/A
Landscape/Outdoor Pesticide Use	◉ Yes	○ No	○ N/A
Pools, spas, ponds, decorative fountains, and other water features	○ Yes	○ No	◉ N/A
Food service	○ Yes	○ No	◉ N/A
Refuse areas	○ Yes	○ No	◉ N/A
Industrial processes	◉ Yes	○ No	○ N/A
Outdoor storage of equipment or materials	◉ Yes	○ No	○ N/A
Vehicle/Equipment Repair and Maintenance	○ Yes	○ No	◉ N/A
Fuel Dispensing Areas	○ Yes	○ No	◉ N/A
Loading Docks	◉ Yes	○ No	○ N/A
Fire Sprinkler Test Water	○ Yes	○ No	◉ N/A
Miscellaneous Drain or Wash Water	○ Yes	○ No	◉ N/A
Plazas, sidewalks, and parking lots	◉ Yes	○ No	○ N/A
SC-6A: Large Trash Generating Facilities	○ Yes	○ No	◉ N/A
SC-6B: Animal Facilities	○ Yes	○ No	◉ N/A
SC-6C: Plant Nurseries and Garden Centers	○ Yes	○ No	◉ N/A
SC-6D: Automotive-related Uses	○ Yes	○ No	◉ N/A
Discussion / justification if SC-6 not implemented. Clearly identify which sources of runoff pollutants are discussed. Justification must be provided for <u>all</u> "No" answers shown above. Click or tap here to enter text.			

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Project Name: **Sunroad Otay**

Site Design BMP Checklist for All Development Projects			Form I-5
Site Design BMPs			
All development projects must implement site design BMPs SD-1 through SD-8 where applicable and feasible. See Chapter 4 and Appendix E of the BMP Design Manual (Part 1 of Storm Water Standards) for information to implement site design BMPs shown in this checklist. Answer each category below pursuant to the following. • "Yes" means the project will implement the site design BMP as described in Chapter 4 and/or Appendix E of the BMP Design Manual. Discussion / justification is not required. • "No" means the BMP is applicable to the project but it is not feasible to implement. Discussion / justification must be provided. • "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project site has no existing natural areas to conserve). Discussion / justification may be provided. A site map with implemented site design BMPs must be included at the end of this checklist.			
Site Design Requirement	Applied?		
SD-1 Maintain Natural Draiange Pathways and Hydrologic Features	○ Yes	○ No	◉ N/A
Discussion / justification if SD-1 not implemented: Click or tap here to enter text.			
1-1 Are existing natural drainage pathways and hydrologic features mapped on the site map?	○ Yes	○ No	◉ N/A
1-2 Are street trees implemented? If yes, are they shown on the site map?	○ Yes	○ No	◉ N/A
1-3 Implemented street trees meet the design criteria in SD-1 Fact Sheet (e.g. soil volume, maximum credit, etc.)?	○ Yes	○ No	◉ N/A
1-4 Is street tree credit volume calculated using Appendix B.2.2.1 and SD-1 Fact Sheet in Appendix E?	○ Yes	○ No	◉ N/A
SD-2 Have natural areas, soils and vegetation been conserved?	◉ Yes	○ No	○ N/A
Discussion / justification if SD-2 not implemented: Click or tap here to enter text.			

Project Name: Sunroad Otay

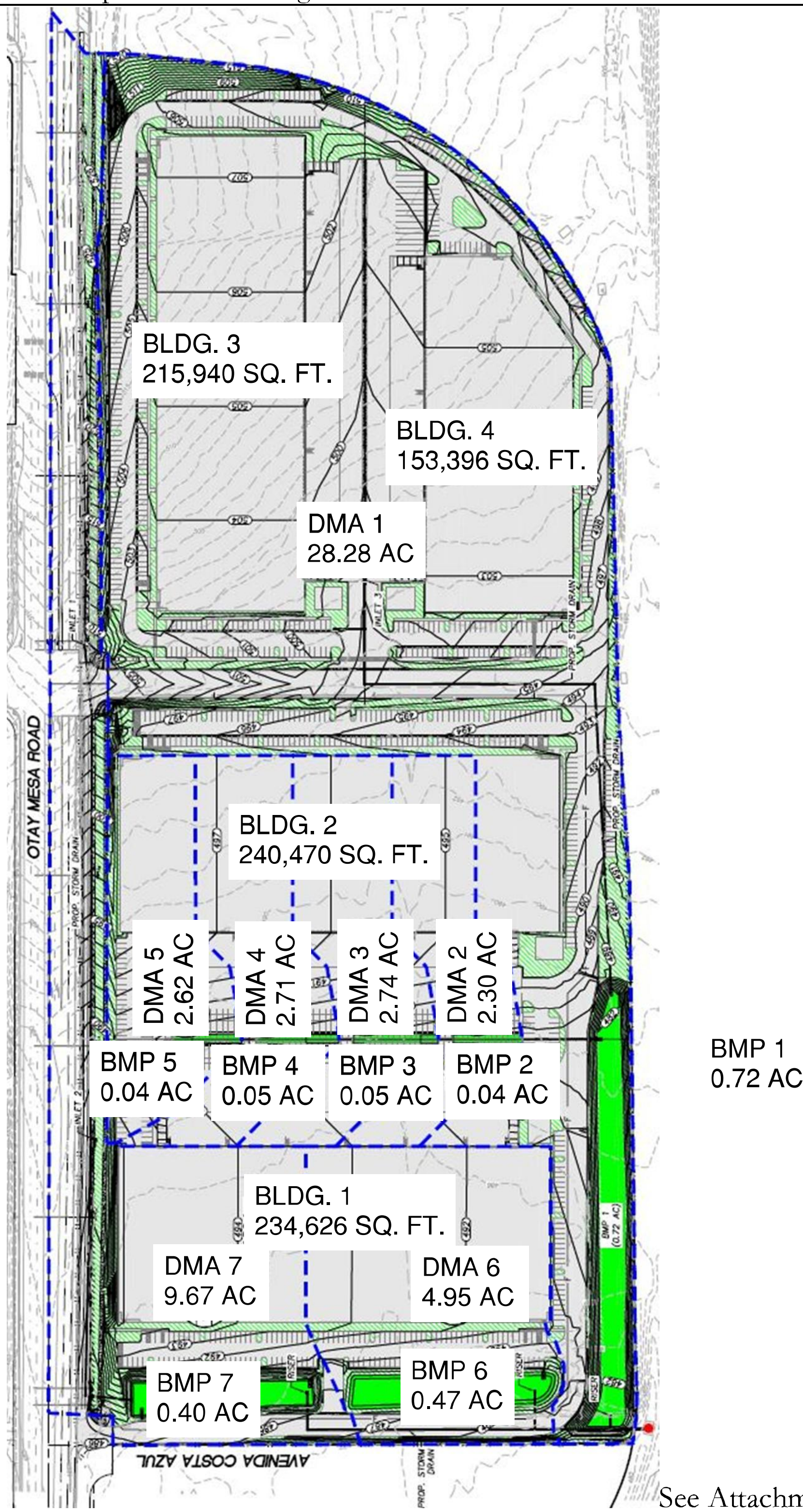
Form I-5 Page 2 of 4			
Site Design Requirement	Applied?		
SD-3 Minimize Impervious Area	◉ Yes	○ No	○ N/A
Discussion / justification if SD-3 not implemented: Click or tap here to enter text.			
SD-4 Minimize Soil Compaction	◉ Yes	○ No	○ N/A
Discussion / justification if SD-4 not implemented: Click or tap here to enter text.			
SD-5 Impervious Area Dispersion	◉ Yes	○ No	○ N/A
Discussion / justification if SD-5 not implemented: Applied where feasible, not possible in all locations due to steep topography and site constraints			
5-1 Is the pervious area receiving runon from impervious area identified on the site map?	◉ Yes	○ No	
5-2 Does the pervious area satisfy the design criteria in SD-5 Fact Sheet in Appendix E (e.g. maximum slope, minimum length, etc.)	◉ Yes	○ No	
5-3 Is impervious area dispersion credit volume calculated using Appendix B.2.1.1 and SD-5 Fact Sheet in Appendix E?	○ Yes	◉ No	

Project Name: Sunroad Otay

Form I-5 Page 3 of 4			
Site Design Requirement	Applied?		
SD-6 Runoff Collection	○ Yes	◉ No	○ N/A
Discussion / justification if SD-6 not implemented: Click or tap here to enter text.			
6a-1 Are green roofs implemented in accordance with design criteria in SD-6A Fact Sheet? If yes, are they shown on the site map?	○ Yes	○ No	◉ N/A
6a-2 Is green roof credit volume calculated using Appendix B.2.1.2 and SD-6A Fact Sheet in Appendix E?	○ Yes	○ No	◉ N/A
6b-1 Are permeable pavements implemented in accordance with design criteria in SD-6B Fact Sheet? If yes, are they shown on the site map?	○ Yes	○ No	◉ N/A
6b-2 Is permeable pavement credit volume calculated using Appendix B.2.1.3 and SD-6B Fact Sheet in Appendix E?	○ Yes	○ No	◉ N/A
SD-7 Landscaping with Native or Drought Tolerant Species	◉ Yes	○ No	○ N/A
Discussion / justification if SD-7 not implemented: Click or tap here to enter text.			
SD-8 Harvesting and Using Precipitation	○ Yes	◉ No	○ N/A
Discussion / justification if SD-8 not implemented: Irrigation demand is not sufficient for rainwater harvesting because drought tolerant landscape is proposed on the project site.			
8-1 Are rain barrels implemented in accordance with design criteria in SD-8 Fact Sheet? If yes, are they shown on the site map?	○ Yes	○ No	◉ N/A
8-2 Is rain barrel credit volume calculated using Appendix B.2.2.2 and SD-8 Fact Sheet in Appendix E?	○ Yes	○ No	◉ N/A

Project Name: Sunroad Otay

Form I-5 Page 4 of 4
Insert Site Map with all site design BMPs identified:



See Attachment 1 for DMA Exhibit

Summary of PDP Structural BMPs	Form I-6
PDP Structural BMPs	

All PDPs must implement structural BMPs for storm water pollutant control (see Chapter 5 of the BMP Design Manual, Part 1 of Storm Water Standards). Selection of PDP structural BMPs for storm water pollutant control must be based on the selection process described in Chapter 5. PDPs subject to hydromodification management requirements must also implement structural BMPs for flow control for hydromodification management (see Chapter 6 of the BMP Design Manual). Both storm water pollutant control and flow control for hydromodification management can be achieved within the same structural BMP(s).

PDP structural BMPs must be verified by the City at the completion of construction. This includes requiring the project owner or project owner's representative to certify construction of the structural BMPs (complete Form DS-563). PDP structural BMPs must be maintained into perpetuity (see Chapter 7 of the BMP Design Manual).

Use this form to provide narrative description of the general strategy for structural BMP implementation at the project site in the box below. Then complete the PDP structural BMP summary information sheet (page 3 of this form) for each structural BMP within the project (copy the BMP summary information page as many times as needed to provide summary information for each individual structural BMP).

Describe the general strategy for structural BMP implementation at the site. This information must describe how the steps for selecting and designing storm water pollutant control BMPs presented in Section 5.1 of the BMP Design Manual were followed, and the results (type of BMPs selected). For projects requiring hydromodification flow control BMPs, indicate whether pollutant control and flow control BMPs are integrated or separate.

The "Storm Water Management Investigation" Letter date April 17, 2017 Prepared by Geocon (Refer to Attachment 6), considers the site's ability to use full or partial infiltration as unfeasible due to interbedded permeable sandy layers resulting in a high probability of lateral water migration. The proposed BMP treatment for the site are Biofiltration facilities sized using worksheet B.5-1 and are sized adequately to treat the DCV as required. Biofiltration BMP's 1, 6 and 7 provide adequate surface area to meet the minimum surface area per the minimum 3% in worksheet B.5-1, while BMP's 2, 3, 4, and 5 have utilized the alternative minimum sizing worksheet B.5-2. BMP's 2, 3, 4, and 5 have tributary areas composed of nearly 50% roof and coupled with an in series treatment through BMP #1, both providing justification for allowing the alternaitve minimum sizing per worksheet B.5-2. The BMP's were designed in accordance with the BMP design manual and are compliant with the Pollutant Control BMP sizing requirements. This project combines pollutant treatment and hydromodification flow control within BMP's 1, 6 and 7 while BMP's 2, 3, 4, and 5 are solely for the purposes of treatment. See associated BMP sizing worksheets in Attachment #1 and the continuous simulation prepared in SWMM for hydromodification purposed in Attachment 3 for complete details of the BMPs proposed.

(Continue on page 2 as necessary.)

Form I-6 Page 3 of X (Copy as many as needed)	
Structural BMP Summary Information	
Structural BMP ID No. BMP 1	
Construction Plan Sheet No. C-4 and C-5	
Type of structural BMP: ○ Retention by harvest and use (HU-1) ○ Retention by infiltration basin (INF-1) ○ Retention by bioretention (INF-2) ○ Retention by permeable pavement (INF-3) ○ Partial retention by biofiltration with partial retention (PR-1) ◉ Biofiltration (BF-1) ○ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide (BMP type/description in discussion section below) ○ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ○ Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion ○ Detention pond or vault for hydromodification management ○ Other (describe in discussion section below)	
Purpose: ○ Pollutant control only ○ Hydromodification control only ◉ Combined pollutant control and hydromodification control ○ Pre-treatment/forebay for another structural BMP ○ Other (describe in discussion section below)	
Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification form DS-563	Kimley-Horn Michael Knapton, P.E. (619) 744-0142
Who will be the final owner of this BMP?	Sunroad Otay Partners, L.P. 4445 Eastgate Mall, Suite 400 San Diego, CA 92121
Who will maintain this BMP into perpetuity?	Sunroad Otay Partners, L.P. 4445 Eastgate Mall, Suite 400 San Diego, CA 92121
What is the funding mechanism for maintenance?	Sunroad Otay Partners, L.P. 4445 Eastgate Mall, Suite 400 San Diego, CA 92121

Form I-6 Page 3 of X (Copy as many as needed)
Structural BMP Summary Information
Structural BMP ID No. BMP 2
Construction Plan Sheet No. C-4 and C-5
Type of structural BMP: ○ Retention by harvest and use (HU-1) ○ Retention by infiltration basin (INF-1) ○ Retention by bioretention (INF-2) ○ Retention by permeable pavement (INF-3) ○ Partial retention by biofiltration with partial retention (PR-1) ◉ Biofiltration (BF-1) ○ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide (BMP type/description in discussion section below) ○ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ○ Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion ○ Detention pond or vault for hydromodification management ○ Other (describe in discussion section below)
Purpose: ○ Pollutant control only ○ Hydromodification control only ◉ Combined pollutant control and hydromodification control ○ Pre-treatment/forebay for another structural BMP ○ Other (describe in discussion section below)

Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification form DS-563	Kimley-Horn Michael Knapton, P.E. (619) 744-0142
Who will be the final owner of this BMP?	Sunroad Otay Partners, L.P. 4445 Eastgate Mall, Suite 400 San Diego, CA 92121
Who will maintain this BMP into perpetuity?	Sunroad Otay Partners, L.P. 4445 Eastgate Mall, Suite 400 San Diego, CA 92121
What is the funding mechanism for maintenance?	Sunroad Otay Partners, L.P. 4445 Eastgate Mall, Suite 400 San Diego, CA 92121

Project Name: Sunroad Otay

Form I-6 Page 3 of X (Copy as many as needed)	
Structural BMP Summary Information	
Structural BMP ID No. BMP 3	
Construction Plan Sheet No. C-4 and C-5	
Type of structural BMP: ○ Retention by harvest and use (HU-1) ○ Retention by infiltration basin (INF-1) ○ Retention by bioretention (INF-2) ○ Retention by permeable pavement (INF-3) ○ Partial retention by biofiltration with partial retention (PR-1) ◉ Biofiltration (BF-1) ○ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide (BMP type/description in discussion section below) ○ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ○ Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion ○ Detention pond or vault for hydromodification management ○ Other (describe in discussion section below)	
Purpose: ○ Pollutant control only ○ Hydromodification control only ◉ Combined pollutant control and hydromodification control ○ Pre-treatment/forebay for another structural BMP ○ Other (describe in discussion section below)	
Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification form DS-563	Kimley-Horn Michael Knapton, P.E. (619) 744-0142
Who will be the final owner of this BMP?	Sunroad Otay Partners, L.P. 4445 Eastgate Mall, Suite 400 San Diego, CA 92121
Who will maintain this BMP into perpetuity?	Sunroad Otay Partners, L.P. 4445 Eastgate Mall, Suite 400 San Diego, CA 92121
What is the funding mechanism for maintenance?	Sunroad Otay Partners, L.P. 4445 Eastgate Mall, Suite 400 San Diego, CA 92121

Project Name: Sunroad Otay

Form I-6 Page 3 of X (Copy as many as needed)	
Structural BMP Summary Information	
Structural BMP ID No. BMP 4	
Construction Plan Sheet No. C-4 and C-5	
Type of structural BMP: ○ Retention by harvest and use (HU-1) ○ Retention by infiltration basin (INF-1) ○ Retention by bioretention (INF-2) ○ Retention by permeable pavement (INF-3) ○ Partial retention by biofiltration with partial retention (PR-1) ◉ Biofiltration (BF-1) ○ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide (BMP type/description in discussion section below) ○ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ○ Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion ○ Detention pond or vault for hydromodification management ○ Other (describe in discussion section below)	
Purpose: ○ Pollutant control only ○ Hydromodification control only ◉ Combined pollutant control and hydromodification control ○ Pre-treatment/forebay for another structural BMP ○ Other (describe in discussion section below)	
Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification form DS-563	Kimley-Horn Michael Knapton, P.E. (619) 744-0142
Who will be the final owner of this BMP?	Sunroad Otay Partners, L.P. 4445 Eastgate Mall, Suite 400 San Diego, CA 92121
Who will maintain this BMP into perpetuity?	Sunroad Otay Partners, L.P. 4445 Eastgate Mall, Suite 400 San Diego, CA 92121
What is the funding mechanism for maintenance?	Sunroad Otay Partners, L.P. 4445 Eastgate Mall, Suite 400 San Diego, CA 92121

Project Name: Sunroad Otay

Form I-6 Page 3 of X (Copy as many as needed)	
Structural BMP Summary Information	
Structural BMP ID No. BMP 5	
Construction Plan Sheet No. C-4 and C-5	
Type of structural BMP: ○ Retention by harvest and use (HU-1) ○ Retention by infiltration basin (INF-1) ○ Retention by bioretention (INF-2) ○ Retention by permeable pavement (INF-3) ○ Partial retention by biofiltration with partial retention (PR-1) ◉ Biofiltration (BF-1) ○ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide (BMP type/description in discussion section below) ○ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ○ Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion ○ Detention pond or vault for hydromodification management ○ Other (describe in discussion section below)	
Purpose: ○ Pollutant control only ○ Hydromodification control only ◉ Combined pollutant control and hydromodification control ○ Pre-treatment/forebay for another structural BMP ○ Other (describe in discussion section below)	
Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification form DS-563	Kimley-Horn Michael Knapton, P.E. (619) 744-0142
Who will be the final owner of this BMP?	Sunroad Otay Partners, L.P. 4445 Eastgate Mall, Suite 400 San Diego, CA 92121
Who will maintain this BMP into perpetuity?	Sunroad Otay Partners, L.P. 4445 Eastgate Mall, Suite 400 San Diego, CA 92121
What is the funding mechanism for maintenance?	Sunroad Otay Partners, L.P. 4445 Eastgate Mall, Suite 400 San Diego, CA 92121

Project Name: Sunroad Otay

Form I-6 Page 3 of X (Copy as many as needed)	
Structural BMP Summary Information	
Structural BMP ID No. BMP 6	
Construction Plan Sheet No. C-4 and C-5	
Type of structural BMP: ○ Retention by harvest and use (HU-1) ○ Retention by infiltration basin (INF-1) ○ Retention by bioretention (INF-2) ○ Retention by permeable pavement (INF-3) ○ Partial retention by biofiltration with partial retention (PR-1) ◉ Biofiltration (BF-1) ○ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide (BMP type/description in discussion section below) ○ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ○ Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion ○ Detention pond or vault for hydromodification management ○ Other (describe in discussion section below)	
Purpose: ○ Pollutant control only ○ Hydromodification control only ◉ Combined pollutant control and hydromodification control ○ Pre-treatment/forebay for another structural BMP ○ Other (describe in discussion section below)	
Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification form DS-563	Kimley-Horn Michael Knapton, P.E. (619) 744-0142
Who will be the final owner of this BMP?	Sunroad Otay Partners, L.P. 4445 Eastgate Mall, Suite 400 San Diego, CA 92121
Who will maintain this BMP into perpetuity?	Sunroad Otay Partners, L.P. 4445 Eastgate Mall, Suite 400 San Diego, CA 92121
What is the funding mechanism for maintenance?	Sunroad Otay Partners, L.P. 4445 Eastgate Mall, Suite 400 San Diego, CA 92121

Form I-6 Page 3 of X (Copy as many as needed)	
Structural BMP Summary Information	
Structural BMP ID No. BMP 7	
Construction Plan Sheet No. C-4 and C-5	
Type of structural BMP: ○ Retention by harvest and use (HU-1) ○ Retention by infiltration basin (INF-1) ○ Retention by bioretention (INF-2) ○ Retention by permeable pavement (INF-3) ○ Partial retention by biofiltration with partial retention (PR-1) ◉ Biofiltration (BF-1) ○ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide (BMP type/description in discussion section below) ○ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ○ Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion ○ Detention pond or vault for hydromodification management ○ Other (describe in discussion section below)	
Purpose: ○ Pollutant control only ○ Hydromodification control only ◉ Combined pollutant control and hydromodification control ○ Pre-treatment/forebay for another structural BMP ○ Other (describe in discussion section below)	
Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification form DS-563	Kimley-Horn Michael Knapton, P.E. (619) 744-0142
Who will be the final owner of this BMP?	Sunroad Otay Partners, L.P. 4445 Eastgate Mall, Suite 400 San Diego, CA 92121
Who will maintain this BMP into perpetuity?	Sunroad Otay Partners, L.P. 4445 Eastgate Mall, Suite 400 San Diego, CA 92121
What is the funding mechanism for maintenance?	Sunroad Otay Partners, L.P. 4445 Eastgate Mall, Suite 400 San Diego, CA 92121

City of San Diego
Development Services
1222 First Ave., MD-302
San Diego, CA 92101
(619) 446-5000

THE CITY OF SAN DIEGO

Permenant BMP Construction

Self Certification Form

FORM
DS-563
January 2016

Date Prepared: May 25, 2017	Project No.: 538140
Project Applicant: Craig Bachman	Phone: (858) 362-8500
Project Address: Otay Mesa Road at Piper Ranch Road, San Diego, CA 92154	
Project Engineer: Nicholas Roberts, P.E.	Phone: (619) 744-0118

The purpose of this form is to verify that the site improvements for the project, identified above, have been constructed in conformance with the approved Storm Water Quality Management Plan (SWQMP) documents and drawings.

This form must be completed by the engineer and submitted prior to final inspection of the construction permit. Completion and submittal of this form is required for all new development and redevelopment projects in order to comply with the City's Storm Water ordinances and NDPES Permit Order No. R9-2013-0001 as amended by R9-2015-0001 and R9-2015-0100. Final inspection for occupancy and/or release of grading or public improvement bonds may be delayed if this form is not submitted and approved by the City of San Diego.

CERTIFICATION:
As the professional in responsible charge for the design of the above project, I certify that I have inspected all constructed Low Impact Development (LID) site design, source control and structural BMP's required per the approved SWQMP and Construction Permit No. Click here to enter text.; and that said BMP's have been constructed in compliance with the approved plans and all applicable specifications, permits, ordinances and Order No. R9-2013-0001 as amended by R9-2015-0001 and R9-2015-0100 of the San Diego Regional Water Quality Control Board.

I understand that this BMP certification statement does not constitute an operation and maintenance verification.

Signature: ________________________________

Date of Signature: _ Insert Date___

Printed Name: _Nicholas Roberts_

Title: _P.E._

Phone No. _(619) 744-0118_

Engineer's Stamp

DS-563 (12-15)

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ATTACHMENT 1
BACKUP FOR PDP POLLUTANT CONTROL BMPS

This is the cover sheet for Attachment 1.

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Project Name: Sunroad Otay

Indicate which Items are Included:

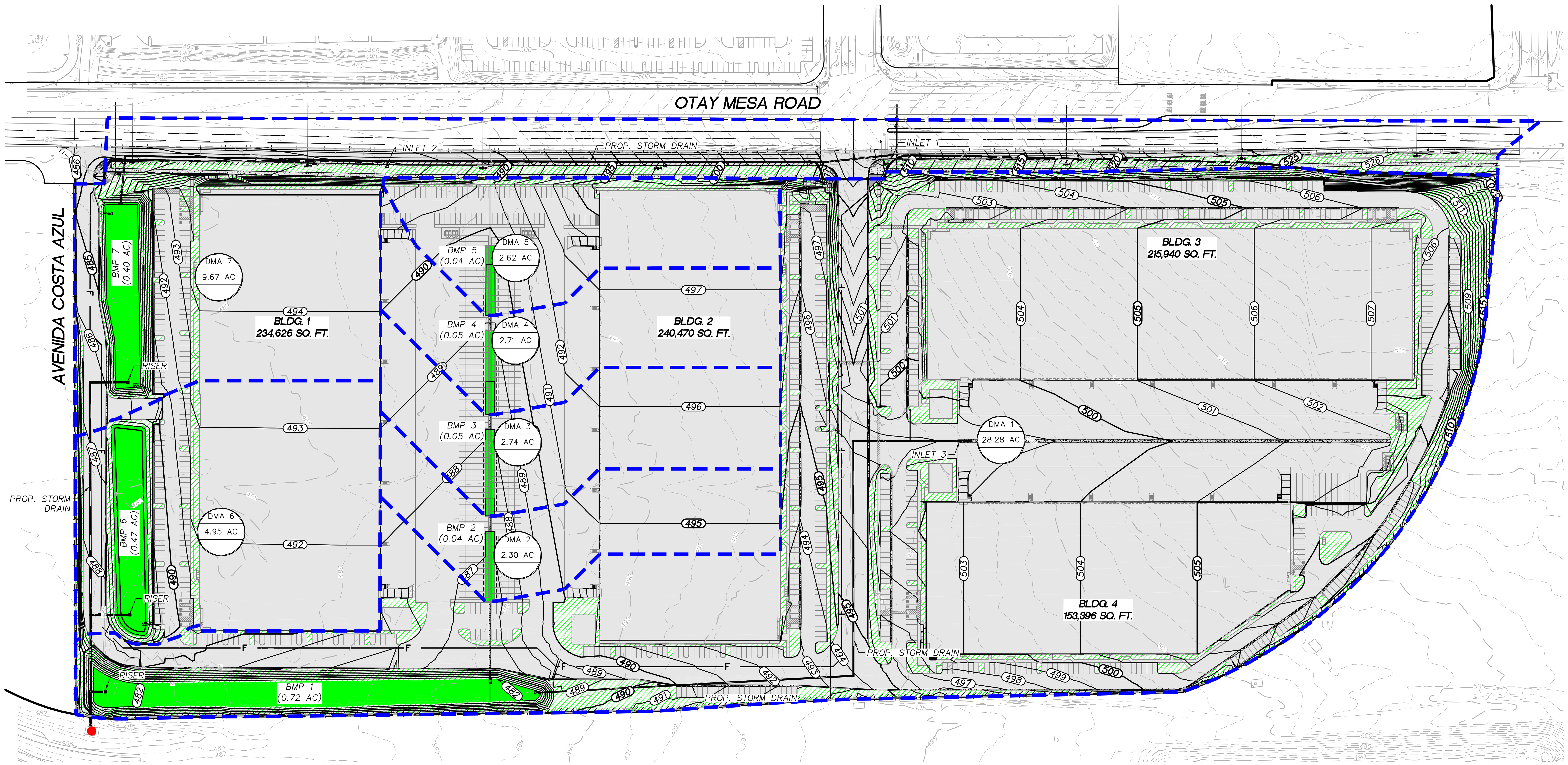
Attachment Sequence	Contents	Checklist
Attachment 1a	DMA Exhibit (Required) See DMA Exhibit Checklist.	☒ Included
Attachment 1b	Tabular Summary of DMAs Showing DMA ID matching DMA Exhibit, DMA Area, and DMA Type (Required)* *Provide table in this Attachment OR on DMA Exhibit in Attachment 1a	◉ Included on DMA Exhibit in Attachment 1a ◉ Included as Attachment 1b, separate from DMA Exhibit
Attachment 1c	Form I-7, Harvest and Use Feasibility Screening Checklist (Required unless the entire project will use infiltration BMPs) Refer to Appendix B.3-1 of the BMP Design Manual to complete Form I-7.	◉ Included ○ Not included because the entire project will use infiltration BMPs
Attachment 1d	Form I-8, Categorization of Infiltration Feasibility Condition (Required unless the project will use harvest and use BMPs) Refer to Appendices C and D of the BMP Design Manual to complete Form I-8.	◉ Included ○ Not included because the entire project will use harvest and use BMPs
Attachment 1e	Pollutant Control BMP Design Worksheets / Calculations (Required) Refer to Appendices B and E of the BMP Design Manual for structural pollutant control BMP design guidelines and site design credit calculations	☒ Included

Project Name: Sunroad Otay

Use this checklist to ensure the required information has been included on the DMA Exhibit:

The DMA Exhibit must identify:

☒ Underlying hydrologic soil group
☒ Approximate depth to groundwater
☒ Existing natural hydrologic features (watercourses, seeps, springs, wetlands)
☒ Critical coarse sediment yield areas to be protected
☒ Existing topography and impervious areas
☒ Existing and proposed site drainage network and connections to drainage offsite
☒ Proposed grading
☒ Proposed impervious features
☒ Proposed design features and surface treatments used to minimize imperviousness
☒ Drainage management area (DMA) boundaries, DMA ID numbers, and DMA areas (square footage or acreage), and DMA type (i.e., drains to BMP, self-retaining, or self-mitigating)
☒ Potential pollutant source areas and corresponding required source controls (see Chapter 4, Appendix E.1, and Form I-3B)
☒ Structural BMPs (identify location, type of BMP, and size/detail)



LEGEND

PROPERTY BOUNDARY	
DRAINAGE MANAGEMENT AREA BOUNDARY	
EXISTING CONTOUR	XXXX
PROPOSED CONTOUR	XXXX
STORM DRAIN	
DRAINAGE MANAGEMENT AREA LABEL	DMA / AREA ← ACRES
BMP AREA	
LANDSCAPE AREA	
NEW IMPERVIOUS AREA	
POINT OF COMPLIANCE	

DMA	TYPE	AREA (AC)
1	DRAINS TO BIOFILTRATION BMP 1	28.28
2	DRAINS TO BIOFILTRATION BMP 2	2.30
3	DRAINS TO BIOFILTRATION BMP 3	2.74
4	DRAINS TO BIOFILTRATION BMP 4	2.71
5	DRAINS TO BIOFILTRATION BMP 5	2.62
6	DRAINS TO BIOFILTRATION BMP 6	4.95
7	DRAINS TO BIOFILTRATION BMP 7	9.67

SITE INFORMATION

HYDROLOGICAL SOIL GROUP: TYPE D

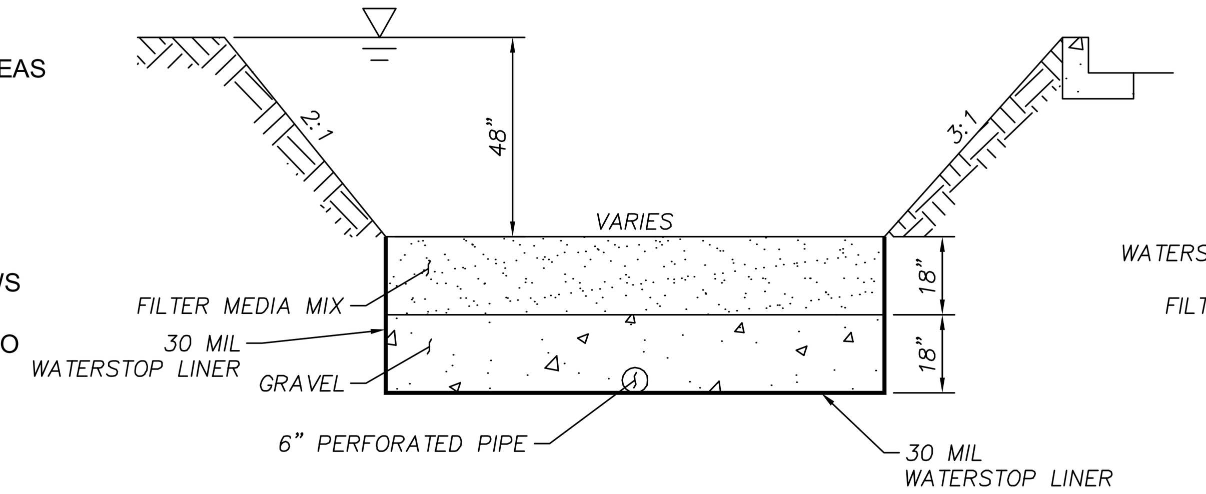
EXISTING CONDITION HAS NO IMPERVIOUS AREAS

DEPTH TO GROUNDWATER: 16' - 36'

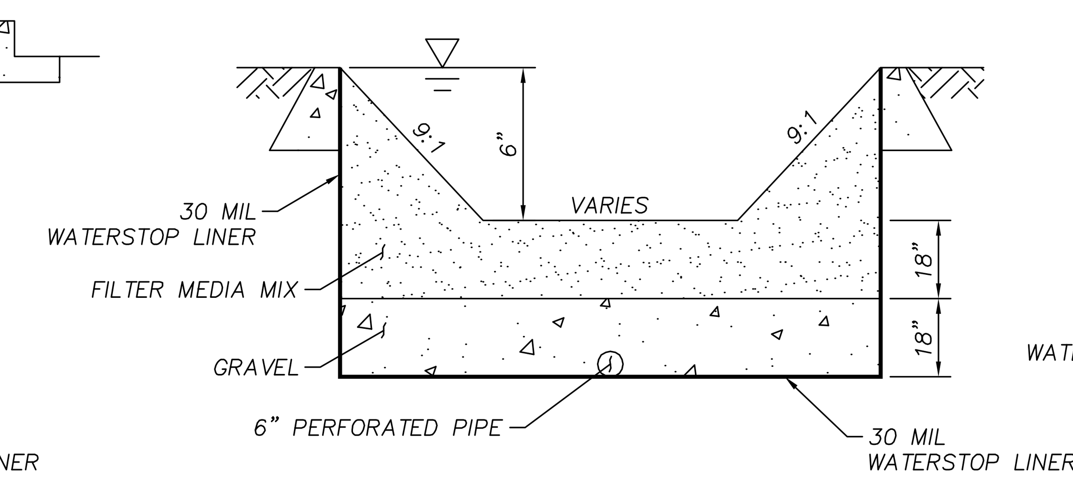
ALL BMPS ARE BIOFILTRATION

NOTE: ROOF DRAINS ARE NOT PROPOSED AT THIS TIME AND THE DRAINAGE FOLLOWS THE SLOPE OF THE ROOF AND WILL BE COLLECTED AND CONVEYED SIMILAR TO ALL ADJACENT PAVEMENT

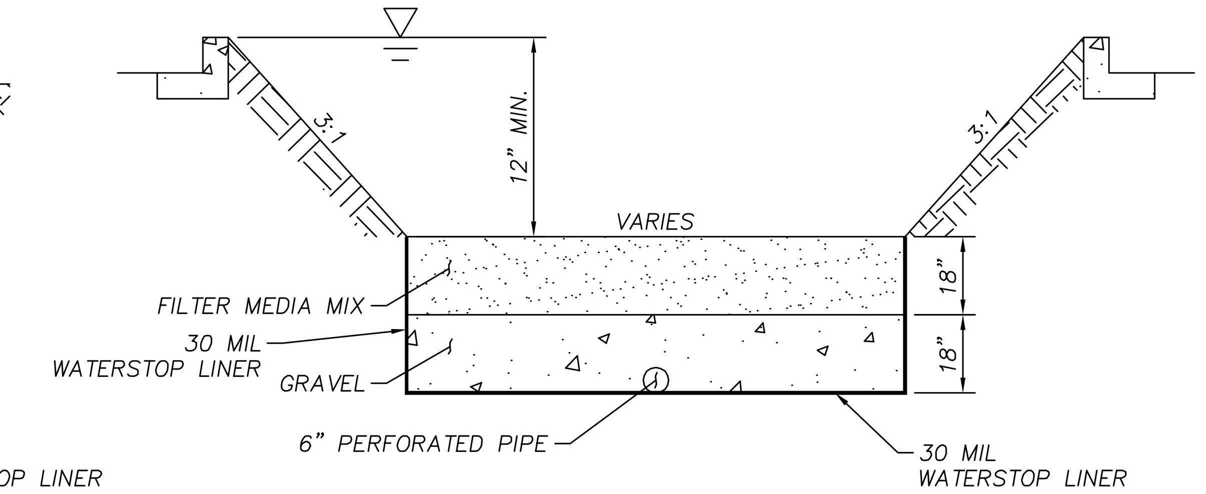
BMP 1
NTS

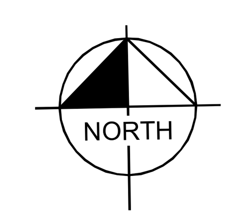


BMP 2 - 5
NTS



BMP 6 - 7
NTS





GRAPHIC SCALE IN FEET
0 50 100 200

K:\SND_LDEV\095128024 – Sunroad Otay\Storm Water\Exhibits\WQMP BMP EXHIBIT.dwg 6-30-17–10:22 AM

Kimley»Horn

30 June 2017

DMA EXHIBIT

SUNROAD OTAY PLAZA - SAN DIEGO, CALIFORNIA

Attachment 1B

DMA	Area	DMA Type
1	28.28	Drains to Bioretention
2	2.3	Drains to Bioretention
3	2.74	Drains to Bioretention
4	2.71	Drains to Bioretention
5	2.62	Drains to Bioretention
6	4.94	Drains to Bioretention
7	9.67	Drains to Bioretention

<table>
<tr><th colspan="2">Harvest and Use Feasibility Checklist</th><th>Form I-7</th></tr>
<tr><td colspan="3">1. Is there a demand for harvested water (check all that apply) at the project site that is reliably present during the wet season?
☐ Toilet and urinal flushing
☐ Landscape irrigation
☐ Other:______________

No demand. Toilets and irrigated landscape are at a minimum and reclaimed water is not planned for use.</td></tr>
<tr><td colspan="3">2. If there is a demand; estimate the anticipated average wet season demand over a period of 36 hours. Guidance for planning level demand calculations for toilet/urinal flushing and landscape irrigation is provided in Section B.3.2.
[Provide a summary of calculations here]

Modified ETWU = $ET_{o_{Wet}} \times [[\Sigma(PF \times HA)/IE] + SLA] \times 0.015$

$2.7 \times [[(145{,}952 \times 0.2)/(0.9)] + 0.0] \times 0.015 = 1313$ cubic feet</td></tr>
<tr><td colspan="3">3. Calculate the DCV using worksheet B-2.1.
DCV = ___71083___ (cubic feet)</td></tr>
<tr><td>3a. Is the 36 hour demand greater than or equal to the DCV?
☐ Yes / ☒ No ⇨
⇩</td><td>3b. Is the 36 hour demand greater than 0.25DCV but less than the full DCV?
☐ Yes / ☒ No ⇨
⇩</td><td>3c. Is the 36 hour demand less than 0.25DCV?
☒ Yes
⇩</td></tr>
<tr><td>Harvest and use appears to be feasible. Conduct more detailed evaluation and sizing calculations to confirm that DCV can be used at an adequate rate to meet drawdown criteria.</td><td>Harvest and use may be feasible. Conduct more detailed evaluation and sizing calculations to determine feasibility. Harvest and use may only be able to be used for a portion of the site, or (optionally) the storage may need to be upsized to meet long term capture targets while draining in longer than 36 hours.</td><td>Harvest and use is considered to be infeasible.</td></tr>
<tr><td colspan="3">Is harvest and use feasible based on further evaluation?
☐ Yes, refer to Appendix E to select and size harvest and use BMPs.
☒ No, select alternate BMPs.</td></tr>
</table>

Categorization of Infiltration Feasibility Condition				Form I-8
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: From Geotechnical Investigation in Attachment 7: "This form applies for biofiltration basin Nos. 1, 2 and 3. "We performed 3 infiltration tests using a Soil Moisture Corp Aardvark Constant Head Permeameter. The unfactored (FS-1) test results indicate infiltration rates ranging between 0.001 inches/hour and 0.015 inches/hour. After applying a feasibility factor of safety of 2.0, the infiltration rates reduce to 0.0005 to 0.008 inches/hour, which is below the minimum threshold value of 0.5 inches/hour. Based on the USDA Wets Soil Survey website, 100 percent of the site consists of a unit that possesses a Hydrologic Soil Group D." After the Geotechnical Investigation, the site has been updated to have biofiltration basins 1-7. The above conditions apply to all 7 of the basins. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.				
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: From Geotechnical Investigation in Attachment 7: "The site will be underlain by compacted fill and very stiff to very dense, clay and sand of the Very Old Paralic Deposits. Infiltration into compacted fill could cause settlement and adverse distress to improvements and structures. There is a high potential for lateral water migration, which could impact existing improvements as a result of soil settlement in the fill and/or volume change of the clays within the fill soils and of the Very Old Paralic Deposits, which could impact existing improvements as a result of soil settlement in the fill or volume change (expansion) of the clay and may cause water to perch and travel laterally to Otay Mesa Road and Interstate 905 Right of Way and adjacent properties and utility lines. Expansion index tests indicate that the native soils have a high expansion potential. Therefore, there is a high potential for heavingon existing and proposed sidewalks and associated improvements." Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.				

Form I-8 Page 2 of 4			
Criteria	Screening Question	Yes	No
3	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.	X	
Provide basis: From Geotechnical Investigation in Attachment 7: "Based on our experience and review of www.water.ca.gov website, groundwater is expected to be deeper than 100 feet; therefore, the risk of impacting the groundwater as a result of storm water infiltration is very low." Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
4	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.	X	
Provide basis: From Geotechnical Investigation in Attachment 7: "From a geotechnical perspective, due to the very low permeability of the underlying soils, we do not expect a significant change in any stream flow or seasonality of stream flow or increased risk of contaminated groundwater to adversely impact any stream flows. It should be noted that researching downstream water right6s or evaluating water balance issues to stream flows is beyond the scope of the geotechnical consultant." Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
Part 1 Result*	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	Full Infiltration Not Feasible	

*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 Engineer to substantiate findings

Form I-8 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: From Geotechnical Investigation in Attachment 7: "The unfactored infiltration rates are 0.001, 0.015 and 0.004 inches per hour. Based on the geotechnical study and infiltration test results, the soil conditions at the site does not allow for full or partial infiltration." Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
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: From Geotechnical Investigation in Attachment 7: "Based on our study and information presented in the update geotechnical report dated March 31, 2017, the site will have variable soil conditions consisting of compacted fill and Very Old Paralic Deposits. Infiltration into compacted fill can cause heaving and/or settlement and distress to infrastructure within the Interstate 905 Right of Way and Otay Mesa Road and associated improvements. As the test results indicate, infiltration rates are very low across the site, there is a high probability that infiltration, even in inappreciable amounts, will migrate laterally to compacted fills, adjacent utility lines and could cause distress to existing and proposed site improvements. To reduce the potential for lateral water migration, side and bottom liners should be installed in proposed detention basins." Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			

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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: From Geotechnical Investigation in Attachment 7: "Based on our experience and review of www.water.ca.gov website, groundwater is expected to be deeper than 100 feet; therefore, the risk of impacting the groundwater as a result of storm water infiltration is very low." Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
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: From Geotechnical Investigation in Attachment 7: "Researching downstream water rights is beyond the scope of our geotechnical services. In this regard, we are not aware of any downstream water rights that would be adversely impacted by storm water BMP's at the site. The volume of storm water to percolate into the ground is expected to be very low." Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
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 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 Engineer to substantiate findings

Project:	Sunroad Otay
Date:	September 21, 2017
BMP:	1

Design Capture Volume			Worksheet B.2-1	
1	85th percentile 24-hr storm depth from Figure B.1-1	d=	0.46	inches
2	Area tributary to BMP	A=	28.28	acres
3	Area weighted runoff factor (estimate using Appenfix B.1.1 and B.2.1)	C=	0.78	unitless
4	Street trees volume reduction	TCV=	0	cubic-feet
5	Rain barrels volume reduction	RCV=	0	cubic-feet
6	Calculate DCV (3630xCxDxA) - TCV - RCV	DCV=	36,833	cubic-feet

Name of Area Draining to BMP:	DMA-1
Name of BMP Area:	BMP 1

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1	
1	Remaining DCV after implementing retention BMPs	36,833	cubic-feet
Patrial Retention			
2	Infiltration rate from Worksheet D.5-1 if partial infiltration is feasible	0.0	in/hr
3	Allowable drawdown time for aggregate storage below the underdrain	36	hours
4	Depth of runoff that can be infiltrated [Line 2 x Line 3]	0	inches
5	Aggregate pore space	0.40	in/in
6	Required depth of gravel below the underdrain [Line 4/Line 5]	0	inches
7	Assumed surface area of the biofiltraiton BMP	31,368	sq-ft
8	Media retained pore space	0.1	in/in
9	Volume retained by BMP [[Line 4 + (Line 12x Line 8)]/12] x Line 7	4,705	cubic-feet
10	DCV that requires biofiltration [Line 1 - Line 9]	32,128	cubic-feet
BMP Parameters			
11	Surface Ponding [6 inch minimum, 12 inch maximum]	12	inches
12	Media Thickness [18 inch minimum], also add mulch layer for thickness to this line	18	inches
13	Aggregate Storage above underdrain invert (12 inches typical) - use 0 inches for sizing if the aggregate is not over the entire bottom surface area	18	inches
14	Media available pore space	0.2	in/in
15	Media filtration rate to be used for sizing	5	in/hr
Baseline Calculations			
16	Allowable Routing Time for sizing	6	hours
17	Depth filtered during storm [Line 15 x Line 16]	30	inches
18	Depth of Detention Storage [Line 11+ (Line 12 x Line 14) + (Line 13 x Line 5)]	22.8	inches
19	Total Depth Treated [Line 17 + Line 18]	52.8	inches
Option 1 - Biofilter 1.5 times the DCV			
20	Required biofiltered volume [1.5 x Line 10]	48,192	cubic-feet
21	Required Footprint [Line 20/Line 19] x 12	10,953	sq-ft
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
22	Required Storage (surface + pore) Volume [0.75 x Line 10]	24,096	cubic-feet
23	Required Footprint [Line 22/Line 18] x 12	12,682	sq-ft
Footprint of BMP			
24	Area draining to the BMP	1,231,877	sq-ft
25	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and B.2)	0.78	
26	BMP Footprint Sizing Factor (Default 0.03 or an alternative minimum footprint sizing factor from worksheet B.5-2, Line 11)	0.03	
27	Minimum BMP Footprint [Line 24x Line 25x Line 26]	28,826	sq-ft
28	Footprint of the BMP = Maximum(Minimum(Line 21, Line 23), Line 27)	28,826	sq-ft
Check for Volume Reduction [Not applicable for No Infiltration Condition]			
29	Calculate the fraction of DCV retained in the BMP [line9/line11	N/A	unitless
30	Minimum required fraction of DCV Retained for partial Infiltration condition	0.375	unitless
31	Is the retained DCV > 0.375? If the answer is no increase the footprint sizing factor in line 26 until the answer is yes for this criterion	yes or	no

Project:	Sunroad Otay
Date:	September 21, 2017
BMP:	2

Design Capture Volume			Worksheet B.2-1	
1	85th percentile 24-hr storm depth from Figure B.1-1	d=	0.46	inches
2	Area tributary to BMP	A=	2.30	acres
3	Area weighted runoff factor (estimate using Appenfix B.1.1 and B.2.1)	C=	0.89	unitless
4	Street trees volume reduction	TCV=	0	cubic-feet
5	Rain barrels volume reduction	RCV=	0	cubic-feet
6	Calculate DCV (3630xCxDxA) - TCV - RCV	DCV=	3,418	cubic-feet

Name of Area Draining to BMP:	DMA-2
Name of BMP Area:	BMP 2

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1	
1	Remaining DCV after implementing retention BMPs	3,418	cubic-feet
Patrial Retention			
2	Infiltration rate from Worksheet D.5-1 if partial infiltration is feasible	0.0	in/hr
3	Allowable drawdown time for aggregate storage below the underdrain	36	hours
4	Depth of runoff that can be infiltrated [Line 2 x Line 3]	0	inches
5	Aggregate pore space	0.40	in/in
6	Required depth of gravel below the underdrain [Line 4/Line 5]	0	inches
7	Assumed surface area of the biofiltraiton BMP	1,920	sq-ft
8	Media retained pore space	0.1	in/in
9	Volume retained by BMP [[Line 4 + (Line 12x Line 8)]/12] x Line 7	384	cubic-feet
10	DCV that requires biofiltration [Line 1 - Line 9]	3,034	cubic-feet
BMP Parameters			
11	Surface Ponding [6 inch minimum, 12 inch maximum]	6	inches
12	Media Thickness [18 inch minimum], also add mulch layer for thickness to this line	24	inches
13	Aggregate Storage above underdrain invert (12 inches typical) - use 0 inches for sizing if the aggregate is not over the entire bottom surface area	36	inches
14	Media available pore space	0.2	in/in
15	Media filtration rate to be used for sizing	5	in/hr
Baseline Calculations			
16	Allowable Routing Time for sizing	6	hours
17	Depth filtered during storm [Line 15 x Line 16]	30	inches
18	Depth of Detention Storage [Line 11+ (Line 12 x Line 14) + (Line 13 x Line 5)]	25.2	inches
19	Total Depth Treated [Line 17 + Line 18]	55.2	inches
Option 1 - Biofilter 1.5 times the DCV			
20	Required biofiltered volume [1.5 x Line 10]	4,551	cubic-feet
21	Required Footprint [Line 20/Line 19] x 12	989	sq-ft
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
22	Required Storage (surface + pore) Volume [0.75 x Line 10]	2,276	cubic-feet
23	Required Footprint [Line 22/Line 18] x 12	1,084	sq-ft
Footprint of BMP			
24	Area draining to the BMP	100,188	sq-ft
25	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and B.2)	0.89	
26	BMP Footprint Sizing Factor (Default 0.03 or an alternative minimum footprint sizing factor from worksheet B.5-2, Line 11)	0.01	
27	Minimum BMP Footprint [Line 24x Line 25x Line 26]	957	sq-ft
28	Footprint of the BMP = Maximum(Minimum(Line 21, Line 23), Line 27)	989	sq-ft
Check for Volume Reduction [Not applicable for No Infiltration Condition]			
29	Calculate the fraction of DCV retained in the BMP [line9/line11	N/A	unitless
30	Minimum required fraction of DCV Retained for partial Infiltration condition	0.375	unitless
31	Is the retained DCV > 0.375? If the answer is no increase the footprint sizing factor in line 26 until the answer is yes for this criterion	yes or	no

Alternate Minimum Footprint Sizing Factor				Worksheet B.5-1	
1	Area draining to the BMP			2.30	acres
2	Adjusted Runoff Factor for Drainage Area			0.89	
3	Load to Clog			2.00	lb/sq-ft
4	Allowable Period to Accumulate Clogged load			10	years
Volume Weighted EMC Calculation					
Land Use	Fraction of Total DCV	TSS EMC	Product		
Industrial	1	125	125		
5	Volume Weighted EMC (sum of all products)			125.00	mg/L
BMP Parameters					
6	If Pretreatment measure are included in the design, apply an adjustment of 25% [Line 5 x			93.75	unitless
7	Average Annual Precipitation			10.13	inches
8	calculate the average annual runoff (line 7x43560/12)x Line 2			32,727	cu-ft/year
9	Calculate the Average Annual TSS Load (line 8x62.4xline 6)/10^6			191	lb/year
10	Calculate the BMP Footprint Needed (line 9 x line 4)/ line3			957	sq-ft
11	Calculate the Average Minimum Footprint Sizing Factor {Line10 (sq ft) /[Line 1 (acres) x 43,560sq ft/acres) x Line 2 } need to divide by 43,560 to Convert to Square Feet			0.011	

Project:	Sunroad Otay
Date:	September 21, 2017
BMP:	3

Design Capture Volume			Worksheet B.2-1	
1	85th percentile 24-hr storm depth from Figure B.1-1	d=	0.46	inches
2	Area tributary to BMP	A=	2.74	acres
3	Area weighted runoff factor (estimate using Appenfix B.1.1 and B.2.1)	C=	0.89	unitless
4	Street trees volume reduction	TCV=	0	cubic-feet
5	Rain barrels volume reduction	RCV=	0	cubic-feet
6	Calculate DCV (3630xCxDxA) - TCV - RCV	DCV=	4,072	cubic-feet

Name of Area Draining to BMP:	DMA-3
Name of BMP Area:	BMP 3

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1	
1	Remaining DCV after implementing retention BMPs	4,072	cubic-feet
Patrial Retention			
2	Infiltration rate from Worksheet D.5-1 if partial infiltration is feasible	0.0	in/hr
3	Allowable drawdown time for aggregate storage below the underdrain	36	hours
4	Depth of runoff that can be infiltrated [Line 2 x Line 3]	0	inches
5	Aggregate pore space	0.40	in/in
6	Required depth of gravel below the underdrain [Line 4/Line 5]	0	inches
7	Assumed surface area of the biofiltraiton BMP	2,368	sq-ft
8	Media retained pore space	0.1	in/in
9	Volume retained by BMP [[Line 4 + (Line 12x Line 8)]/12] x Line 7	355	cubic-feet
10	DCV that requires biofiltration [Line 1 - Line 9]	3,717	cubic-feet
BMP Parameters			
11	Surface Ponding [6 inch minimum, 12 inch maximum]	6	inches
12	Media Thickness [18 inch minimum], also add mulch layer for thickness to this line	18	inches
13	Aggregate Storage above underdrain invert (12 inches typical) - use 0 inches for sizing if the aggregate is not over the entire bottom surface area	18	inches
14	Media available pore space	0.2	in/in
15	Media filtration rate to be used for sizing	5	in/hr
Baseline Calculations			
16	Allowable Routing Time for sizing	6	hours
17	Depth filtered during storm [Line 15 x Line 16]	30	inches
18	Depth of Detention Storage [Line 11+ (Line 12 x Line 14) + (Line 13 x Line 5)]	16.8	inches
19	Total Depth Treated [Line 17 + Line 18]	46.8	inches
Option 1 - Biofilter 1.5 times the DCV			
20	Required biofiltered volume [1.5 x Line 10]	5,575	cubic-feet
21	Required Footprint [Line 20/Line 19] x 12	1,430	sq-ft
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
22	Required Storage (surface + pore) Volume [0.75 x Line 10]	2,788	cubic-feet
23	Required Footprint [Line 22/Line 18] x 12	1,991	sq-ft
Footprint of BMP			
24	Area draining to the BMP	119,354	sq-ft
25	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and B.2)	0.89	
26	BMP Footprint Sizing Factor (Default 0.03 or an alternative minimum footprint sizing factor from worksheet B.5-2, Line 11)	0.01	
27	Minimum BMP Footprint [Line 24x Line 25x Line 26]	1,062	sq-ft
28	Footprint of the BMP = Maximum(Minimum(Line 21, Line 23), Line 27)	1,430	sq-ft
Check for Volume Reduction [Not applicable for No Infiltration Condition]			
29	Calculate the fraction of DCV retained in the BMP [line9/line11	N/A	unitless
30	Minimum required fraction of DCV Retained for partial Infiltration condition	0.375	unitless
31	Is the retained DCV > 0.375? If the answer is no increase the footprint sizing factor in line 26 until the answer is yes for this criterion	yes or	no

Alternate Minimum Footprint Sizing Factor			Worksheet B.5-1	
1	Area draining to the BMP		2.74	acres
2	Adjusted Runoff Factor for Drainage Area		0.89	
3	Load to Clog		2.00	lb/sq-ft
4	Allowable Period to Accumulate Clogged load		10	years
Volume Weighted EMC Calculation				
Land Use	Fraction of Total DCV	TSS EMC	Product	
Industrial	1	125	125	
5	Volume Weighted EMC (sum of all products)		125.00	mg/L
BMP Parameters				
6	If Pretreatment measure are included in the design, apply an adjustment of 25% [Line 5 x 91-		93.75	unitless
7	Average Annual Precipitation		10.13	inches
8	calculate the average annual runoff (line 7x43560/12)x Line 2		32,727	cu-ft/year
9	Calculate the Average Annual TSS Load (line 8x62.4xline 6)/10^6		191	lb/year
10	Calculate the BMP Footprint Needed (line 9 x line 4)/ line3		957	sq-ft
11	Calculate the Average Minimum Footprint Sizing Factor {Line10 (sq ft) /[Line 1 (acres) x 43,560sq ft/acres) x Line 2 } need to divide by 43,560 to Convert to Square Feet		0.01	

Project:	Sunroad Otay
Date:	September 21, 2017
BMP:	4

Design Capture Volume			Worksheet B.2-1	
1	85th percentile 24-hr storm depth from Figure B.1-1	d=	0.46	inches
2	Area tributary to BMP	A=	2.71	acres
3	Area weighted runoff factor (estimate using Appenfix B.1.1 and B.2.1)	C=	0.89	unitless
4	Street trees volume reduction	TCV=	0	cubic-feet
5	Rain barrels volume reduction	RCV=	0	cubic-feet
6	Calculate DCV (3630xCxDxA) - TCV - RCV	DCV=	4,027	cubic-feet

Name of Area Draining to BMP:	DMA-4
Name of BMP Area:	BMP 4

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1	
1	Remaining DCV after implementing retention BMPs	4,027	cubic-feet
Patrial Retention			
2	Infiltration rate from Worksheet D.5-1 if partial infiltration is feasible	0.0	in/hr
3	Allowable drawdown time for aggregate storage below the underdrain	36	hours
4	Depth of runoff that can be infiltrated [Line 2 x Line 3]	0	inches
5	Aggregate pore space	0.40	in/in
6	Required depth of gravel below the underdrain [Line 4/Line 5]	0	inches
7	Assumed surface area of the biofiltraiton BMP	2,304	sq-ft
8	Media retained pore space	0.1	in/in
9	Volume retained by BMP [[Line 4 + (Line 12x Line 8)]/12] x Line 7	346	cubic-feet
10	DCV that requires biofiltration [Line 1 - Line 9]	3,682	cubic-feet
BMP Parameters			
11	Surface Ponding [6 inch minimum, 12 inch maximum]	6	inches
12	Media Thickness [18 inch minimum], also add mulch layer for thickness to this line	18	inches
13	Aggregate Storage above underdrain invert (12 inches typical) - use 0 inches for sizing if the aggregate is not over the entire bottom surface area	18	inches
14	Media available pore space	0.2	in/in
15	Media filtration rate to be used for sizing	5	in/hr
Baseline Calculations			
16	Allowable Routing Time for sizing	6	hours
17	Depth filtered during storm [Line 15 x Line 16]	30	inches
18	Depth of Detention Storage [Line 11+ (Line 12 x Line 14) + (Line 13 x Line 5)]	16.8	inches
19	Total Depth Treated [Line 17 + Line 18]	46.8	inches
Option 1 - Biofilter 1.5 times the DCV			
20	Required biofiltered volume [1.5 x Line 10]	5,523	cubic-feet
21	Required Footprint [Line 20/Line 19] x 12	1,416	sq-ft
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
22	Required Storage (surface + pore) Volume [0.75 x Line 10]	2,761	cubic-feet
23	Required Footprint [Line 22/Line 18] x 12	1,972	sq-ft
Footprint of BMP			
24	Area draining to the BMP	118,048	sq-ft
25	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and B.2)	0.89	
26	BMP Footprint Sizing Factor (Default 0.03 or an alternative minimum footprint sizing factor from worksheet B.5-2, Line 11)	0.01	
27	Minimum BMP Footprint [Line 24x Line 25x Line 26]	1,051	sq-ft
28	Footprint of the BMP = Maximum(Minimum(Line 21, Line 23), Line 27)	1,416	sq-ft
Check for Volume Reduction [Not applicable for No Infiltration Condition]			
29	Calculate the fraction of DCV retained in the BMP [line9/line11	N/A	unitless
30	Minimum required fraction of DCV Retained for partial Infiltration condition	0.375	unitless
31	Is the retained DCV > 0.375? If the answer is no increase the footprint sizing factor in line 26 until the answer is yes for this criterion	yes or	no

Alternate Minimum Footprint Sizing Factor				Worksheet B.5-1	
1	Area draining to the BMP			2.71	acres
2	Adjusted Runoff Factor for Drainage Area			0.89	
3	Load to Clog			2.00	lb/sq-ft
4	Allowable Period to Accumulate Clogged load			10	years
Volume Weighted EMC Calculation					
Land Use	Fraction of Total DCV	TSS EMC	Product		
Industrial	1	125	125		
5	Volume Weighted EMC (sum of all products)			125.00	mg/L
BMP Parameters					
6	If Pretreatment measure are included in the design, apply an adjustment of 25% [Line 5 x 91-			93.75	unitless
7	Average Annual Precipitation			10.13	inches
8	calculate the average annual runoff (line 7x43560/12)x Line 2			32,727	cu-ft/year
9	Calculate the Average Annual TSS Load (line 8x62.4xline 6)/10^6			191	lb/year
10	Calculate the BMP Footprint Needed (line 9 x line 4)/ line3			957	sq-ft
11	Calculate the Average Minimum Footprint Sizing Factor {Line10 (sq ft) /[Line 1 (acres) x 43,560sq ft/acres) x Line 2 } need to divide by 43,560 to Convert to Square Feet			0.01	

Project:	Sunroad Otay
Date:	September 21, 2017
BMP:	5

Design Capture Volume			Worksheet B.2-1	
1	85th percentile 24-hr storm depth from Figure B.1-1	d=	0.46	inches
2	Area tributary to BMP	A=	2.62	acres
3	Area weighted runoff factor (estimate using Appenfix B.1.1 and B.2.1)	C=	0.84	unitless
4	Street trees volume reduction	TCV=	0	cubic-feet
5	Rain barrels volume reduction	RCV=	0	cubic-feet
6	Calculate DCV (3630xCxDxA) - TCV - RCV	DCV=	3,675	cubic-feet

Name of Area Draining to BMP:	DMA-5
Name of BMP Area:	BMP 5

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1	
1	Remaining DCV after implementing retention BMPs	3,675	cubic-feet
Patrial Retention			
2	Infiltration rate from Worksheet D.5-1 if partial infiltration is feasible	0.0	in/hr
3	Allowable drawdown time for aggregate storage below the underdrain	36	hours
4	Depth of runoff that can be infiltrated [Line 2 x Line 3]	0	inches
5	Aggregate pore space	0.40	in/in
6	Required depth of gravel below the underdrain [Line 4/Line 5]	0	inches
7	Assumed surface area of the biofiltraiton BMP	1,920	sq-ft
8	Media retained pore space	0.1	in/in
9	Volume retained by BMP [[Line 4 + (Line 12x Line 8)]/12] x Line 7	288	cubic-feet
10	DCV that requires biofiltration [Line 1 - Line 9]	3,387	cubic-feet
BMP Parameters			
11	Surface Ponding [6 inch minimum, 12 inch maximum]	6	inches
12	Media Thickness [18 inch minimum], also add mulch layer for thickness to this line	18	inches
13	Aggregate Storage above underdrain invert (12 inches typical) - use 0 inches for sizing if the aggregate is not over the entire bottom surface area	18	inches
14	Media available pore space	0.2	in/in
15	Media filtration rate to be used for sizing	5	in/hr
Baseline Calculations			
16	Allowable Routing Time for sizing	6	hours
17	Depth filtered during storm [Line 15 x Line 16]	30	inches
18	Depth of Detention Storage [Line 11+ (Line 12 x Line 14) + (Line 13 x Line 5)]	16.8	inches
19	Total Depth Treated [Line 17 + Line 18]	46.8	inches
Option 1 - Biofilter 1.5 times the DCV			
20	Required biofiltered volume [1.5 x Line 10]	5,080	cubic-feet
21	Required Footprint [Line 20/Line 19] x 12	1,303	sq-ft
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
22	Required Storage (surface + pore) Volume [0.75 x Line 10]	2,540	cubic-feet
23	Required Footprint [Line 22/Line 18] x 12	1,814	sq-ft
Footprint of BMP			
24	Area draining to the BMP	114,127	sq-ft
25	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and B.2)	0.84	
26	BMP Footprint Sizing Factor (Default 0.03 or an alternative minimum footprint sizing factor from worksheet B.5-2, Line 11)	0.01	
27	Minimum BMP Footprint [Line 24x Line 25x Line 26]	959	sq-ft
28	Footprint of the BMP = Maximum(Minimum(Line 21, Line 23), Line 27)	1,303	sq-ft
Check for Volume Reduction [Not applicable for No Infiltration Condition]			
29	Calculate the fraction of DCV retained in the BMP [line9/line11	N/A	unitless
30	Minimum required fraction of DCV Retained for partial Infiltration condition	0.375	unitless
31	Is the retained DCV > 0.375? If the answer is no increase the footprint sizing factor in line 26 until the answer is yes for this criterion	yes or	no

Alternate Minimum Footprint Sizing Factor				Worksheet B.5-1	
1	Area draining to the BMP			2.62	acres
2	Adjusted Runoff Factor for Drainage Area			0.84	
3	Load to Clog			2.00	lb/sq-ft
4	Allowable Period to Accumulate Clogged load			10	years
Volume Weighted EMC Calculation					
Land Use	Fraction of Total DCV	TSS EMC	Product		
Industrial	1	125	125		
5	Volume Weighted EMC (sum of all products)			125.00	mg/L
BMP Parameters					
6	If Pretreatment measure are included in the design, apply an adjustment of 25% [Line 5 x 91-			93.75	unitless
7	Average Annual Precipitation			10.13	inches
8	calculate the average annual runoff (line 7x43560/12)x Line 2			30,888	cu-ft/year
9	Calculate the Average Annual TSS Load (line 8x62.4xline 6)/10^6			181	lb/year
10	Calculate the BMP Footprint Needed (line 9 x line 4)/ line3			903	sq-ft
11	Calculate the Average Minimum Footprint Sizing Factor {Line10 (sq ft) /[Line 1 (acres) x 43,560sq ft/acres) x Line 2 } need to divide by 43,560 to Convert to Square Feet			0.01	

Project:	Sunroad Otay
Date:	September 21, 2017
BMP:	6

Design Capture Volume			Worksheet B.2-1	
1	85th percentile 24-hr storm depth from Figure B.1-1	d=	0.46	inches
2	Area tributary to BMP	A=	4.94	acres
3	Area weighted runoff factor (estimate using Appenfix B.1.1 and B.2.1)	C=	0.80	unitless
4	Street trees volume reduction	TCV=	0	cubic-feet
5	Rain barrels volume reduction	RCV=	0	cubic-feet
6	Calculate DCV (3630xCxDxA) - TCV - RCV	DCV=	6,599	cubic-feet

Name of Area Draining to BMP:	DMA-6
Name of BMP Area:	BMP 6

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1	
1	Remaining DCV after implementing retention BMPs	6,599	cubic-feet
Patrial Retention			
2	Infiltration rate from Worksheet D.5-1 if partial infiltration is feasible	0.0	in/hr
3	Allowable drawdown time for aggregate storage below the underdrain	36	hours
4	Depth of runoff that can be infiltrated [Line 2 x Line 3]	0	inches
5	Aggregate pore space	0.40	in/in
6	Required depth of gravel below the underdrain [Line 4/Line 5]	0	inches
7	Assumed surface area of the biofiltraiton BMP	20,296	sq-ft
8	Media retained pore space	0.1	in/in
9	Volume retained by BMP [[Line 4 + (Line 12x Line 8)]/12] x Line 7	3,044	cubic-feet
10	DCV that requires biofiltration [Line 1 - Line 9]	3,555	cubic-feet
BMP Parameters			
11	Surface Ponding [6 inch minimum, 12 inch maximum]	12	inches
12	Media Thickness [18 inch minimum], also add mulch layer for thickness to this line	18	inches
13	Aggregate Storage above underdrain invert (12 inches typical) - use 0 inches for sizing if the aggregate is not over the entire bottom surface area	18	inches
14	Media available pore space	0.2	in/in
15	Media filtration rate to be used for sizing	5	in/hr
Baseline Calculations			
16	Allowable Routing Time for sizing	6	hours
17	Depth filtered during storm [Line 15 x Line 16]	30	inches
18	Depth of Detention Storage [Line 11+ (Line 12 x Line 14) + (Line 13 x Line 5)]	22.8	inches
19	Total Depth Treated [Line 17 + Line 18]	52.8	inches
Option 1 - Biofilter 1.5 times the DCV			
20	Required biofiltered volume [1.5 x Line 10]	5,332	cubic-feet
21	Required Footprint [Line 20/Line 19] x 12	1,212	sq-ft
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
22	Required Storage (surface + pore) Volume [0.75 x Line 10]	2,666	cubic-feet
23	Required Footprint [Line 22/Line 18] x 12	1,403	sq-ft
Footprint of BMP			
24	Area draining to the BMP	215,186	sq-ft
25	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and B.2)	0.80	
26	BMP Footprint Sizing Factor (Default 0.03 or an alternative minimum footprint sizing factor from worksheet B.5-2, Line 11)	0.03	
27	Minimum BMP Footprint [Line 24x Line 25x Line 26]	5,164	sq-ft
28	Footprint of the BMP = Maximum(Minimum(Line 21, Line 23), Line 27)	5,164	sq-ft
Check for Volume Reduction [Not applicable for No Infiltration Condition]			
29	Calculate the fraction of DCV retained in the BMP [line9/line11	N/A	unitless
30	Minimum required fraction of DCV Retained for partial Infiltration condition	0.375	unitless
31	Is the retained DCV > 0.375? If the answer is no increase the footprint sizing factor in line 26 until the answer is yes for this criterion	yes or	no

Project:	Sunroad Otay
Date:	September 21, 2017
BMP:	7

Design Capture Volume			Worksheet B.2-1	
1	85th percentile 24-hr storm depth from Figure B.1-1	d=	0.46	inches
2	Area tributary to BMP	A=	9.67	acres
3	Area weighted runoff factor (estimate using Appenfix B.1.1 and B.2.1)	C=	0.77	unitless
4	Street trees volume reduction	TCV=	0	cubic-feet
5	Rain barrels volume reduction	RCV=	0	cubic-feet
6	Calculate DCV (3630xCxDxA) - TCV - RCV	DCV=	12,433	cubic-feet

Name of Area Draining to BMP:	DMA-7
Name of BMP Area:	BMP 7

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1	
1	Remaining DCV after implementing retention BMPs	12,433	cubic-feet
Patrial Retention			
2	Infiltration rate from Worksheet D.5-1 if partial infiltration is feasible	0.0	in/hr
3	Allowable drawdown time for aggregate storage below the underdrain	36	hours
4	Depth of runoff that can be infiltrated [Line 2 x Line 3]	0	inches
5	Aggregate pore space	0.40	in/in
6	Required depth of gravel below the underdrain [Line 4/Line 5]	0	inches
7	Assumed surface area of the biofiltraiton BMP	17,239	sq-ft
8	Media retained pore space	0.1	in/in
9	Volume retained by BMP [[Line 4 + (Line 12x Line 8)]/12] x Line 7	2,586	cubic-feet
10	DCV that requires biofiltration [Line 1 - Line 9]	9,847	cubic-feet
BMP Parameters			
11	Surface Ponding [6 inch minimum, 12 inch maximum]	12	inches
12	Media Thickness [18 inch minimum], also add mulch layer for thickness to this line	18	inches
13	Aggregate Storage above underdrain invert (12 inches typical) - use 0 inches for sizing if the aggregate is not over the entire bottom surface area	18	inches
14	Media available pore space	0.2	in/in
15	Media filtration rate to be used for sizing	5	in/hr
Baseline Calculations			
16	Allowable Routing Time for sizing	6	hours
17	Depth filtered during storm [Line 15 x Line 16]	30	inches
18	Depth of Detention Storage [Line 11+ (Line 12 x Line 14) + (Line 13 x Line 5)]	22.8	inches
19	Total Depth Treated [Line 17 + Line 18]	52.8	inches
Option 1 - Biofilter 1.5 times the DCV			
20	Required biofiltered volume [1.5 x Line 10]	14,771	cubic-feet
21	Required Footprint [Line 20/Line 19] x 12	3,357	sq-ft
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
22	Required Storage (surface + pore) Volume [0.75 x Line 10]	7,385	cubic-feet
23	Required Footprint [Line 22/Line 18] x 12	3,887	sq-ft
Footprint of BMP			
24	Area draining to the BMP	421,225	sq-ft
25	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and B.2)	0.77	
26	BMP Footprint Sizing Factor (Default 0.03 or an alternative minimum footprint sizing factor from worksheet B.5-2, Line 11)	0.03	
27	Minimum BMP Footprint [Line 24x Line 25x Line 26]	9,730	sq-ft
28	Footprint of the BMP = Maximum(Minimum(Line 21, Line 23), Line 27)	9,730	sq-ft
Check for Volume Reduction [Not applicable for No Infiltration Condition]			
29	Calculate the fraction of DCV retained in the BMP [line9/line11	N/A	unitless
30	Minimum required fraction of DCV Retained for partial Infiltration condition	0.375	unitless
31	Is the retained DCV > 0.375? If the answer is no increase the footprint sizing factor in line 26 until the answer is yes for this criterion	yes or	no

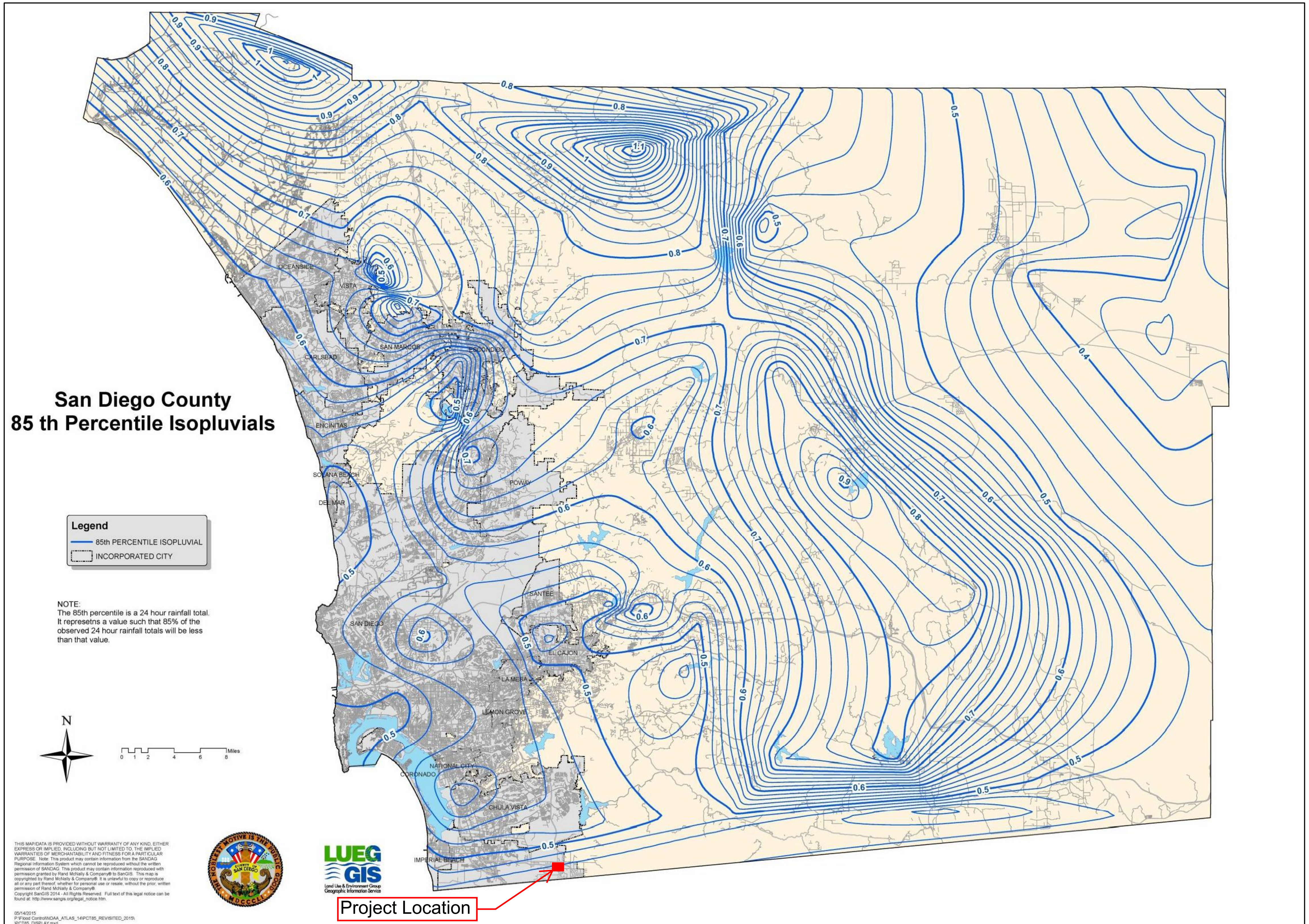

Figure B.1-1: 85th Percentile 24-hour Isopluvial Map

ATTACHMENT 2
BACKUP FOR PDP HYDROMODIFICATION CONTROL MEASURES

This is the cover sheet for Attachment 2.

☐ Mark this box if this attachment is empty because the project is exempt from PDP hydromodification management requirements.

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Project Name: **Sunroad Otay**

Indicate which Items are Included:

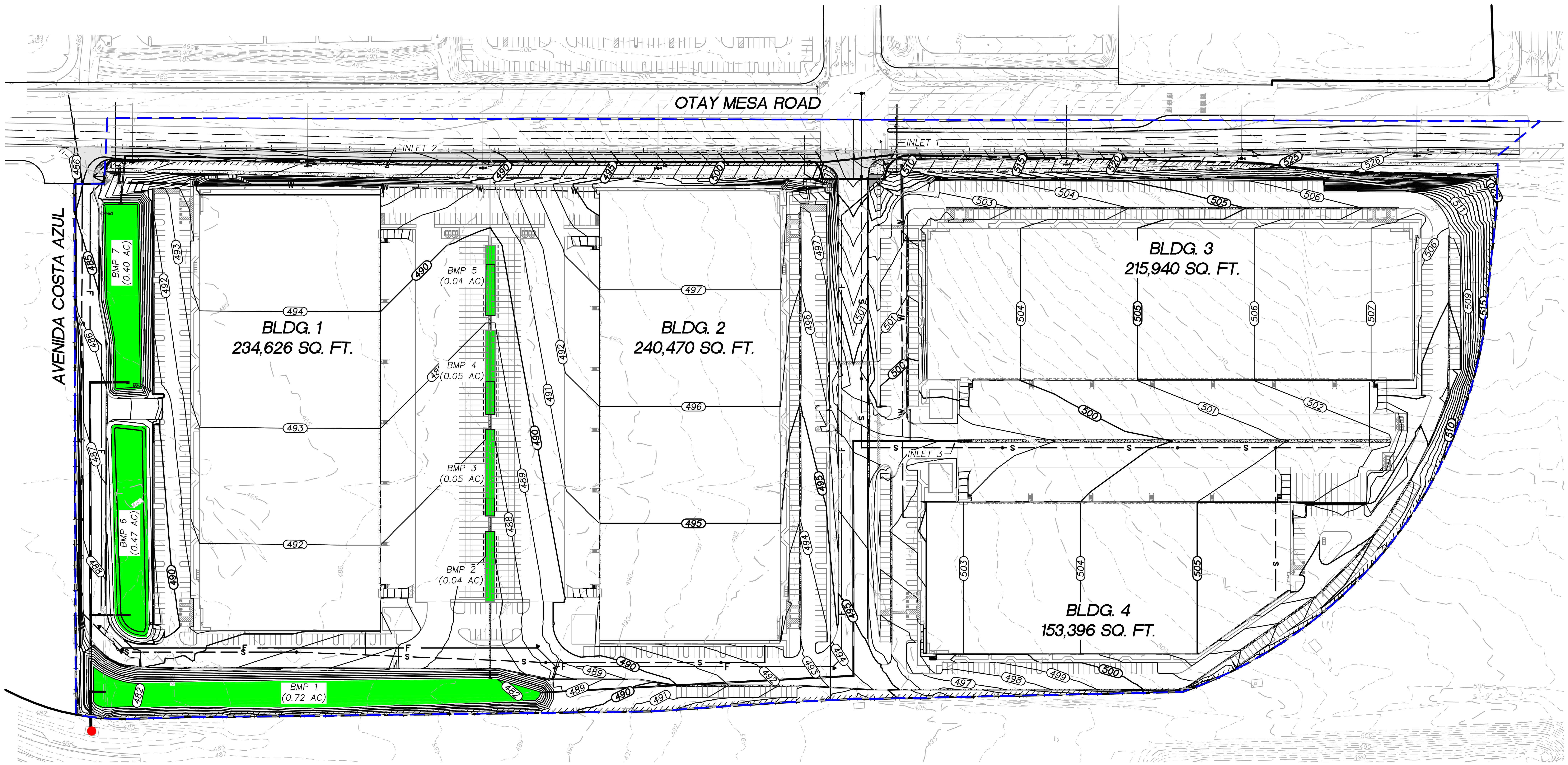
Attachment Sequence	Contents	Checklist
Attachment 2a	Hydromodification Management Exhibit (Required)	☒ Included See Hydromodification Management Exhibit Checklist.
Attachment 2b	Management of Critical Coarse Sediment Yield Areas (WMAA Exhibit is required, additional analyses are optional) See Section 6.2 of the BMP Design Manual.	☒ Exhibit showing project drainage boundaries marked on WMAA Critical Coarse Sediment Yield Area Map (Required) Optional analyses for Critical Coarse Sediment Yield Area Determination ☐ 6.2.1 Verification of Geomorphic Landscape Units Onsite ☐ 6.2.2 Downstream Systems Sensitivity to Coarse Sediment ☐ 6.2.3 Optional Additional Analysis of Potential Critical Coarse Sediment Yield Areas Onsite
Attachment 2c	Geomorphic Assessment of Receiving Channels (Optional) See Section 6.3.4 of the BMP Design Manual.	○ Not Performed ◉ Included ○ Submitted as separate stand-alone document
Attachment 2d	Flow Control Facility Design and Structural BMP Drawdown Calculations (Required) Overflow Design Summary for each structural BMP See Chapter 6 and Appendix G of the BMP Design Manual	◉ Included ○ Submitted as separate stand-alone document
Attachment 2e	Vector Control Plan (Required when structural BMPs will not drain in 96 hours)	○ Included ◉ Not required because BMPs will drain in less than 96 hours

Project Name: Sunroad Otay

Use this checklist to ensure the required information has been included on the Hydromodification Management Exhibit:

The Hydromodification Management Exhibit must identify:

☒ Underlying hydrologic soil group
☒ Approximate depth to groundwater
☒ Existing natural hydrologic features (watercourses, seeps, springs, wetlands)
☒ Critical coarse sediment yield areas to be protected
☒ Existing topography
☒ Existing and proposed site drainage network and connections to drainage offsite
☒ Proposed grading
☒ Proposed impervious features
☒ Proposed design features and surface treatments used to minimize imperviousness
☒ Point(s) of Compliance (POC) for Hydromodification Management
☒ Existing and proposed drainage boundary and drainage area to each POC (when necessary, create separate exhibits for pre-development and post-project conditions)
☒ Structural BMPs for hydromodification management (identify location, type of BMP, and size/detail)



LEGEND

PROPERTY BOUNDARY	
DRAINAGE BOUNDARY TO POINT OF COMPLIANCE	
EXISTING CONTOUR	XXXX
PROPOSED CONTOUR	XXXX
STORM DRAIN	
BMP AREA	
POINT OF COMPLIANCE	

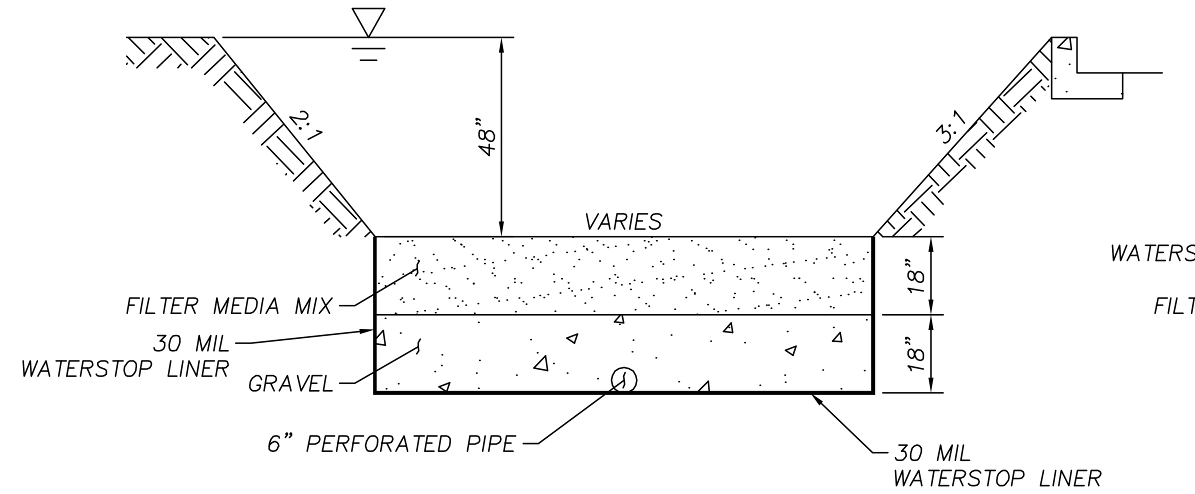
SITE INFORMATION

HYDROLOGICAL SOIL GROUP: TYPE D

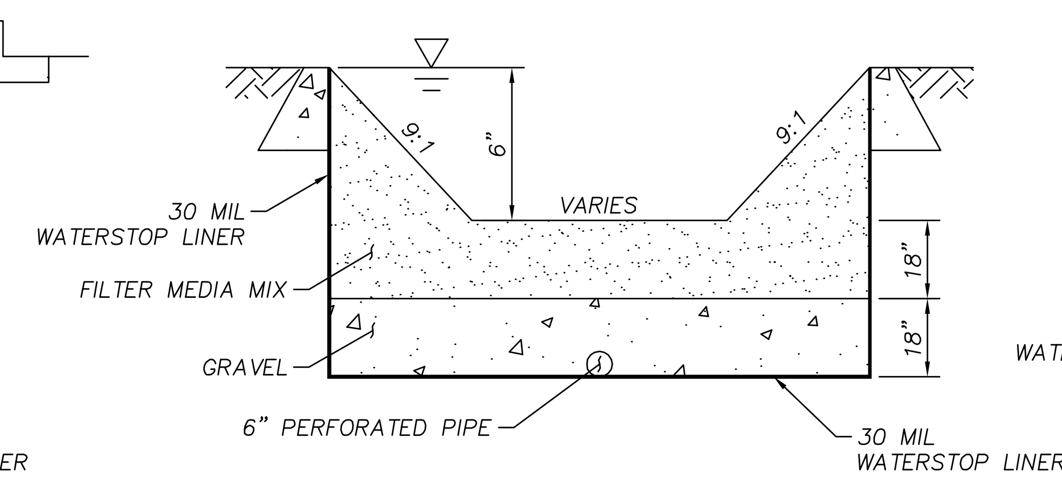
DEPTH TO GROUNDWATER: 16' - 36'

ALL BMPS ARE BIOFILTRATION

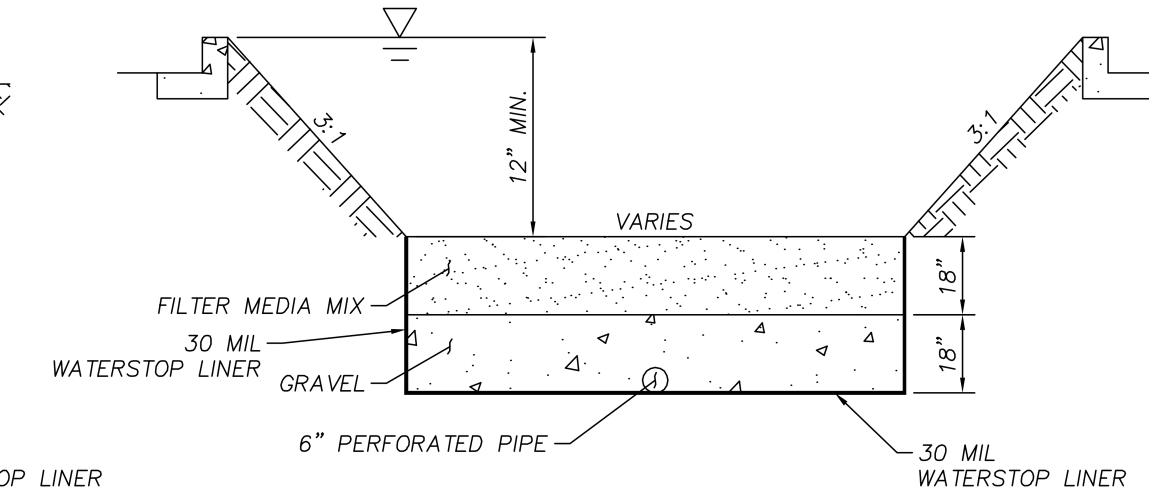
BMP 1
NTS



BMP 2 - 5
NTS



BMP 6 - 7
NTS



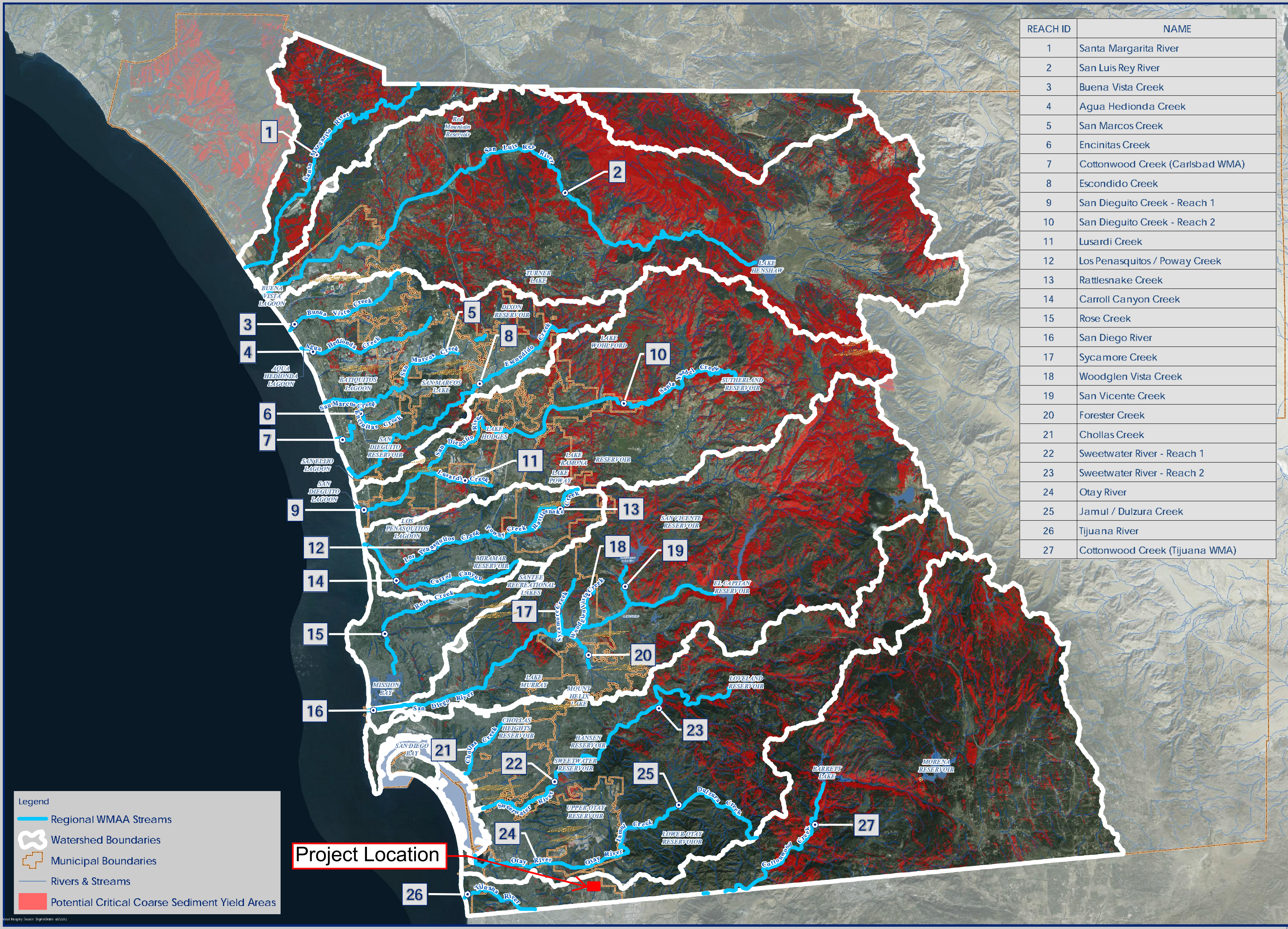
NORTH

GRAPHIC SCALE IN FEET
0 50 100 200

Kimley»Horn

30 June 2017

HYDROMODIFICATION MANAGEMENT EXHIBIT
SUNROAD OTAY PLAZA - SAN DIEGO, CALIFORNIA



REACH ID	NAME
1	Santa Margarita River
2	San Luis Rey River
3	Buena Vista Creek
4	Agua Hedionda Creek
5	San Marcos Creek
6	Encinitas Creek
7	Cottonwood Creek (Carlsbad WMA)
8	Escondido Creek
9	San Dieguito Creek - Reach 1
10	San Dieguito Creek - Reach 2
11	Lusardi Creek
12	Los Penasquitos / Poway Creek
13	Rattlesnake Creek
14	Carroll Canyon Creek
15	Rose Creek
16	San Diego River
17	Sycamore Creek
18	Woodglen Vista Creek
19	San Vicente Creek
20	Forester Creek
21	Chollas Creek
22	Sweetwater River - Reach 1
23	Sweetwater River - Reach 2
24	Otay River
25	Jamul / Dulzura Creek
26	Tijuana River
27	Cottonwood Creek (Tijuana WMA)

Potential Critical Coarse Sediment Yield Areas

Regional San Diego County Watersheds

Exhibit Date: Sept. 8, 2014

Geosyntec consultants

RICK ENGINEERING COMPANY

HYDROMODIFICATION SCREENING

FOR THE

SUNROAD 80 PROJECT

May 14, 2012

Wayne W. Chang, MS, PE 46548

Chang Consultants

Civil Engineering ◦ Hydrology ◦ Hydraulics ◦ Sedimentation

P.O. Box 9496
Rancho Santa Fe, CA 92067
(858) 692-0760

FOR REVIEW ONLY

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APPENDICES

INTRODUCTION

The City of San Diego's January 14, 2011, *Storm Water Standards*, outline low flow thresholds for hydromodification analyses. The thresholds are based on a percentage of the pre-project 2-year flow (Q_2), i.e., $0.1Q_2$ (low flow threshold and high susceptibility to erosion), $0.3Q_2$ (medium flow threshold and medium susceptibility to erosion), or $0.5Q_2$ (high flow threshold and low susceptibility to erosion). A flow threshold of $0.1Q_2$ represents a natural downstream receiving conveyance system with a high susceptibility to bed and/or bank erosion. This is the default value used for hydromodification analyses and will result in the most conservative (largest) on-site facility sizing. A flow threshold of $0.3Q_2$ or $0.5Q_2$ represents downstream receiving conveyance systems with a medium or low susceptibility to erosion, respectively. In order to qualify for a medium or low erosion susceptibility rating, a project must perform a channel screening analysis based on the March 2010, *Hydromodification Screening Tools: Field Manual for Assessing Channel Susceptibility*, developed by the Southern California Coastal Water Research Project (SCCWRP). The SCCWRP results are compared with the critical shear stress calculator results from the County of San Diego's BMP Sizing Calculator to establish the appropriate erosion susceptibility threshold of low, medium, or high.

This report provides hydromodification channel screening analyses for the 49.1 acre Sunroad 80 project being designed by Kimley-Horn and Associates, Inc. (KHA). The project is located between Otay Mesa Road on the north and Interstate 905 on the south, and approximately 1,400 feet east of La Media Road in the city of San Diego. The project is a proposed commercial development with several buildings of various sizes and a large parking lot serving the entire site (see the Study Area Exhibit following the figures). The project is subject to hydromodification requirements because it is a priority development project.

Under pre-project conditions, the site is undeveloped, covered with grasses and low lying brush, and gently sloping in southerly and westerly directions. Surface runoff sheet flows across the site. Under post-project conditions, storm runoff at the site will be conveyed within a series of on-site drainage facilities constructed by the project to an existing 48-inch reinforced concrete pipe (RCP) by Caltrans at the southwest corner of the site. The RCP carries the runoff under Interstate 905 and discharges into an unnamed natural channel on the south side of Interstate 905. The unnamed natural channel conveys flow west along Interstate 905 nearly 1,200 feet, and then turns 90 degrees south just prior to La Media Road. The channel continues in a southerly to southwesterly direction for over 1.1 miles and ultimately enters Mexico.

The SCCWRP screening tool requires both office and field work to establish the vertical and lateral susceptibility of a downstream receiving channel to erosion. The vertical and lateral assessments are performed independently of each other although the lateral results can be affected by the vertical rating. A screening analysis was performed to assess the low flow threshold for the project's point of compliance, which is at the outlet of the Caltrans culvert into the unnamed natural channel.

The initial step in performing the SCCWRP screening analysis is to establish the domain of analysis and the study reaches within the domain. This is followed by office and field components of the screening tool along with the associated analyses and results. The following sections cover these procedures in sequence.

DOMAIN OF ANALYSIS

SCCWRP defines an upstream and downstream domain of analysis, which establish the study limits. The County of San Diego's March 2011, *Final Hydromodification Management Plan* (HMP), specifies the downstream domain of analysis based on the SCCWRP criteria. The HMP indicates that the downstream domain is the first point where one of these is reached:

- at least one reach downstream of the first grade control point (preferably second downstream grade control location)
- tidal backwater/lentic waterbody
- equal order tributary
- accumulation of 50 percent drainage area for stream systems or 100 percent drainage area for urban conveyance systems (storm drains, hardened channels, etc.)

The upstream limit is defined as:

- proceed upstream for 20 channel top widths or to the first grade control point, whichever comes first. Identify hard points that can check headward migration and evidence of active headcutting.

SCCWRP defines the maximum spatial unit, or reach (a reach is circa 20 channel widths), for assigning a susceptibility rating within the domain of analysis to be 200 meters (656 feet). If the domain of analysis is greater than 200 meters, the study area should be subdivided into smaller reaches of less than 200 meters for analysis. Most of the units in the HMP's SCCWRP analysis are metric. Metric units are used in this report only where given so in the HMP. Otherwise English units are used.

Downstream Domain of Analysis

The downstream domain of analysis for the study area has been determined by assessing and comparing the four bullet items above. The outlet of the existing Caltrans RCP that captures the site runoff is the single point of compliance (POC) for the project. The downstream domain of analysis is selected below this POC.

Per the first bullet item, the first permanent grade control below the POC was located. A site visit was performed along the watercourse below the POC and the first permanent grade control was observed at the culverts under La Media Road. The culverts convey flow from the natural channel under La Media Road. The combination of the culverts and asphalt lined road function as a permanent grade control. These will not erode and will maintain the upstream channel bed elevations.

The second bullet item is the tidal backwater or lentic (standing or still water such as ponds, pools, marshes, lakes, etc.) waterbody location. A tidal backwater or lentic waterbody does not exist between the project site and Mexico. Therefore, the tidal backwater or lentic waterbody will be further downstream than the downstream domain of analysis established by the permanent grade control criteria.

The final two bullet items are related to the tributary drainage area. The drainage area tributary to the POC covers approximately 651 acres, while the area tributary to the permanent grade control covers approximately 1,372 acres (see the Watershed Exhibit in Appendix A). There are no watercourses that connect to the unnamed natural channel with a drainage area exceeding 50 or 100 percent of these areas. Consequently, a 50 percent or equal order tributary does not occur prior to the grade control.

Based on the above information, the permanent grade control at the La Media Road culverts establishes the HMP criteria for the downstream domain of analysis because it is the first point reached from the four bullet items. The tidal/lentic waterbody and 50/100 percent tributary areas are downstream of the permanent grade control. Per the first bullet item, the downstream domain of analysis begins one reach below the box culverts or at the next (second) permanent grade control. The downstream domain of analysis for the POC was based on the second grade control below the first grade control point. After the natural channel crosses La Media Road it continues approximately 290 feet south to another culvert crossing at Airway Road. The Airway Road crossing is the second permanent grade control below the POC and is the downstream domain of analysis location.

Upstream Domain of Analysis

A concrete weir wall exists in the unnamed natural channel approximately 257 feet upstream of the POC. The weir wall crosses the channel bed and banks and will check headward migration and headcutting. Therefore, the weir wall is the first upstream grade control point above the POC. The channel top width in this area is approximately 60 feet, so the weir wall is closer to the POC than 20 top widths. Consequently, the upstream domain of analysis location is at the weir wall.

Study Reaches within Domain of Analysis

The entire domain of analysis extends over approximately 2,555 feet from the upstream domain of analysis to the downstream domain of analysis. This overall reach includes approximately 290 feet that will be conveyed in the La Media Road culverts, and which can be excluded from analysis since the culverts are not subject to erosion. The remaining portion of the unnamed natural channel extends over 2,451 feet from the upstream to downstream domain of analysis locations.

The domain of analysis was subdivided into three study reaches (see the Study Area Exhibit). Reach 1 stretches over 257 feet from the upstream domain of analysis location to the POC. Reach 2 extends over 1,904 feet from the POC to the upstream end of the La Media Road culverts. Reach 3 covers 290 feet below downstream end of the La Media Road culverts to the downstream domain of analysis location (at the upstream end of the Airway Road culverts). Reach 2 is longer than the 656 feet (200 meters) maximum reach length specified by SCCWRP.

Review of topographic mapping, aerial photographs, and field conditions reveals that the physical (channel geometry and longitudinal slope), vegetative, hydraulic, and soil conditions within this reach are relatively uniform. Subdividing the reach into smaller subreaches of less than 656 feet will not yield significantly varying results within the reach. Although the screening tool was applied across the entire length of Reach 2, the results will be similar for shorter subreaches within the reach.

INITIAL DESKTOP ANALYSIS

After the domain of analysis is established, SCCWRP requires an "initial desktop analysis" that involves office work. The initial desktop analysis establishes the watershed area, mean annual precipitation, valley slope, and valley width. These terms are defined in Form 1, which is included in Appendix A. SCCWRP recommends the use of National Elevation Data (NED) to determine the watershed area, valley slope, and valley width. The NED data is similar to USGS mapping. For the project, various topographic mapping sources were used, much of which is more detailed than NED data. For the site and unnamed natural channel, 1-foot contour interval flow topographic mapping was available. Just beyond this, 2-foot contour interval topographic mapping was available. The 1- and 2-foot contour interval topographic mapping covered the majority, but not all, of the tributary watershed. USGS mapping was used to delineate the upper portion of the watershed beyond the extents of the flown mapping. Since the 1-foot contour interval topographic mapping covers the study reaches, it will allow more precise results for the valley slope and valley width.

The watershed areas tributary to Reaches 1 through 3 were determined from the flown and USGS mapping. The watershed delineations are included on the Watershed Exhibit in Appendix A. The areas tributary to the downstream ends of Reaches 1 through 3 are summarized in Table 1.

The mean annual precipitation was obtained from the rain gage closest to the site. This is the Western Regional Climate Center's Lower Otay Reservoir gage (see Appendix A), which is approximately 3.8 miles from the site. The average annual rainfall measured at this gage for the period of record from 1940 to 1956 is 11.1 inches. Since the period of record does not cover an overly extensive time period, data for the next closest rain gage at Bonita was also reviewed. The Bonita gage is over 8.3 miles from the site, but has a period of record from 1915 to 1970. The average annual rainfall at Bonita over this period is 11.5 inches. Since this rainfall is similar to the Lower Otay Reservoir gage data, the Lower Otay Reservoir data was determined to appropriately represent the mean annual precipitation for the project.

The valley slopes and widths of Reaches 1 through 3 were determined from the 1-foot contour interval topographic mapping. The valley slope is the longitudinal slope of the channel bed along the flow line, so it is determined by dividing the elevation difference within a reach by the length of the flow line. The valley width is the average channel bottom width. The tributary drainage area, valley slope, and valley width within each reach are summarized in Table 1.

Reach	Tributary Drainage Area, sq. mi.	Valley Slope, m/m	Valley Width, m
1	1.02	0.0012	7.6
2	2.14	0.0015	7.6
3	2.15	0.0010	11.0

Table 1. Summary of Valley Slope and Valley Width

These values were input to a spreadsheet to calculate the simulated peak flow, screening index, reference width, and valley width index outlined in Form 1. The input data and results are tabulated in Appendix A. This completes the initial desktop analysis.

FIELD SCREENING

After the initial desktop analysis is complete, a field assessment must be performed. The field assessment is used to establish a natural channel's vertical and lateral susceptibility to erosion. SCCWRP states that although they are admittedly linked, vertical and lateral susceptibility are assessed separately for several reasons. First, vertical and lateral responses are primarily controlled by different types of resistance, which, when assessed separately, may improve ease of use and lead to increased repeatability compared to an integrated, cross-dimensional assessment. Second, the mechanistic differences between vertical and lateral responses point to different modeling tools and potentially different management strategies. Having separate screening ratings may better direct users and managers to the most appropriate tools for subsequent analyses.

The field screening tool uses combinations of decision trees and checklists. Decision trees are typically used when a question can be answered fairly definitively and/or quantitatively (e.g., d_{50} < 16 mm). Checklists are used where answers are relatively qualitative (e.g., the condition of a grade control). Low, medium, high, and very high ratings are applied separately to the vertical and lateral analyses. When the vertical and lateral analyses return divergent values, the most conservative value shall be selected as the flow threshold for the hydromodification analyses.

Vertical Stability

The purpose of the vertical stability decision tree (Figure 6-4 in the County of San Diego HMP) is to assess the state of the channel bed with a particular focus on the risk of incision (i.e., down cutting). The decision tree is included in Figure 10 The first step is to assess the channel bed resistance. There are three categories defined as follows:

1. Labile Bed – sand-dominated bed, little resistant substrate.

2. Transitional/Intermediate Bed – bed typically characterized by gravel/small cobble, Intermediate level of resistance of the substrate and uncertain potential for armoring.

3. Threshold Bed (Coarse/Armored Bed) – armored with large cobbles or larger bed material or highly-resistant bed substrate (i.e., bedrock).

Figures 7 through 9 contain photographs of the bed material representative of the study reaches. A gravelometer is included in the photographs for reference. Each square on the gravelometer indicates grain size in millimeters (the squares range from 2 mm to 180 mm). Based on the photographs and site investigation, the bed material and resistance is generally within the transitional/intermediate bed category. There was no evidence of a threshold bed condition. However, some bed areas contained smaller grain sizes found in a labile bed. A pebble count was performed that determined the median (d_{50}) bed material size to be 22.6 millimeters (mm) in Reaches 1 and 2, and 16 mm in Reach 3 (see Appendix B). Figure 6-4 in the County HMP indicates that a d_{50} of 16 mm or greater is within the transitional/intermediate bed category. Dr. Eric Stein from SCCWRP, who co-authored the *Hydromodification Screening Tools: Field Manual* in the *Final Hydromodification Management Plan* (HMP), indicated that it would be appropriate to analyze channels with multiple factors that impact erodibility using the transitional/intermediate bed procedure. This requires the most rigorous steps and will generate the appropriate results for the size range.

Transitional/intermediate beds cover a wide susceptibility/potential response range and need to be assessed in greater detail to develop a weight of evidence for the appropriate screening rating. The three primary risk factors used to assess vertical susceptibility for channels with transitional/intermediate bed materials are:

1. Armoring potential – three states (Checklist 1)

2. Grade control – three states (Checklist 2)

3. Proximity to regionally-calibrated incision/braiding threshold (Mobility Index Threshold – Probability Diagram)

These three risk factors are assessed using checklists and a diagram (see Appendix B), and the results of each are combined to provide a final vertical susceptibility rating for the intermediate/transitional bed-material group. Each checklist and diagram contains a Category A, B, or C rating. Category A is the most resistant to vertical changes while Category C is the most susceptible.

Checklist 1 determines armoring potential of the channel bed. The natural channel bed along each of the three reaches is within Category B, which represents intermediate bed material of unknown resistance or unknown armoring potential due to a surface veneer such as vegetation. The soil was probed and penetration was relatively difficult through the underlying layer. The channel bed in all reaches was covered with dense vegetation.

Checklist 2 determines grade control characteristics of the channel bed. The first category of grade control spacing is based on $2/S_v$, where S_v is the valley slope from Table 1. The $2/S_v$ values range from 1,313 (Reach 2) to 1,933 meters (Reach 3). Each of the three reaches has a downstream grade control within these distances, so each reach is within Category A. SCCWRP also states that grade controls can be natural. Examples are vegetation or confluences with a larger waterbody. As verified with photographs and during a site investigation, each reach contains dense vegetation (see Figures 1 through 6). The plant roots serve as a natural grade control. The spacing of the plants throughout the study area is less than a meter. Further evidence of the effectiveness of the natural grade controls is the absence of headcutting and mass wasting (large vertical erosion of a channel bank). The dense vegetation further confirms that each reach is within Category A on Checklist 2.

The Mobility Index Threshold is a probability diagram that depicts the risk of incising or braiding based on the potential stream power of the valley relative to the median particle diameter. The threshold is based on regional data from Dr. Howard Chang of Chang Consultants and others. The probability diagram is based on d_{50} as well as the Screening Index determined in the initial desktop analysis (see Appendix A). d_{50} is derived from a pebble count in which a minimum of 100 particles are obtained along transects at the site. SCCRWP states that if fines less than ½-inch thick are at a sample point, it is appropriate to sample the coarser buried substrate. The d_{50} value is the particle size in which 50 percent of the particles are smaller and 50 percent are larger. The pebble count results for Reaches 1 through 3 are included in Appendix B. The results show a d_{50} of 22.6 millimeters (mm) for Reaches 1 and 2, and 16 mm for Reach 3. The screening index values for the three reaches are tabulated in Appendix A. The Mobility Index Threshold diagram shows that each reach has less than 50 percent probability of incision, so they are within Category A.

The overall vertical rating is determined from the Checklist 1, Checklist 2, and Mobility Index Threshold results. The scoring is based on the following values:

Category A = 3, Category B = 6, Category C = 9

The vertical rating score is based on these values and the equation:

$$\begin{aligned}\text{Vertical Rating} &= [(\text{armoring} \times \text{grade control})^{1/2} \times \text{screening index score}]^{1/2} \\ &= [(6 \times 3)^{1/2} \times 3]^{1/2} \\ &= 3.6\end{aligned}$$

Since the vertical rating is less than 4.5 for Reaches 1 through 3, each reach has a low threshold for vertical susceptibility.

Lateral Stability

The purpose of the lateral decision tree (Figure 6-5 from County of San Diego HMP included in Figure 11 is to assess the state of the channel banks with a focus on the risk of widening. Channels can widen from either bank failure or through fluvial processes such as chute cutoffs, avulsions, and braiding. Widening through fluvial avulsions/active braiding is a relatively straightforward observation. If braiding is not already occurring, the next logical step is to assess the condition of the banks. Banks fail through a variety of mechanisms; however, one of the most important distinctions is whether they fail in mass (as many particles) or by fluvial detachment of individual particles. Although much research is dedicated to the combined effects of weakening, fluvial erosion, and mass failure, SCCWRP found it valuable to segregate bank types based on the inference of the dominant failure mechanism (as the management approach may vary based on the dominant failure mechanism). A decision tree (Form 4 in Appendix B) is used in conducting the lateral susceptibility assessment. Definitions and photographic examples are also provided below for terms used in the lateral susceptibility assessment.

The first step in the decision tree is to determine if lateral adjustments are occurring. The adjustments can take the form of extensive mass wasting (greater than 50 percent of the banks are exhibiting planar, slab, or rotational failures and/or scalloping, undermining, and/or tension cracks). The adjustments can also involve extensive fluvial erosion (significant and frequent bank cuts on over 50 percent of the banks). Neither mass wasting nor extensive fluvial erosion was evident within any of the reaches during a field investigation. The drainage courses all have a generally trapezoidal cross-section with dense vegetation and banks that are not subject to stream erosion (see Figures 1 through 6).

The next step in the Form 4 decision tree is to assess the consolidation of the bank material. The banks were moderate to well-consolidated. This determination was made because the ground surface was difficult to penetrate with a probe. In addition, the banks showed no evidence of crumbling and were composed of relatively well-packed particles.

Form 6 (see Appendix B) is used to assess the probability of mass wasting. Form 6 identifies a 10, 50, and 90 percent probability based on the bank angle and bank height. Based on the topographic mapping, the banks along the drainage course are 2:1 (26 degrees) or flatter (most are 3:1). Form 6 shows that the probably of mass wasting and bank failure has less than 10 percent risk for a 26 degree bank angle or less regardless of the bank height.

The final two steps in the Form 4 decision tree are based on the braiding risk determined from the vertical rating as well as the Valley Width Index (VWI) calculated in Appendix A. If the vertical rating is high, the braiding risk is considered to be greater than 50 percent. Excessive braiding can lead to lateral bank failure. For Reaches 1 through 3 the vertical rating is low, so the braiding risk is less than 50 percent. Furthermore, a VWI greater than 2 represents channels unconfined by bedrock or hillslope and, hence, subject to lateral migration. The VWI calculations in the spreadsheet in Appendix A show that the VWI for each reach is less than 2.

From the above steps, the lateral susceptibility rating is low (red circles are included on the Form 4: Lateral Susceptibility Field Sheet decision tree in Appendix B showing the decision path).

CONCLUSION

The SCCWRP channel screening tools were used to assess the downstream channel susceptibility for the Sunroad 80 project. The project runoff will be collected by a Caltrans pipe at the southwest corner of the site and convey under Interstate 905 to a naturally-lined channel. The natural channel supports dense vegetation and benefits from grade controls because the longitudinal slope is very flat. There is no evidence of significant vertical or lateral stream-induced erosion in the drainage course. The downstream channel assessment for the drainage courses was performed based on office analyses and field work. The results indicate a low threshold for vertical and lateral susceptibilities to erosion for each of the three study reaches, which is consistent with the in-site conditions.

The HMP requires that these results be compared with the critical stress calculator results incorporated in the County of San Diego's BMP Sizing Calculator. The BMP Sizing Calculator critical stress results are included in Appendix B for Reaches 1 through 3. Based on these values, the critical stress results returned a low threshold. Therefore, the SCCWRP analyses and critical stress calculator demonstrate that the project can be designed assuming a low susceptibility to erosion, i.e., $0.5Q_2$.

Figure 1. Looking Westerly towards Reach 1

Figure 2. Looking Easterly towards East-West Segment of Reach 2

Figure 3. Looking Southerly towards North-South Segment of Reach 2

Figure 4. Looking Upstream towards Reach 2 from La Media Road

Figure 5. Upstream End of Reach 3 at La Media Road

Figure 6. Downstream End of Reach 3 at Airway Road

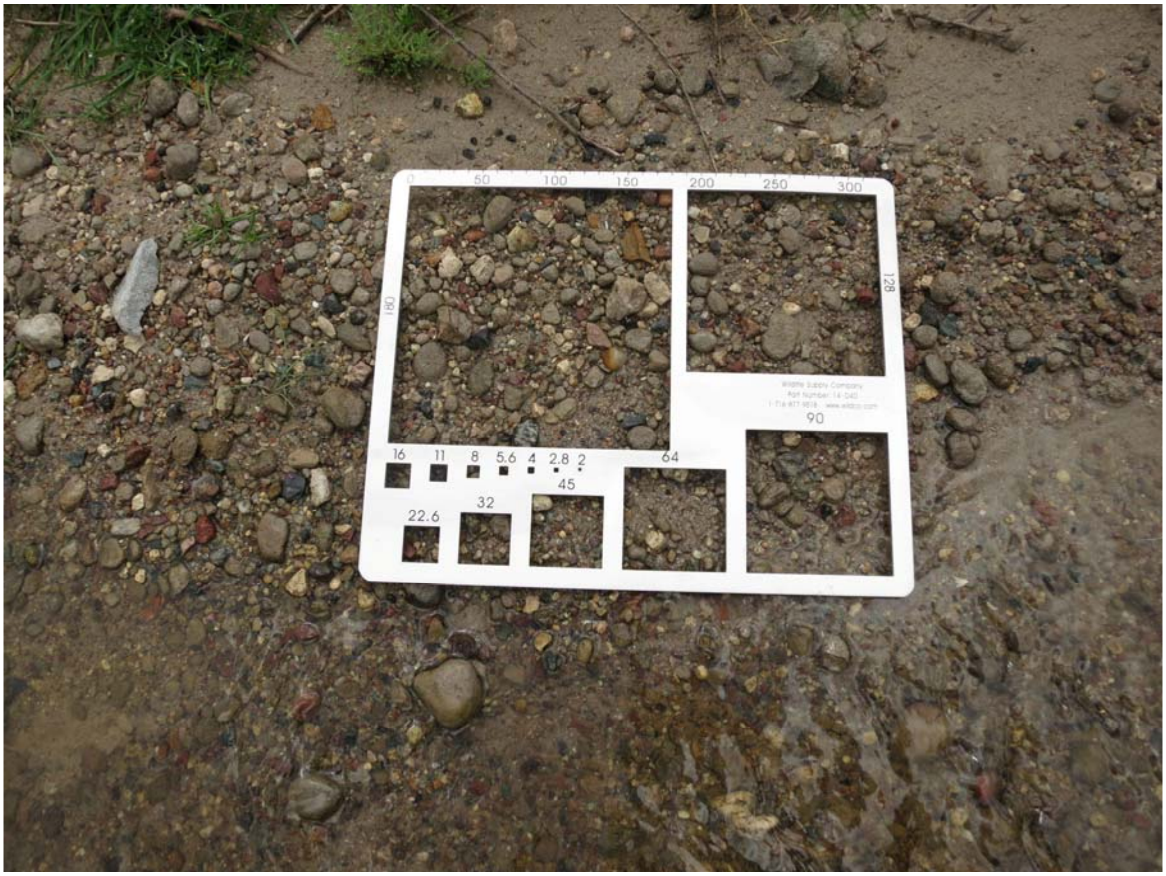


Figure 7. Gravelometer on Channel

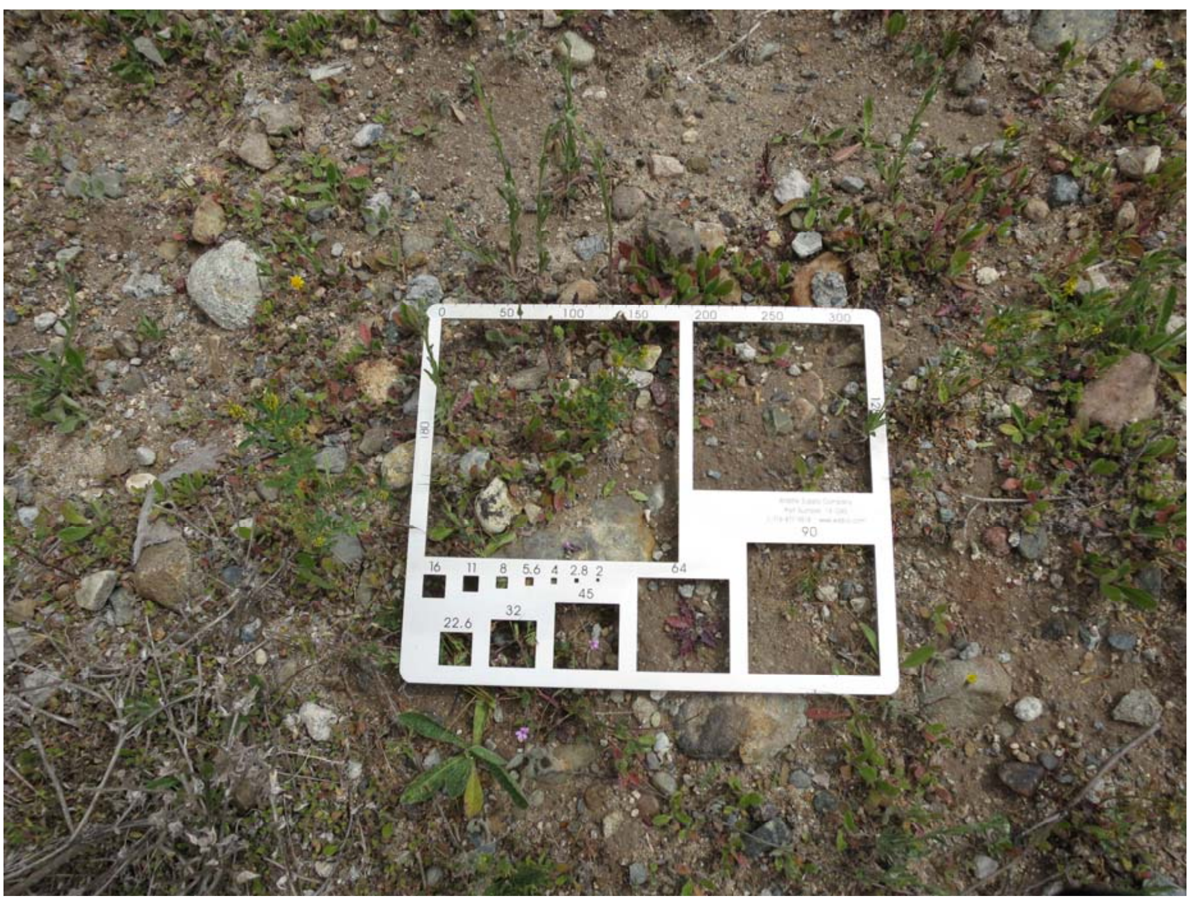


Figure 8. Gravelometer on Channel

Figure 9. Gravelometer on Channel

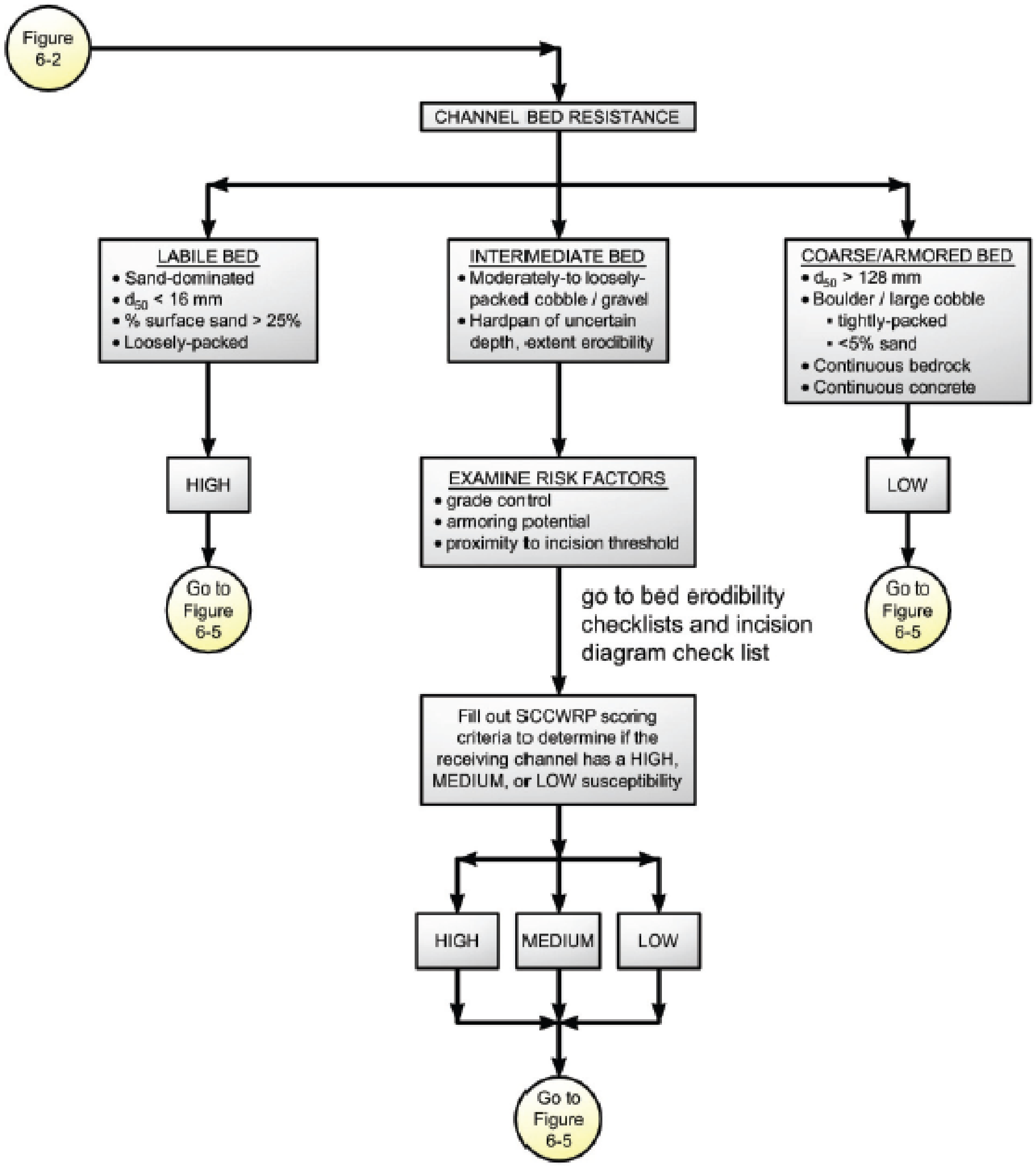


Figure 6-4. SCCWRP Vertical Susceptibility

Figure 10. SCCWRP Vertical Channel Susceptibility Matrix

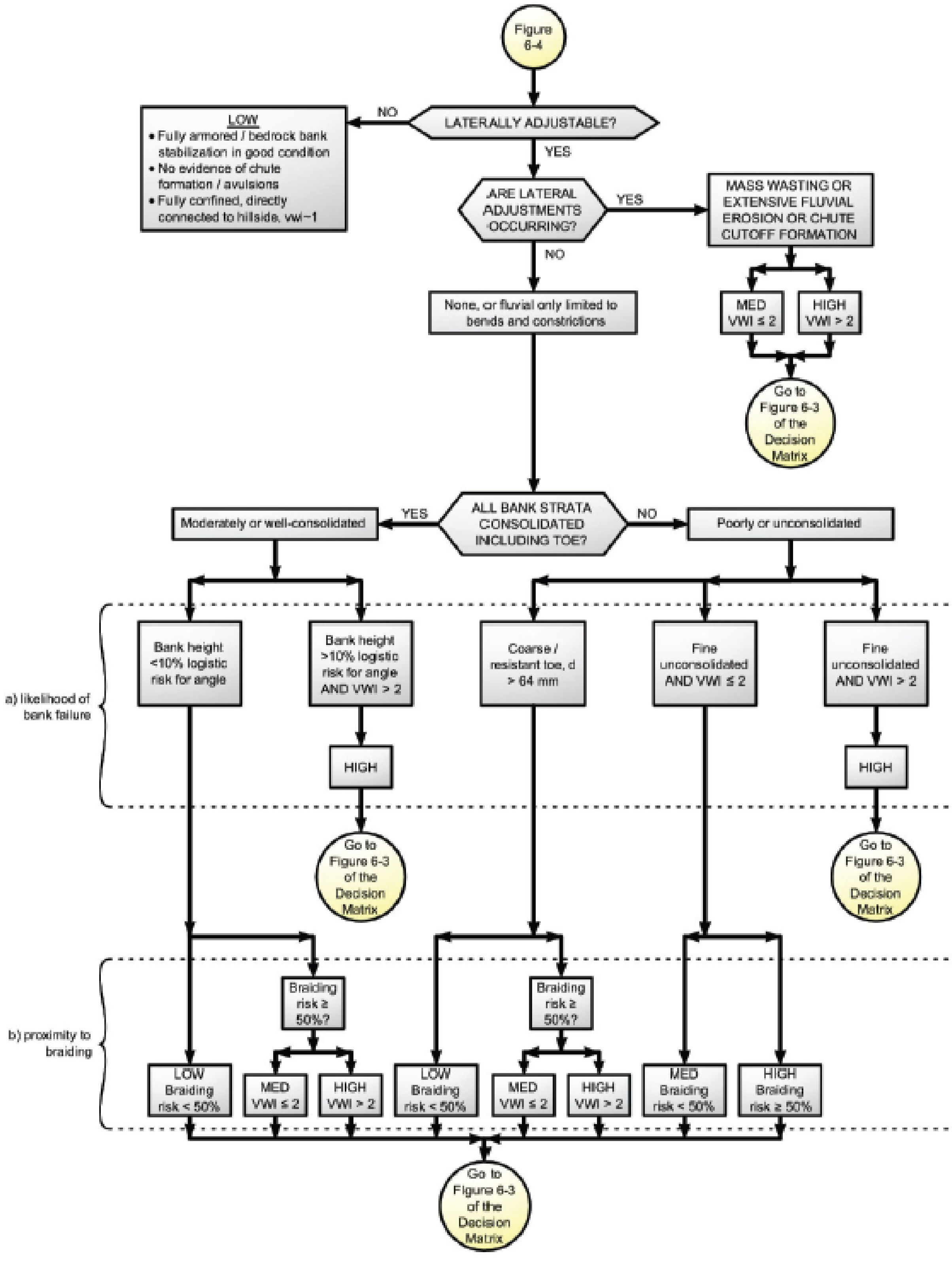
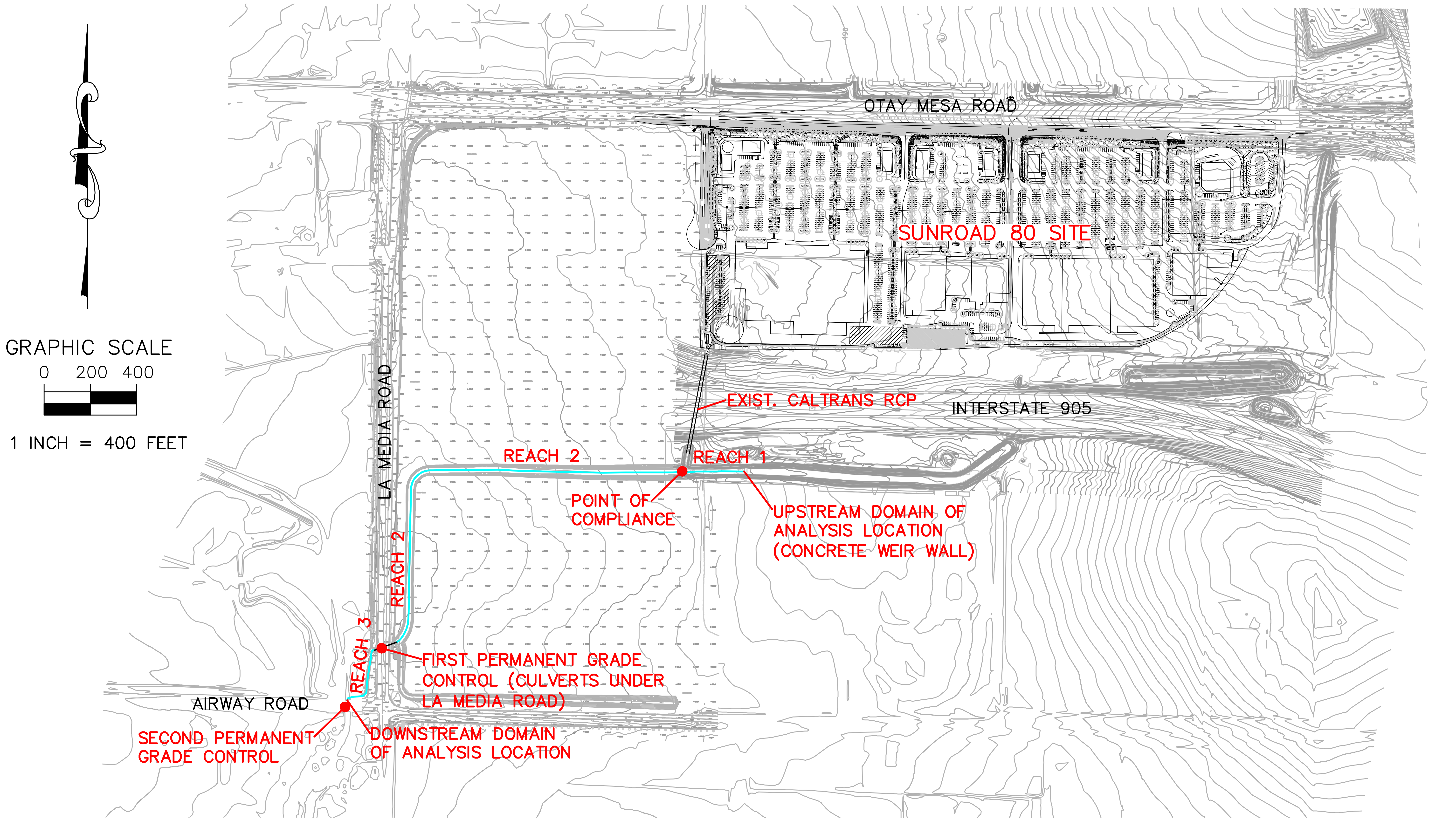


Figure 6-5. Lateral Channel Susceptibility

Figure 11. SCCWRP Lateral Channel Susceptibility Matrix



STUDY AREA EXHIBIT

APPENDIX A

SCCWRP INITIAL DESKTOP ANALYSIS

FORM 1: INITIAL DESKTOP ANALYSIS

Complete all shaded sections.

IF required at multiple locations, circle one of the following site types:

Applicant Site / Upstream Extent / Downstream Extent

Location: Latitude: 32.5658 Longitude: -116.9562

Description (river name, crossing streets, etc.): Sunroad 80 - between Otay Mesa Road and Interstate 905, east of La Media Road.

GIS Parameters: The International System of Units (SI) is used throughout the assessment as the field standard and for consistency with the broader scientific community. However, as the singular exception, US Customary units are used for contributing drainage area (A) and mean annual precipitation (P) to apply regional flow equations after the USGS. See SCCWRP Technical Report 607 for example measurements and "Screening Tool Data Entry.xls" for automated calculations.

Form 1 Table 1. Initial desktop analysis in GIS.

	Symbol	Variable	Description and Source	Value
Watershed properties (English units)	**A**	Area (mi^2)	Contributing drainage area to screening location via published Hydrologic Unit Codes (HUCs) and/or ≤ 30 m National Elevation Data (NED), USGS seamless server	See attached Form 1 table on next page for calculated values for each reach.
	P	Mean annual precipitation (in)	Area-weighted annual precipitation via USGS delineated polygons using records from 1900 to 1960 (which was more significant in hydrologic models than polygons delineated from shorter record lengths)	
Site properties (SI units)	**S_v**	Valley slope (m/m)	Valley slope at site via NED, measured over a relatively homogenous valley segment as dictated by hillslope configuration, tributary confluences, etc., over a distance of up to ~500 m or 10% of the main-channel length from site to drainage divide	
	W_v	Valley width (m)	Valley bottom width at site between natural valley walls as dictated by clear breaks in hillslope on NED raster, irrespective of potential armoring from floodplain encroachment, levees, etc. (imprecise measurements have negligible effect on rating in wide valleys where VWI is >> 2, as defined in lateral decision tree)	

Form 1 Tabl e 2. Simplif ied peak flo w, screening index, and valley width index. Values for this table should be calculated in the sequence shown in this table, using values from Form 1 Table 1.

Symbol	Dependent Variable	Equation	Required Units	Value
Q_{10cfs}	10-yr peak flow (ft^3/s)	$Q_{10cfs} = 18.2 * A^{0.87} * P^{0.77}$	A (mi^2) P (in)	See attached Form 1 table on next page for calculated values for each reach.
Q_{10}	10-yr peak flow (m^3/s)	$Q_{10} = 0.0283 * Q_{10cfs}$	Q_{10cfs} (ft^3/s)	
INDEX	10-yr screening index ($m^{1.5}/s^{0.5}$)	$INDEX = S_v * Q_{10}^{0.5}$	Sv (m/m) Q_{10} (m^3/s)	
W_{ref}	Reference width (m)	$W_{ref} = 6.99 * Q_{10}^{0.438}$	Q_{10} (m^3/s)	
VWI	Valley width index (m/m)	$VWI = W_v/W_{ref}$	W_v (m) W_{ref} (m)	

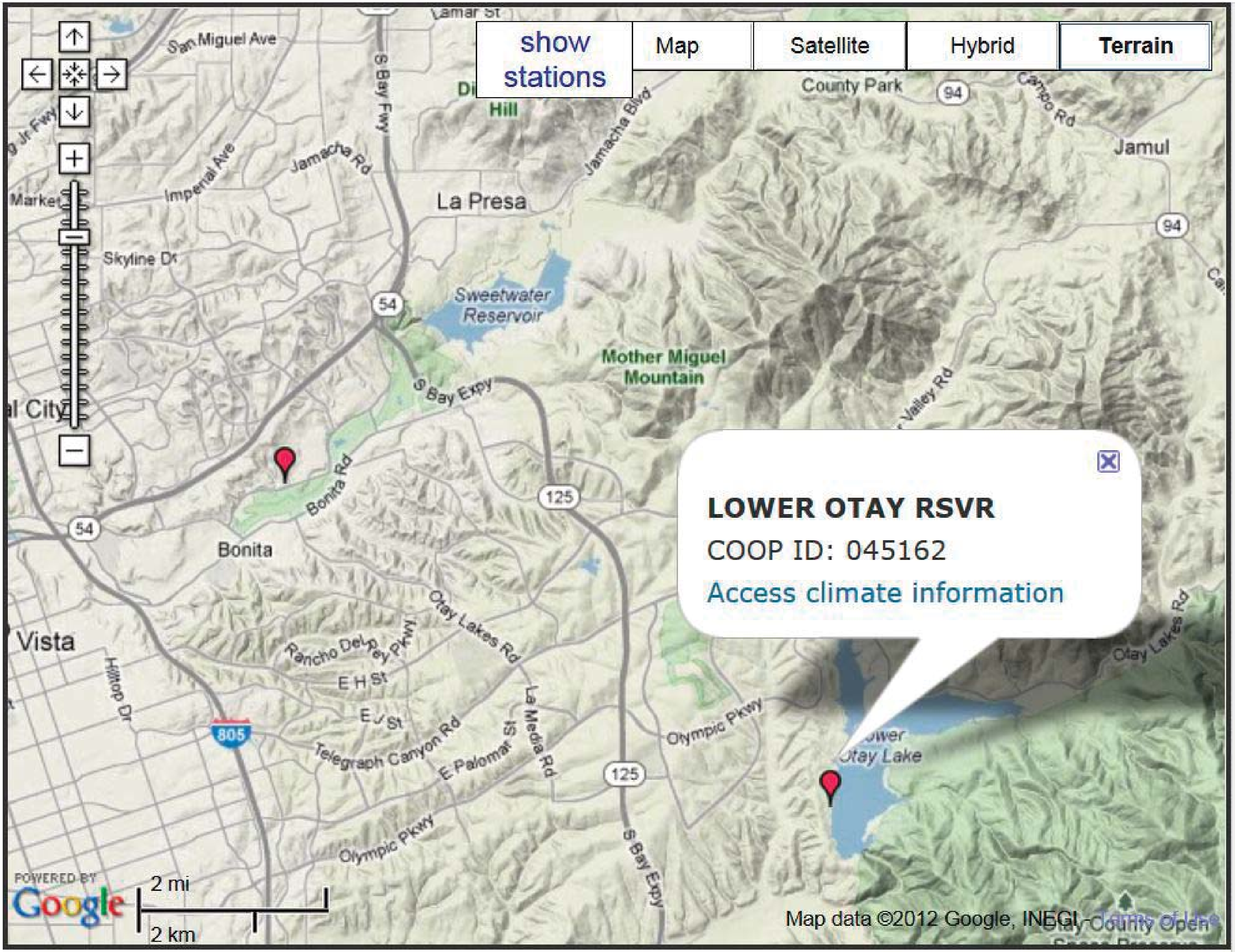
(Sheet 1 of 1)

SCCWRP FORM 1 ANALYSES

Reach	Area A, sq. mi.	Mean Annual Precip. P, inches	Valley Slope Sv, m/m	Valley Width Wv, m	10-Year Flow Q10cfs, cfs	10-Year Flow Q10, cms
1	1.02	11.07	0.0012	7.6	118	3.3
2	2.14	11.07	0.0015	7.6	225	6.4
3	2.15	11.07	0.0010	11.0	225	6.4

Reach	10-Year Screening Index INDEX	Reference Width Wref, m	Valley Width Index VWI, m/m
1	0.0021	11.8	0.64
2	0.0038	15.7	0.48
3	0.0026	15.7	0.70

Western US COOP Station Map



LOWER OTAY RESERVOIR, CALIFORNIA (045162)

Period of Record Monthly Climate Summary

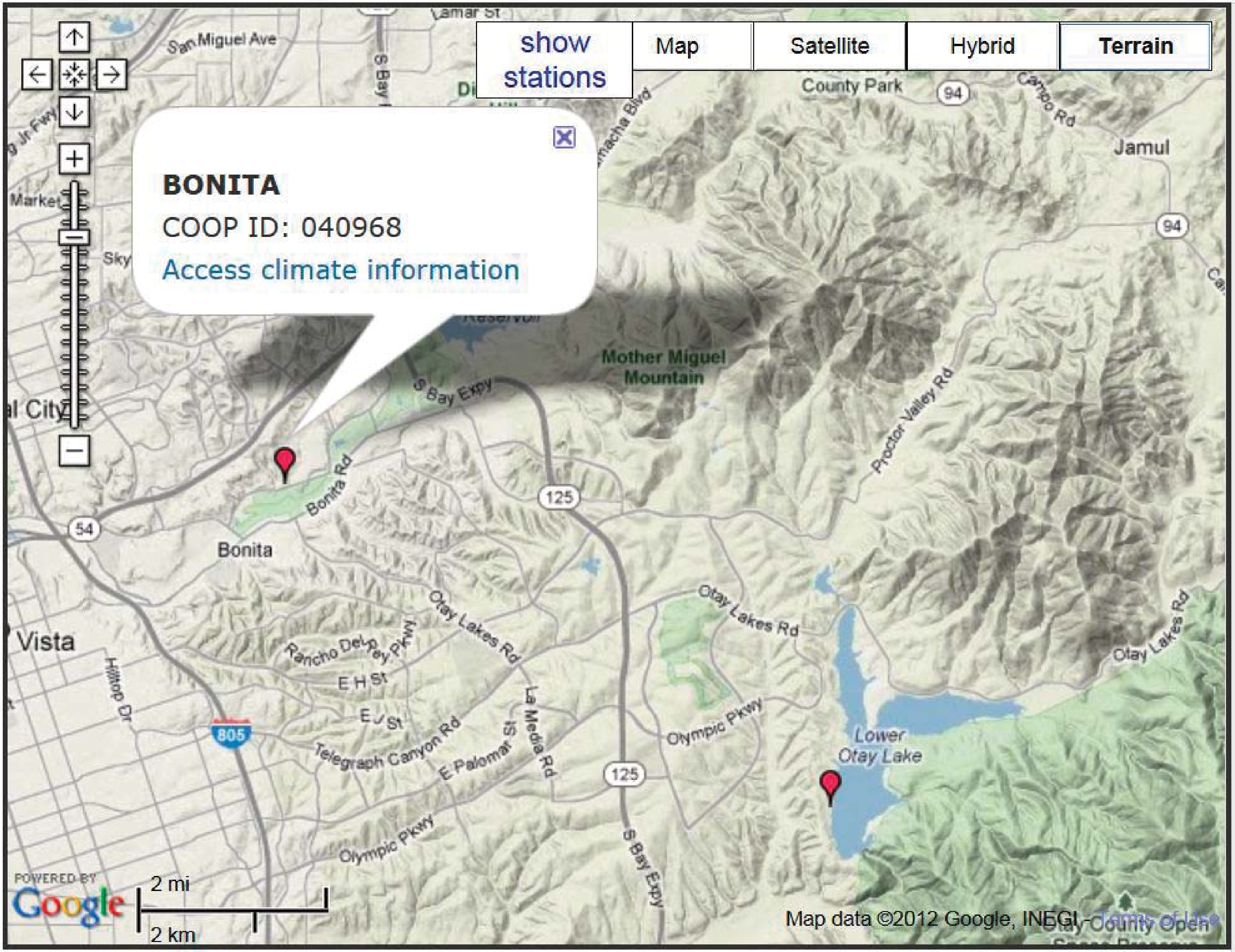
Period of Record : 9/ 1/1940 to 10/31/1956

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)					Insuff	icient	Data						
Average Min. Temperature (F)					Insuff	icient	Data						
Average Total Precipitation (in.)	2.12	1.16	2.28	1.09	0.32	0.03	0.02	0.10	0.03	0.48	0.97	2.46	11.07
Average Total SnowFall (in.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Average Snow Depth (in.)	0	0	0	0	0	0	0	0	0	0	0	0	0

Percent of possible observations for period of record.
Max. Temp.: 0% Min. Temp.: 0% Precipitation: 100% Snowfall: 100% Snow Depth: 100%
Check Station Metadata or Metadata graphics for more detail about data completeness.

Western Regional Climate Center, wrcc@dri.edu

Western US COOP Station Map



BONITA, CALIFORNIA (040968)

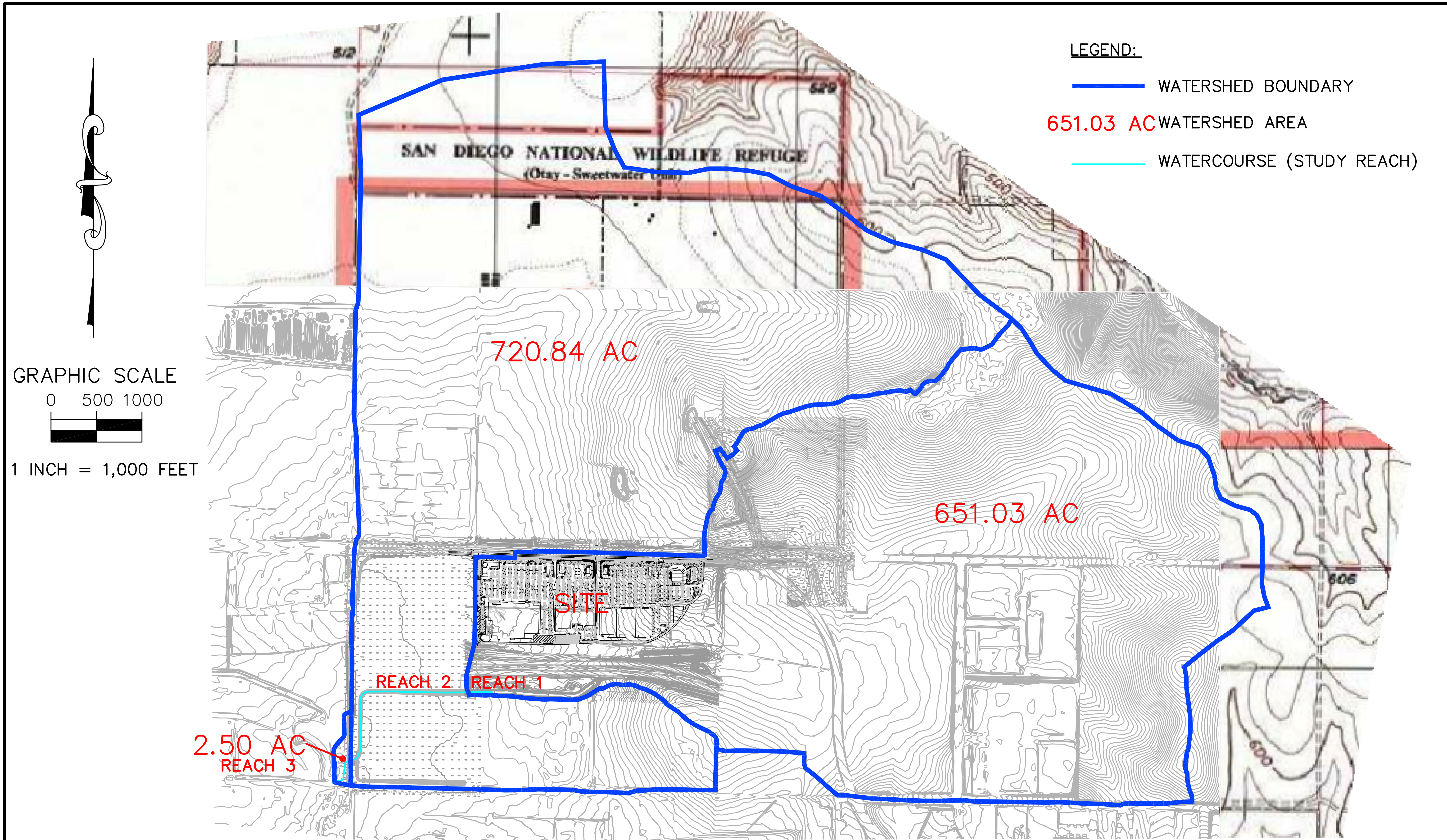
Period of Record Monthly Climate Summary

Period of Record : 10/1/1915 to 12/31/1970

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	66.4	67.3	68.6	70.9	72.6	75.0	79.4	80.8	80.6	77.0	73.5	68.4	73.4
Average Min. Temperature (F)	40.0	42.2	44.2	48.2	52.6	55.9	59.6	60.7	57.5	51.6	44.3	40.9	49.8
Average Total Precipitation (in.)	2.14	2.09	1.75	0.97	0.36	0.06	0.01	0.06	0.18	0.55	1.09	2.25	11.51
Average Total SnowFall (in.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Average Snow Depth (in.)	0	0	0	0	0	0	0	0	0	0	1	0	0

Percent of possible observations for period of record.
Max. Temp.: 92.5% Min. Temp.: 92.6% Precipitation: 94% Snowfall: 93.6% Snow Depth: 93.3%
Check Station Metadata or Metadata graphics for more detail about data completeness.

Western Regional Climate Center, wrcc@dri.edu



WATERSHED EXHIBIT

APPENDIX B

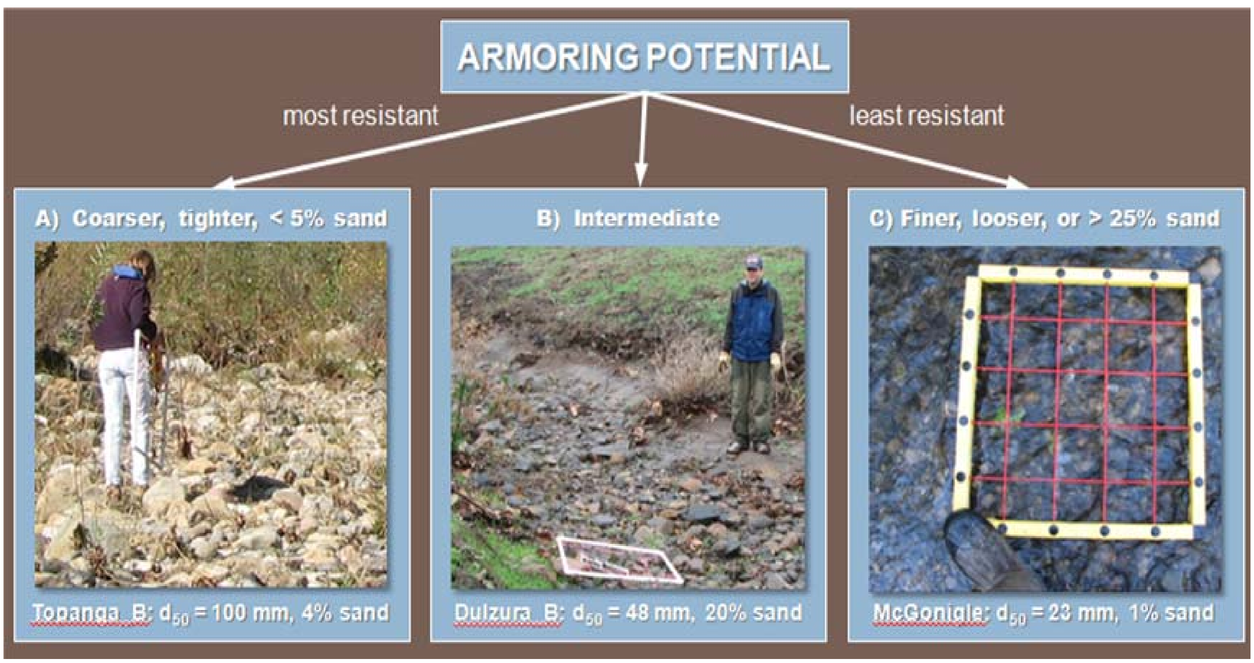
SCCWRP FIELD SCREENING DATA

Form 3 Support Materials

Form 3 Checklists 1 and 2, along with information recording in Form 3 Table 1, are intended to support the decisions pathways illustrated in Form 3 Overall Vertical Rating for Intermediate/Transitional Bed.

Form 3 Checklist 1: Armoring Potential

☐	A	A mix of coarse gravels and cobbles that are tightly packed with <5% surface material of diameter <2 mm
X	B	Intermediate to A and C or hardpan of unknown resistance, spatial extent (longitudinal and depth), or unknown armoring potential due to surface veneer covering gravel or coarser layer encountered with probe
☐	C	Gravels/cobbles that are loosely packed or >25% surface material of diameter <2 mm



Form 3 Figure 2. Armoring potential photographic supplement for assessing intermediate beds (16 < d_{50} < 128 mm) to be used i**n conjunction with Form 3 Checklist 1.**

(Sheet 2 of 4)

REACH 1, 2, AND 3 RESULTS

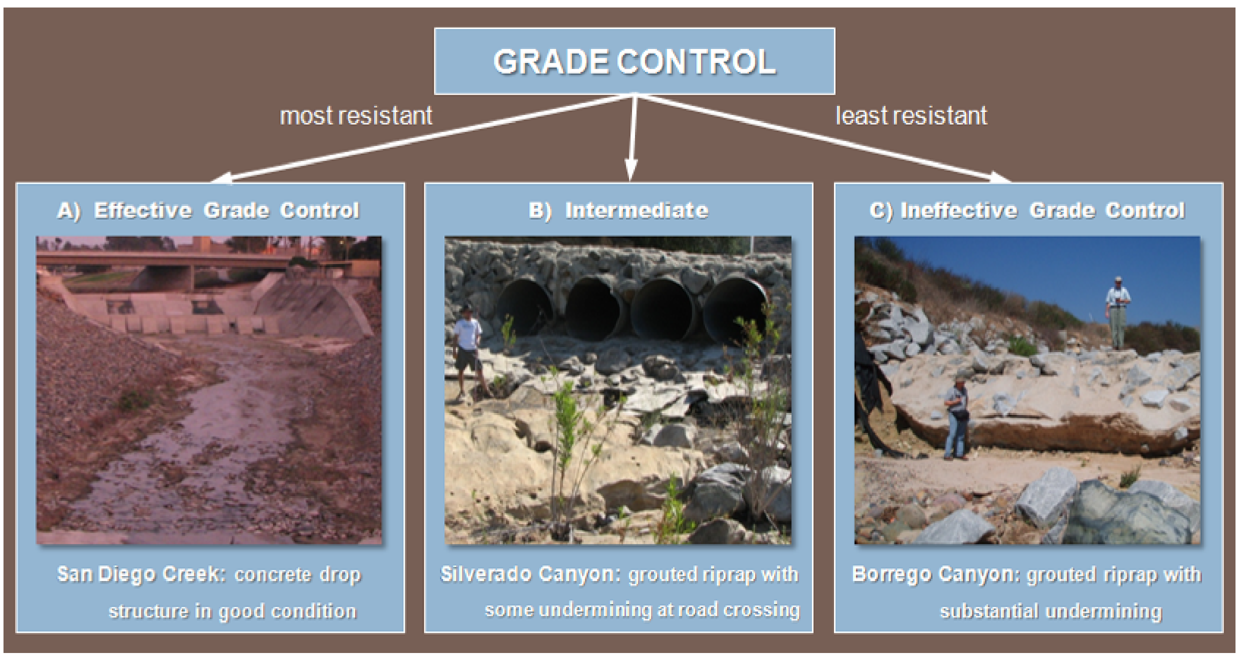
Form 3 Checklist 2: Grade Control

x A Grade control is present with spacing <50 m or 2/S_v m

- No evidence of failure/ineffectiveness, e.g., no headcutting (>30 cm), no active mass wasting (analyst cannot say grade control sufficient if mass-wasting checklist indicates presence of bank failure), no exposed bridge pilings, no culverts/structures undermined
- Hard points in serviceable condition at decadal time scale, e.g., no apparent undermining, flanking, failing grout
- If geologic grade control, rock should be resistant igneous and/or metamorphic; For sedimentary/hardpan to be classified as 'grade control', it should be of demonstrable strength as indicated by field testing such as hammer test/borings and/or inspected by appropriate stakeholder

□ B Intermediate to A and C – artificial or geologic grade control present but spaced 2/Sv m to 4/Sv m or potential evidence of failure or hardpan of uncertain resistance

□ C Grade control absent, spaced >100 m or >4/S_v m, or clear evidence of ineffectiveness



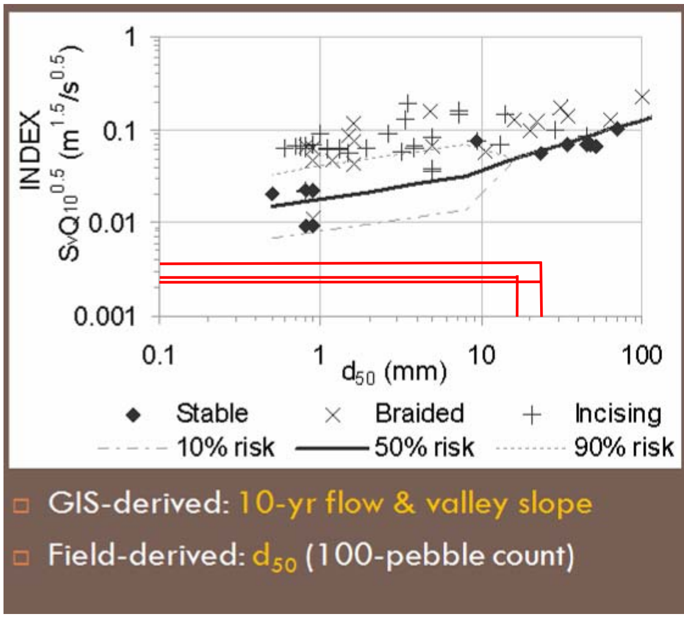
Form 3 Figure 3. Grade-control (condition) photographic supplement for assessing intermediate beds (16 < d_{50} < 128 mm) to be used in conjunction with Form 3 Checklist 2.

(Sheet 3 of 4)

Regionally-Calibrated Screening Index Threshold for Incising/Braiding

For transitional bed channels (d_{50} between 16 and 128 mm) or labile beds (channel not incised past critical bank height), use Form 3 Figure 3 to determine Screening Index Score and complete Form 3 Table 1.

See Appendix A for Reach 1, 2, and 3 INDEX values (0.0021, 0.0038, 0.0026)



Model Type	d_{50} (mm)	50% Risk $S_vQ_{10}^{0.5}$ ($m^{1.5}/s^{0.5}$)
Logistic Regression $d_{50} \geq 16$ mm	128	0.145
	96	0.125
	80	0.114
	64	0.101
	48	0.087
	32	0.070
	16	0.049
Logistic Reg. $d_{50} < 16$ mm	8	0.031
	4	0.026
	2	0.022
	1	0.018
	0.5	0.015

Form 3 Figure 4. Probability of incising/braiding based on logistic regression of Screening Index and d_{50} to be used in conjunction with Form 3 Table 1.

Form 3 Table 1. Values for Screening Index Threshold (probability of incising/braiding) to be used in conjunction with Form 3 Figure 4 (above) to complete Form 3 Overall Vertical Rating for Intermediate/Transitional Bed (below).. Screening Index Score: A = <50% probability of incision for current Q_{10}, valley slope, and d_{50}; B = Hardpan/d_{50} indeterminate; and C = ≥50% probability of incising/braiding for current Q_{10}, valley slope, and d_{50}.

d_{50} (mm) *From Form 2*	**S_v*$Q_{10}^{0.5}$ ($m^{1.5}/s^{0.5}$)** *From Form 1*	**S_v*$Q_{10}^{0.5}$ ($m^{1.5}/s^{0.5}$)** *50% risk of incising/braiding from table in Form 3 Figure 3 above*	**Screening Index Score (A, B, C)**

Overall Vertical Rating for Intermediate/Transitional Bed

Calculate the overall Vertical Rating for Transitional Bed channels using the formula below. Numeric values for responses to Form 3 Checklists and Table 1 as follows: A = 3, B = 6, C = 9.

$$Vertical\ Rating = \sqrt{\{(\sqrt{armoring * grade\ control}) * screening\ index\ score\}}$$

6 x 3 x 3 = 3.6

Vertical Susceptibility based on Vertical Rating: <4.5 = LOW; 4.5 to 7 = MEDIUM; and >7 = HIGH.

(Sheet 4 of 4)

REACH 1, 2, AND 3 RESULTS

PEBBLE COUNT

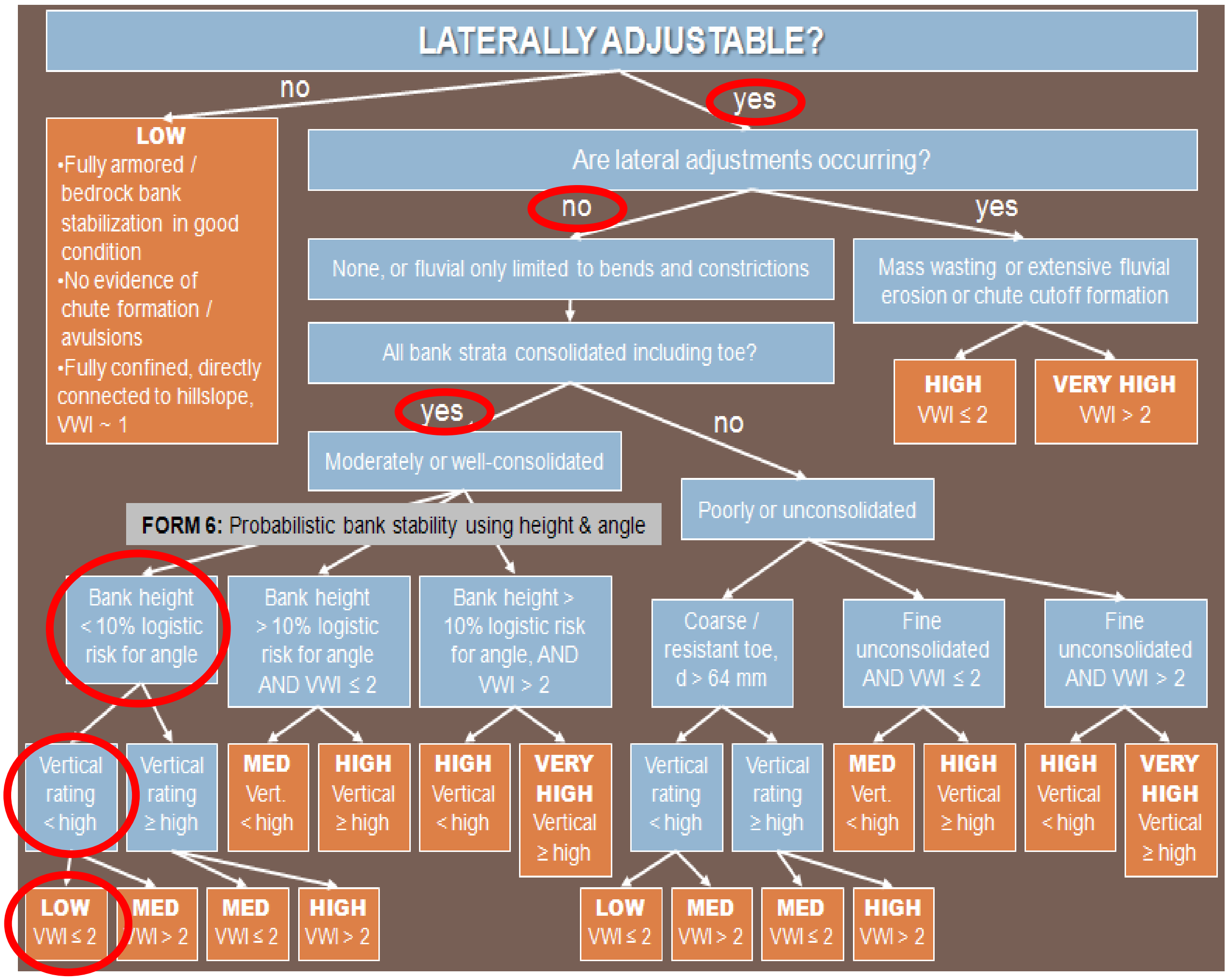
#	Reach 1 Diameter, mm	Reach 2 Diameter, mm	Reach 3 Diameter, mm
1	2.8	2.8	2.8
2	2.8	4	2.8
3	4	4	4
4	4	4	4
5	4	5.6	4
6	4	5.6	4
7	4	5.6	4
8	5.6	5.6	4
9	5.6	5.6	5.6
10	5.6	8	5.6
11	5.6	8	5.6
12	5.6	8	5.6
13	5.6	8	5.6
14	5.6	8	5.6
15	5.6	8	5.6
16	5.6	8	5.6
17	8	8	5.6
18	8	8	5.6
19	8	8	5.6
20	8	8	5.6
21	8	11	5.6
22	8	11	8
23	8	11	8
24	8	11	8
25	8	11	8
26	8	11	8
27	11	11	8
28	11	11	8
29	11	11	8
30	11	11	8
31	11	11	8
32	11	16	8
33	11	16	8
34	11	16	11
35	11	16	11
36	11	16	11
37	11	16	11
38	16	16	11
39	16	16	11
40	16	16	11
41	16	16	11
42	16	16	11
43	16	16	11
44	16	16	11
45	16	16	11

#	Reach 1 Diameter, mm	Reach 2 Diameter, mm	Reach 3 Diameter, mm	
46	16	22.6	11	
47	16	22.6	16	
48	16	22.6	16	
49	16	22.6	16	
50	22.6	22.6	16	D50
51	22.6	22.6	16	
52	22.6	22.6	16	
53	22.6	22.6	16	
54	22.6	22.6	16	
55	22.6	22.6	16	
56	22.6	22.6	16	
57	22.6	22.6	16	
58	22.6	22.6	16	
59	22.6	22.6	16	
60	22.6	22.6	16	
61	22.6	22.6	16	
62	22.6	22.6	16	
63	22.6	22.6	16	
64	22.6	22.6	16	
65	22.6	22.6	16	
66	22.6	22.6	16	
67	22.6	22.6	16	
68	22.6	22.6	16	
69	22.6	22.6	16	
70	22.6	22.6	16	
71	22.6	22.6	16	
72	22.6	32	16	
73	22.6	32	16	
74	22.6	32	22.6	
75	22.6	32	22.6	
76	22.6	32	22.6	
77	22.6	32	22.6	
78	22.6	32	22.6	
79	22.6	32	22.6	
80	22.6	32	22.6	
81	22.6	32	22.6	
82	22.6	32	22.6	
83	22.6	32	22.6	
84	22.6	45	22.6	
85	22.6	45	22.6	
86	22.6	45	22.6	
87	22.6	45	22.6	
88	22.6	45	22.6	
89	22.6	45	22.6	
90	22.6	45	22.6	
91	22.6	45	22.6	
92	22.6	45	22.6	

#	Reach 1 Diameter, mm	Reach 2 Diameter, mm	Reach 3 Diameter, mm
93	22.6	45	22.6
94	22.6	45	22.6
95	32	45	22.6
96	32	45	22.6
97	32	64	32
98	32	64	32
99	32	64	32
100	64	64	32

FORM 4: LATERAL SUSCEPTIBILTY FIELD SHEET

Circle appropriate nodes/pathway for proposed site
OR use sequence of questions provided in Form 5.



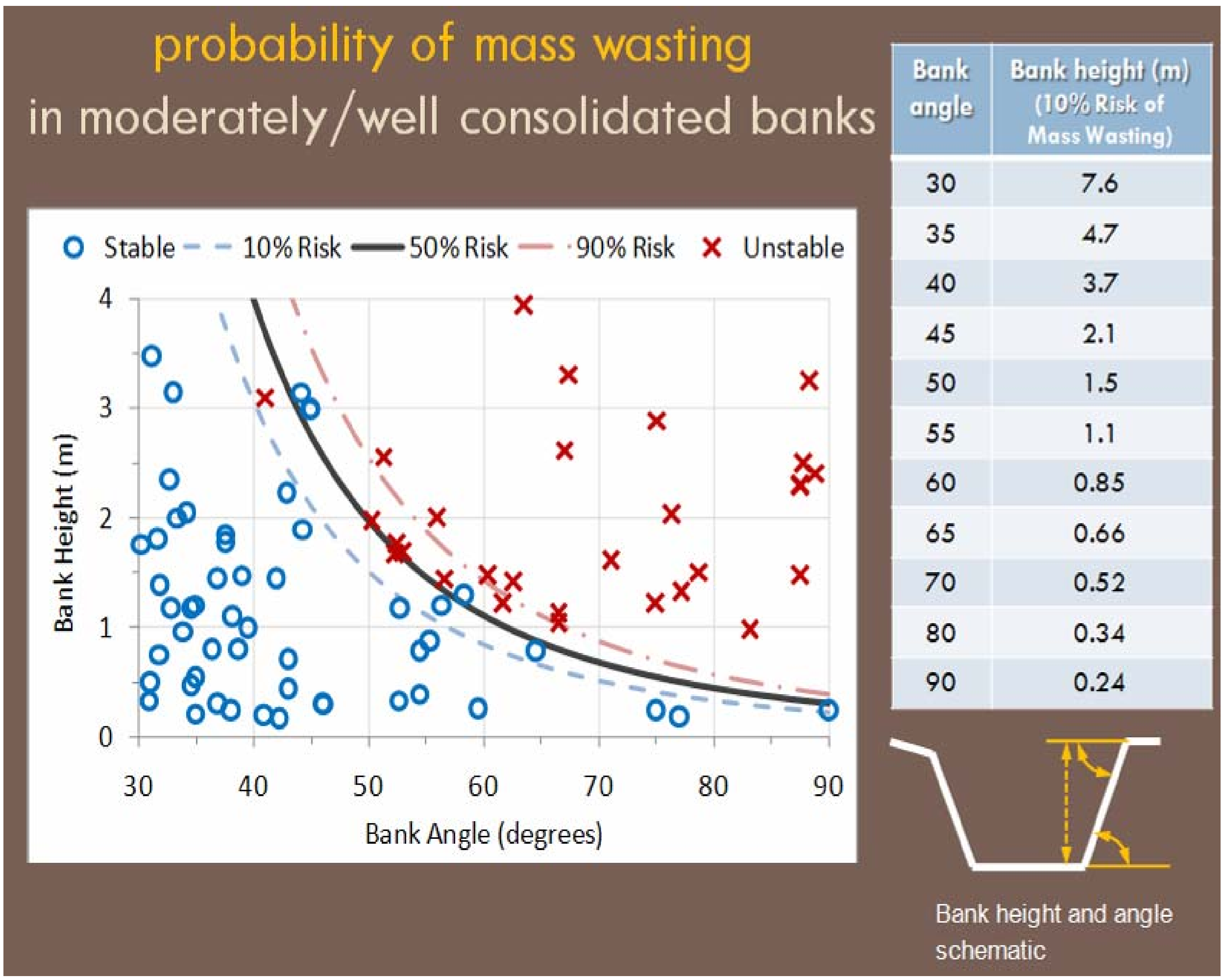
(Sheet 1 of 1)

REACH 1A, 1B, AND 2 RESULTS

FORM 6: PROBABILITY OF MASS WASTING BANK FAILURE

If mass wasting is not currently extensive and the banks are moderately- to well-consolidated, measure bank height and angle at several locations (i.e., at least three locations that capture the range of conditions present in the study reach) to estimate representative values for the reach. Use Form 6 Figure 1 below to determine if risk of bank failure is >10% and complete Form 6 Table 1. Support your results with photographs that include a protractor/rod/tape/person for scale.

	Bank Angle (degrees) *(from Field)*	**Bank Height (m)** *(from Field)*	**Corresponding Bank Height for 10% Risk of Mass Wasting (m)** *(from Form 6 Figure 1 below)*	**Bank Failure Risk** *(<10% Risk)* *(>10% Risk)*
Left Bank	<30	---	---	<10%
Right Bank	<30	---	---	<10%



Form 6 Figure 1. Probability Mass Wasting diagram, Bank Angle:Height/% Risk table, and Band Height:Angle schematic.

(Sheet 1 of 1)

uKnow San Diego BMP Sizing Calculator (v3.0)

Home Contacts Legal Logout

Find

Map data provided by OpenStreetMap

Map Details

Result View

CRITICAL STRESS CALCULATOR RESULTS FOR REACH 1

Define Drainage Basins

Basin: Unnamed Tributary

Project: Sunroad 80

Start | Project | Basin | POC | Export

Manage Your Point of Compliance (POC)

Analyze the receiving water at the 'Point of Compliance' by completing this form. Click Edit and enter the appropriate fields, then click the Update button to calculate the critical flow and low-flow threshold condition. Finally, click Save to commit the changes.

Channel Susceptibility: LOW

Low Flow Threshold: 0.5Q2

Cancel Save Update

Channel Assessed: Yes

Watershed Area (ac): 651.03

Vertical Susceptibility: Low (Vertical)

Lateral Susceptibility: Low (Lateral)

Material: Vegetation

Roughness: 0.100

Channel Top Width (ft): 66.0

Channel Bottom Width (ft): 25.0

Channel Height (ft): 7.0

Channel Slope: 0.0012

Large View

uKnow San Diego BMP Sizing Calculator (v3.0)

Home Contacts Legal Logout

Find

Map data provided by OpenStreetMap

Map Details

Result View

CRITICAL STRESS CALCULATOR RESULTS FOR REACH 2

Define Drainage Basins

Basin: **Unnamed Tributary**

Project: **Sunroad 80**

Start | Project | Basin | POC | Export

Manage Your Point of Compliance (POC)

Analyze the receiving water at the 'Point of Compliance' by completing this form. Click Edit and enter the appropriate fields, then click the Update button to calculate the critical flow and low-flow threshold condition. Finally, click Save to commit the changes.

Channel Susceptibility: LOW

Low Flow Threshold: 0.5Q2

Cancel | Save | Update

Channel Assessed: Yes

Watershed Area (ac): 1371.87

Vertical Susceptibility: Low (Vertical)

Lateral Susceptibility: Low (Lateral)

Material: Vegetation

Roughness: 0.100

Channel Top Width (ft): 66.0

Channel Bottom Width (ft): 25.0

Channel Height (ft): 7.0

Channel Slope: 0.0015

Large View

uKnow San Diego BMP Sizing Calculator (v3.0) Home Contacts Legal Logout

Find

Map data provided by OpenStreetMap

Map Details

Result View **CRITICAL STRESS CALCULATOR RESULTS FOR REACH 3**

Define Drainage Basins

Basin: **Unnamed Tributary** Project: **Sunroad 80**

Start | Project | Basin | **POC** | Export

Manage Your Point of Compliance (POC)

Analyze the receiving water at the 'Point of Compliance' by completing this form. Click Edit and enter the appropriate fields, then click the Update button to calculate the critical flow and low-flow threshold condition. Finally, click Save to commit the changes.

Channel Susceptibility: LOW

Low Flow Threshold: 0.5Q2

Cancel Save Update

Channel Assessed: Yes

Watershed Area (ac): 1374.37

Vertical Susceptibility: Low (Vertical)

Lateral Susceptibility: Low (Lateral)

Material: Vegetation

Roughness: 0.100

Channel Top Width (ft): 70.0

Channel Bottom Width (ft): 36.0

Channel Height (ft): 4.0

Channel Slope: 0.0010

Large View

Hydromodification SWMM Technical Memorandum

To:	Sunroad Partners, L.P. 4445 Eastgate Mall, Suite 400, San Diego, CA 92121
From:	Nick Roberts, P.E. Kimley-Horn and Associates, Inc.
Date:	October 10th, 2017
Subject:	Sunroad Otay – Hydromodification Calculations

A. Introduction

This technical memorandum summaries and documents the approach used to model the continuous simulation using the Environmental Protection Agency (EPA) Storm Water Management Model 5.1 (SWMM). The SMMM model was prepared to support the proposed development and the proposed LID BMP and storage facilities in order to meet the requirements and verify compliance with the City of San Diego Standards for hydromodification management.

B. Model Development & Standard Parameters

The proposed industrial site has one point of compliance on the southwestern corner of the project. Two SWMM models were prepared to analyze the pre development and post development conditions.

Inputs required for the SWMM model include, rainfall, potential evapotranspiration, subcatchment land characteristics, rainfall loss parameters, LID BMP characteristics and storage unit parameters.

The project's location is nearest to the Lower Otay Reservoir Rainfall Gauge. The rainfall data for Lower Otay Reservoir Rainfall Gauge was used for both the pre and post project conditions. This rainfall data was utilized without any modifications to ensure all data was utilized and analyzed per the requirements of the San Diego Hydromodification management standards.

Potential evapotranspiration for the site was modeled using the City of San Diego's Table G.1-1 and entered directly into the SWMM model for both the pre and post conditions.

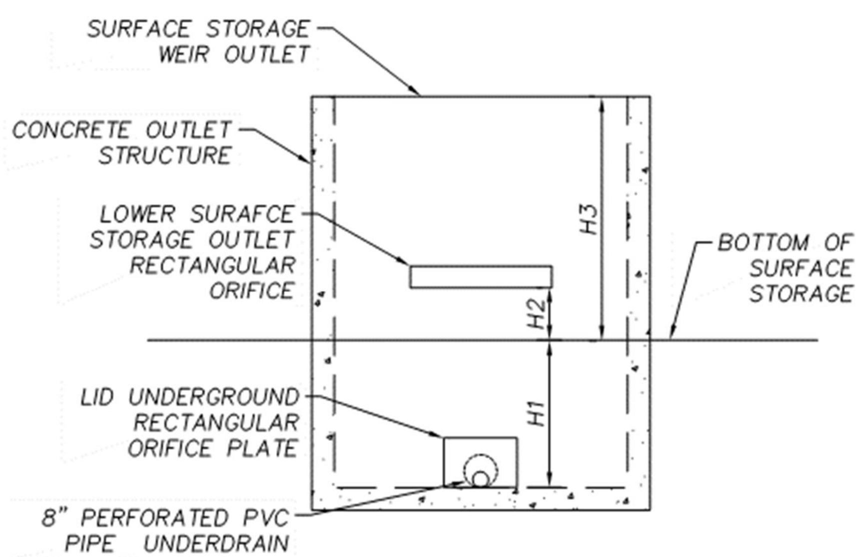
The subcatchments characteristics for percentage of impervious area and total tributary area were defined by the project specific conditions for each sub catchment. The rainfall loss parameters for each subcatchment were entered into the model per the City of San Diego's Table G.1-4 and using type D soils for all soil dependent parameters. Pre project impervious percentages were assumed to be 0% per the requirements of City of San Diego hydromodification standards. Project specific impervious percentages were used for each subcatchment in the post project condition.

LID BMP characteristics and storage unit parameters were developed based on the design developed for each facility. See Project plan sheets in Attachment 5 of the SWQMP and the various model inputs found within this Attachment 4. Table 1 below summarizes the LID BMP design details of the outlet facilities while Figure 1 identifies the variables in Table 1.

Table 1: LID BMP Outlet Design

BASIN ID	LID ORIFICE PLATE		LOWER SURFACE RECTANGULAR ORIFICE			SURFACE STORAGE WEIR OUTLET	
	H1	DIAMETER	H2	LENGTH	HEIGHT	H3	LENGTH
	INCHES	INCHES	INCHES	INCHES	INCHES	FT	FT
1	36	2.5	6	48	6	3.3	18
2	36	1.5	N/A	N/A	N/A	0.5	10
3	36	1.5	N/A	N/A	N/A	0.5	10
4	36	1.75	N/A	N/A	N/A	0.5	10
5	36	1.75	N/A	N/A	N/A	0.5	10
6	36	2	6	12	1	1.3	12
7	36	2	6	12	1	2	12

Figure 1: Typical Outlet Structure Detail identifying variables in Table 1



TYPICAL OUTLET STRUCTURE DETAIL

C. Modeling Results and Target design values

In the pre-developed conditions runoff from the project site and the adjacent tributary area of Otay Mesa Road (via roadside overside drains) drain via overland flow from the northeastern corner of the project to the southwestern corner of the project. The flows discharge to an existing natural channel that lies along the northern edge of State Route 905 and eventually into a drop inlet with a 48" storm drain crossing 905 to the south.

A geomorphic assessment of the receiving channels has been prepared by Chang Consultants on May 14, 2012 (see attachment 2C of SWQMP). The results of the critical stress results returned a low threshold, therefore the downstream receiving streams are considered to have a low susceptibility to erosion and therefore the hydromodification facilities are capable of being designed to the 0.5Q2 threshold. This threshold has been utilized to demonstrate compliance with the hydromodification requirements.

The pre project conditions point of compliance summary table is identified below where the 0 % impervious conditions is identified.

Table 1: Pre-Conditions Point of Compliance #1

POC	Tributary Area (acres)	Impervious Percentage [1]
1	53.26	0%

The post project conditions point of compliance summary table identified below identifies the total tributary area has a total impervious percentage of 83%. Each sub catchment (DMA) has various percentages based on the project specific conditions.

Table 2: Post-Project Conditions Point of Compliance #1

POC	Tributary Area (acres)	Impervious Percentage
1	53.26	83%

As can be seen below in table 3, the post project conditions have mitigated flow rates as required to meet the hydromodification requirements.

Table 3: Pre vs Post Project Flow rates for continuous

	Peak Flow Rate (cfs)			
Return Period	Pre-Development Conditions	Post-Development Conditions	Difference	
25-year	32.57	12.62	-19.95	-61%
10-year	25.87	11.75	-14.11	-55%
5-year	20.56	10.25	-10.31	-50%
2-year	14.36	7.74	-6.62	-46%
1-year	9.78	5.52	-4.25	-44%
6-month	5.50	2.81	-2.69	-49%
3-month	1.40	0.67	-0.74	-53%

Flow duration curve comparisons have been developed using the point of compliance 1 for both pre project and post project conditions. This comparison was developed to compare the 50% of the Q2 pre project conditions up to the Q10 storm event. The Q2 and Q10 were determined using the Weibell and Cunnane statistical determination per the City of San Diego requirements. As can be seen in the flow comparison table in the following attachments the project does not exceed the allowable 10% exceedance or 110% of each pre project conditions flow rates determined in the SWMM model for the point of compliance #1.

Drawdown calculations are provided in Attachment 5 of the SWQMP, within the drainage report. All basins will drawdown within the required 96 hour requirement.

D. Conclusion

This technical memorandum documents the modeling prepared for the continuous simulation modeling of both pre project and post project conditions and also demonstrates that the proposed LID BMPs are designed to meet the San Diego current hydromodification management standards for point of compliance #1.

Nick Roberts, P.E.
RC 76010 Exp. 6/30/18

Summary of Existing Conditions

POC	Tributary Area (acres)	Impervious Percentage [1]
1	53.26	0%

1. Per RWQCB permit existing conditions impervious surfaces are not to be accounted fo in existing conditi 484.37

Summary of Proposed Conditions

POC	Tributary Area (acres)	Impervious Percentage
1	53.26	83%

Summary of LID BMP Design

BMP	Tributary Area (acres)	BMP Area (ft^2)	Low Flow Orifice (in)	Gravel Depth (in)	Height of Riser (in)	Weir Length (ft)	Total Surface Depth (in)
BMP-1	28.28	31368	2.5	18	39.6	18	48
BMP-2	2.3	1920	1.5	18	6	12	6
BMP-3	2.74	2368	1.5	18	6	12	6
BMP-4	2.71	2304	1.75	18	6	12	6
BMP-5	2.62	1920	1.75	18	6	12	6
BMP-6	4.94	20296	2	18	15.6	12	2
BMP-7	9.67	17239	2	18	24	12	2.5

Summary of Riser Details

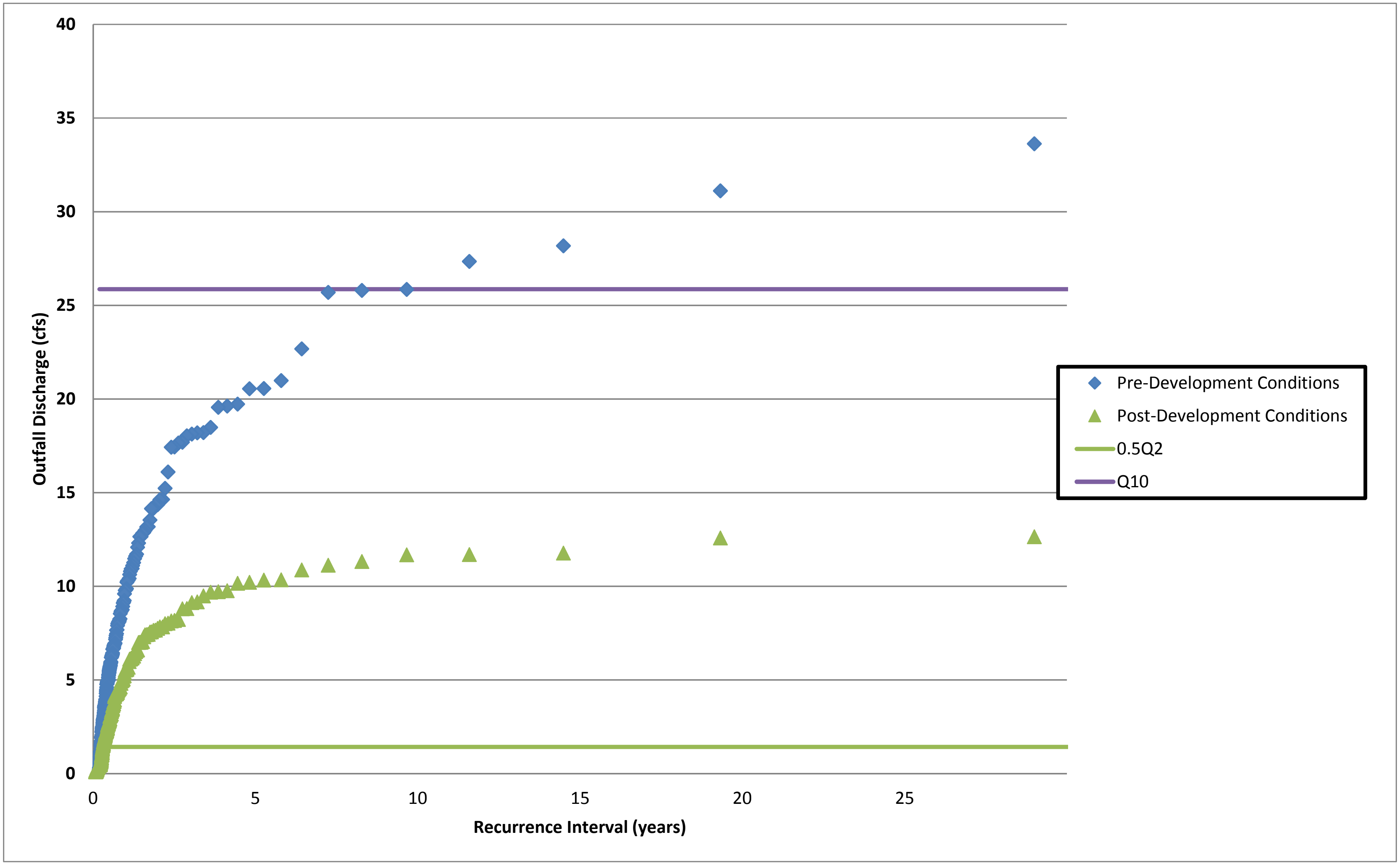
BMP	Lower Slot Orifice			Top Riser	
	Width (ft)	Height (ft)	Elevation (ft)	Length (ft)	Elevation
BMP-1	4	0.1666	0.5	18	3.3
BMP-2	n/a	n/a	n/a	12	0.5
BMP-3	n/a	n/a	n/a	12	0.5
BMP-4	n/a	n/a	n/a	12	0.5
BMP-5	n/a	n/a	n/a	12	0.5
BMP-6	1	0.0833	0.5		1.3
BMP-7	1	0.0833	0.5		2

1. Basin ground elevation assumed to be = 0

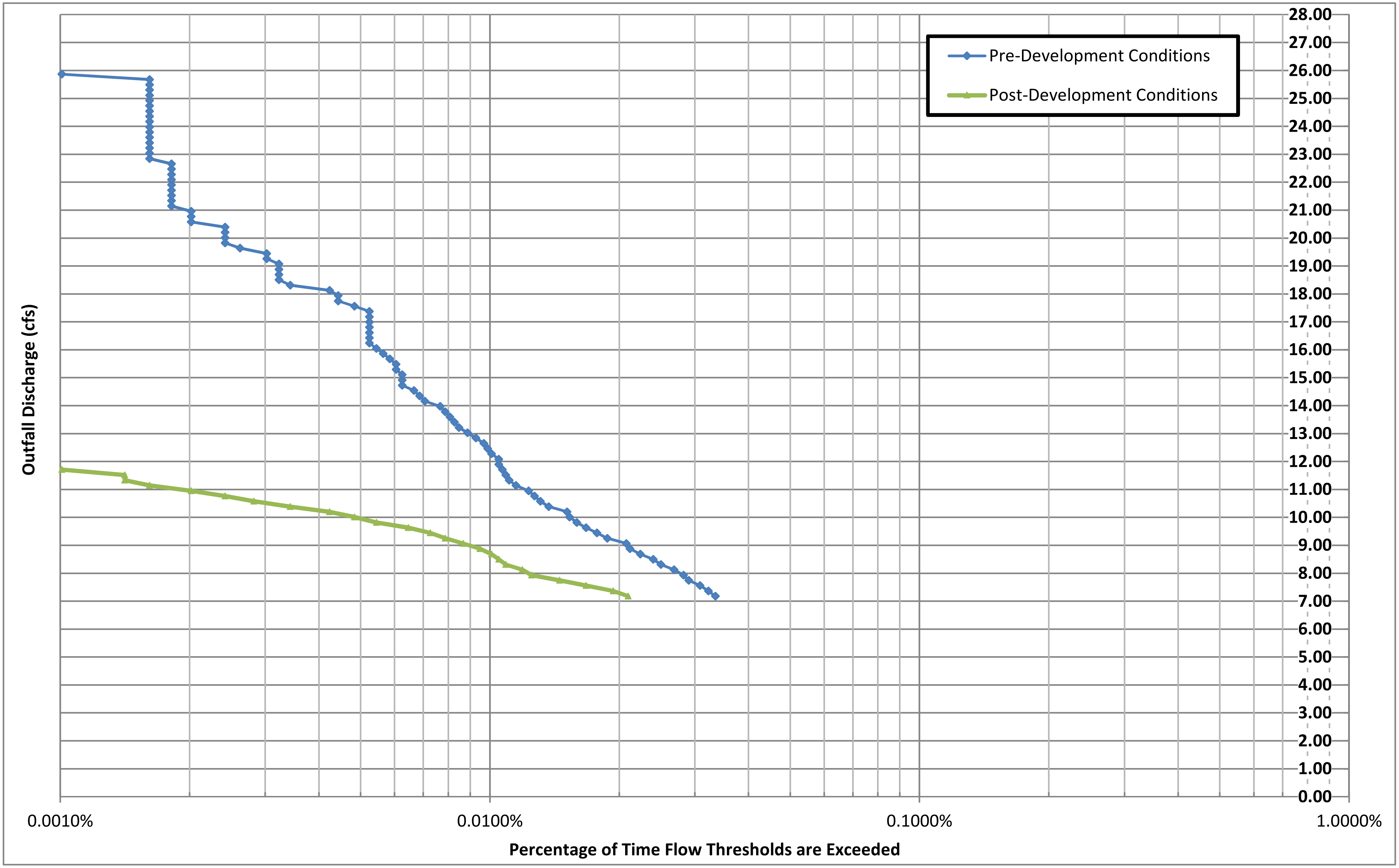
Receiving Watercourse Impact Results - Continuous Simulation Frequency Analysis

	Peak Flow Rate (cfs)			
Return Period	Pre-Development Conditions	Post-Development Conditions	Difference	
25-year	32.57	12.62	-19.95	-61%
10-year	25.87	11.75	-14.11	-55%
5-year	20.56	10.25	-10.31	-50%
2-year	14.36	7.74	-6.62	-46%
1-year	9.78	5.52	-4.25	-44%
6-month	5.50	2.81	-2.69	-49%
3-month	1.40	0.67	-0.74	-53%

Sunroad Otay



Sunroad Otay



Sunroad Otay

Flow Threshold Duration Analysis

Flow Threshold Duration Data

$0.5Q_2$	7.178	cfs
Q_2	14.356	cfs
Q_{10}	25.867	cfs
Plot Interval	0.1888	cfs
Period of Record	57.21	yr
	501,480	hr
Start	10/17/1948	
Finish	12/31/2005	

<<100 intervals between 0.5Q2 and Q10

100% Pass

	Pre-Development Conditions			Post-Development Conditions			HMP
Interval	Q (cfs)	Hours>Q	% time	Hours>Q	% time	Post v. Pre	Test
1	7.178	166	0.033%	104	0.021%	63%	Pass
2	7.367	160	0.032%	96	0.019%	60%	Pass
3	7.556	153	0.031%	83	0.017%	54%	Pass
4	7.744	144	0.029%	72	0.015%	50%	Pass
5	7.933	140	0.028%	62	0.013%	44%	Pass
6	8.122	133	0.027%	59	0.012%	44%	Pass
7	8.311	124	0.025%	54	0.011%	44%	Pass
8	8.499	119	0.024%	52	0.010%	44%	Pass
9	8.688	111	0.022%	50	0.010%	45%	Pass
10	8.877	105	0.021%	47	0.009%	45%	Pass
11	9.066	103	0.021%	43	0.009%	42%	Pass
12	9.255	93	0.019%	39	0.008%	42%	Pass
13	9.443	88	0.018%	36	0.007%	41%	Pass
14	9.632	83	0.017%	32	0.006%	39%	Pass
15	9.821	79	0.016%	27	0.005%	34%	Pass
16	10.010	76	0.015%	24	0.005%	32%	Pass
17	10.198	75	0.015%	21	0.004%	28%	Pass
18	10.387	68	0.014%	17	0.003%	25%	Pass
19	10.576	65	0.013%	14	0.003%	22%	Pass
20	10.765	63	0.013%	12	0.002%	19%	Pass
21	10.954	61	0.012%	10	0.002%	16%	Pass
22	11.142	57	0.011%	8	0.002%	14%	Pass
23	11.331	55	0.011%	7	0.001%	13%	Pass
24	11.520	54	0.011%	7	0.001%	13%	Pass
25	11.709	53	0.011%	5	0.001%	9%	Pass
26	11.897	52	0.010%	4	0.001%	8%	Pass
27	12.086	52	0.010%	4	0.001%	8%	Pass
28	12.275	50	0.010%	3	0.001%	6%	Pass
29	12.464	49	0.010%	3	0.001%	6%	Pass
30	12.652	48	0.010%	1	0.000%	2%	Pass
31	12.841	46	0.009%	1	0.000%	2%	Pass
32	13.030	44	0.009%	1	0.000%	2%	Pass
33	13.219	42	0.008%	0	0.000%	0%	Pass
34	13.408	41	0.008%	0	0.000%	0%	Pass
35	13.596	40	0.008%	0	0.000%	0%	Pass
36	13.785	39	0.008%	0	0.000%	0%	Pass
37	13.974	38	0.008%	0	0.000%	0%	Pass
38	14.163	35	0.007%	0	0.000%	0%	Pass
39	14.351	34	0.007%	0	0.000%	0%	Pass
40	14.540	33	0.007%	0	0.000%	0%	Pass
41	14.729	31	0.006%	0	0.000%	0%	Pass
42	14.918	31	0.006%	0	0.000%	0%	Pass
43	15.107	31	0.006%	0	0.000%	0%	Pass
44	15.295	30	0.006%	0	0.000%	0%	Pass
45	15.484	30	0.006%	0	0.000%	0%	Pass
46	15.673	29	0.006%	0	0.000%	0%	Pass
47	15.862	28	0.006%	0	0.000%	0%	Pass

Q_{10}	25.867 cfs	
Plot Interval	0.1888 cfs	<<100 intervals between 0.5Q2 and Q10

100% Pass

	Pre-Development Conditions			Post-Development Conditions			HMP
Interval	Q (cfs)	Hours>Q	% time	Hours>Q	% time	Post v. Pre	Test
48	16.050	27	0.005%	0	0.000%	0%	Pass
49	16.239	26	0.005%	0	0.000%	0%	Pass
50	16.428	26	0.005%	0	0.000%	0%	Pass
51	16.617	26	0.005%	0	0.000%	0%	Pass
52	16.806	26	0.005%	0	0.000%	0%	Pass
53	16.994	26	0.005%	0	0.000%	0%	Pass
54	17.183	26	0.005%	0	0.000%	0%	Pass
55	17.372	26	0.005%	0	0.000%	0%	Pass
56	17.561	24	0.005%	0	0.000%	0%	Pass
57	17.749	22	0.004%	0	0.000%	0%	Pass
58	17.938	22	0.004%	0	0.000%	0%	Pass
59	18.127	21	0.004%	0	0.000%	0%	Pass
60	18.316	17	0.003%	0	0.000%	0%	Pass
61	18.505	16	0.003%	0	0.000%	0%	Pass
62	18.693	16	0.003%	0	0.000%	0%	Pass
63	18.882	16	0.003%	0	0.000%	0%	Pass
64	19.071	16	0.003%	0	0.000%	0%	Pass
65	19.260	15	0.003%	0	0.000%	0%	Pass
66	19.448	15	0.003%	0	0.000%	0%	Pass
67	19.637	13	0.003%	0	0.000%	0%	Pass
68	19.826	12	0.002%	0	0.000%	0%	Pass
69	20.015	12	0.002%	0	0.000%	0%	Pass
70	20.203	12	0.002%	0	0.000%	0%	Pass
71	20.392	12	0.002%	0	0.000%	0%	Pass
72	20.581	10	0.002%	0	0.000%	0%	Pass
73	20.770	10	0.002%	0	0.000%	0%	Pass
74	20.959	10	0.002%	0	0.000%	0%	Pass
75	21.147	9	0.002%	0	0.000%	0%	Pass
76	21.336	9	0.002%	0	0.000%	0%	Pass
77	21.525	9	0.002%	0	0.000%	0%	Pass
78	21.714	9	0.002%	0	0.000%	0%	Pass
79	21.902	9	0.002%	0	0.000%	0%	Pass
80	22.091	9	0.002%	0	0.000%	0%	Pass
81	22.280	9	0.002%	0	0.000%	0%	Pass
82	22.469	9	0.002%	0	0.000%	0%	Pass
83	22.658	9	0.002%	0	0.000%	0%	Pass
84	22.846	8	0.002%	0	0.000%	0%	Pass
85	23.035	8	0.002%	0	0.000%	0%	Pass
86	23.224	8	0.002%	0	0.000%	0%	Pass
87	23.413	8	0.002%	0	0.000%	0%	Pass
88	23.601	8	0.002%	0	0.000%	0%	Pass
89	23.790	8	0.002%	0	0.000%	0%	Pass
90	23.979	8	0.002%	0	0.000%	0%	Pass
91	24.168	8	0.002%	0	0.000%	0%	Pass
92	24.357	8	0.002%	0	0.000%	0%	Pass
93	24.545	8	0.002%	0	0.000%	0%	Pass
94	24.734	8	0.002%	0	0.000%	0%	Pass
95	24.923	8	0.002%	0	0.000%	0%	Pass
96	25.112	8	0.002%	0	0.000%	0%	Pass
97	25.300	8	0.002%	0	0.000%	0%	Pass
98	25.489	8	0.002%	0	0.000%	0%	Pass
99	25.678	8	0.002%	0	0.000%	0%	Pass
100	25.867	5	0.001%	0	0.000%	0%	Pass

<<from SWMM5 stats, Existing>>
<<24hr Event Separation Time, Q threshold = 1.0000 cfs>>

0	0.4075

Cunnane: for LPIII distribution, b>3/8 with positive ske

TABLE A-1
Plotting Position Analysis - Complete Duration Series (by Ev
Flow Results for Node Outlet

PoR (yrs)	10/17/1948 Start
57.21	12/31/2005 Finish

Otay Industrial Park
Statistics - Node 1 Total Inflow

Rank	Start Date	Event Duration (hours)	Event Peak (CFS)	Exceedance Frequency (percent)	Return Period (years)	0.1Q2	Q10	Event Rank	Event Peak Flow: Start Date	Event Peak Flow: Flow (cfs)	Return Period (years), Plotting Position: Weibull	Return Period (years), Plotting Position: Cunnane	
1	2/13/1998	12	34.968	0.34	58	1.4356	25.8667	1	13-Feb-98	34.968	58.2	96.862	
2	2/7/1998	19	33.631	0.68	29	1.4356	25.8667	2	7-Feb-98	33.631	29.1	36.038	<<25
3	2/2/1998	11	31.113	1.02	19.33	1.4356	25.8667	3	2-Feb-98	31.113	19.4	22.137	<<25
4	10/30/1998	2	28.18	1.36	14.5	1.4356	25.8667	4	30-Oct-98	28.180	14.6	15.975	
5	10/14/2006	3	27.343	1.7	11.6	1.4356	25.8667	5	14-Oct-06	27.343	11.6	12.497	
6	2/2/1988	4	25.854	2.04	9.67	1.4356	25.8667	6	2-Feb-88	25.854	9.7	10.262	<<10
7	10/19/1972	5	25.795	2.38	8.29	1.4356	25.8667	7	19-Oct-72	25.795	8.3	8.705	<<10
8	2/22/2004	26	25.693	2.72	7.25	1.4356	25.8667	8	22-Feb-04	25.693	7.3	7.559	
9	1/3/2005	29	22.677	3.06	6.44	1.4356	25.8667	9	3-Jan-05	22.677	6.5	6.679	
10	2/28/1978	16	20.988	3.4	5.8	1.4356	25.8667	10	28-Feb-78	20.988	5.8	5.983	
11	12/21/1970	13	20.57	3.74	5.27	1.4356	25.8667	11	21-Dec-70	20.570	5.3	5.418	<<5
12	2/22/1998	33	20.552	4.08	4.83	1.4356	25.8667	12	22-Feb-98	20.552	4.9	4.951	<<5
13	11/12/1976	5	19.732	4.42	4.46	1.4356	25.8667	13	12-Nov-76	19.732	4.5	4.558	
14	11/22/1996	22	19.623	4.76	4.14	1.4356	25.8667	14	22-Nov-96	19.623	4.2	4.222	
15	3/4/1978	5	19.566	5.1	3.87	1.4356	25.8667	15	4-Mar-78	19.566	3.9	3.933	
16	2/22/2005	19	18.491	5.44	3.63	1.4356	25.8667	16	22-Feb-05	18.491	3.6	3.681	
17	11/25/1985	18	18.208	5.78	3.41	1.4356	25.8667	17	25-Nov-85	18.208	3.4	3.459	
18	3/1/1983	70	18.205	6.12	3.22	1.4356	25.8667	18	1-Mar-83	18.205	3.2	3.262	
19	2/16/1959	20	18.135	6.46	3.05	1.4356	25.8667	19	16-Feb-59	18.135	3.1	3.087	
20	2/6/1992	7	18.044	6.8	2.9	1.4356	25.8667	20	6-Feb-92	18.044	2.9	2.929	
21	2/15/1986	8	17.693	7.14	2.76	1.4356	25.8667	21	15-Feb-86	17.693	2.8	2.787	
22	1/29/1983	4	17.652	7.48	2.64	1.4356	25.8667	22	29-Jan-83	17.652	2.6	2.658	
23	1/4/1995	8	17.442	7.82	2.52	1.4356	25.8667	23	4-Jan-95	17.442	2.5	2.540	
24	12/30/1951	13	17.438	8.16	2.42	1.4356	25.8667	24	30-Dec-51	17.438	2.4	2.433	
25	2/16/1998	7	16.115	8.5	2.32	1.4356	25.8667	25	16-Feb-98	16.115	2.3	2.334	
26	1/6/1993	38	15.238	8.84	2.23	1.4356	25.8667	26	6-Jan-93	15.238	2.2	2.242	
27	3/21/1954	37	14.64	9.18	2.15	1.4356	25.8667	27	21-Mar-54	14.640	2.2	2.158	
28	3/24/1983	19	14.632	9.52	2.07	1.4356	25.8667	28	24-Mar-83	14.632	2.1	2.080	
29	1/18/1952	12	14.359	9.86	2	1.4356	25.8667	29	18-Jan-52	14.359	2.0	2.007	<<2
30	1/18/1955	5	14.331	10.2	1.93	1.4356	25.8667	30	18-Jan-55	14.331	1.9	1.939	<<2
31	3/27/1971	1	14.164	10.54	1.87	1.4356	25.8667	31	27-Mar-71	14.164	1.9	1.876	
32	2/6/1976	2	14.151	10.88	1.81	1.4356	25.8667	32	6-Feb-76	14.151	1.8	1.817	
33	2/28/1970	32	13.539	11.22	1.76	1.4356	25.8667	33	28-Feb-70	13.539	1.8	1.761	
34	10/27/2004	32	13.189	11.56	1.71	1.4356	25.8667	34	27-Oct-04	13.189	1.7	1.708	
35	1/14/1969	5	13.178	11.9	1.66	1.4356	25.8667	35	14-Jan-69	13.178	1.7	1.659	
36	2/8/1976	10	12.99	12.24	1.61	1.4356	25.8667	36	8-Feb-76	12.990	1.6	1.612	
37	2/28/1991	28	12.881	12.59	1.57	1.4356	25.8667	37	28-Feb-91	12.881	1.6	1.568	
38	11/21/1967	12	12.836	12.93	1.53	1.4356	25.8667	38	21-Nov-67	12.836	1.5	1.527	
39	12/18/1967	21	12.664	13.27	1.49	1.4356	25.8667	39	18-Dec-67	12.664	1.5	1.487	
40	10/19/2004	40	12.654	13.61	1.45	1.4356	25.8667	40	19-Oct-04	12.654	1.5	1.450	
41	1/29/1980	17	12.315	13.95	1.41	1.4356	25.8667	41	29-Jan-80	12.315	1.4	1.414	
42	12/7/1992	4	12.091	14.29	1.38	1.4356	25.8667	42	7-Dec-92	12.091	1.4	1.380	
43	1/16/1978	4	11.725	14.63	1.35	1.4356	25.8667	43	16-Jan-78	11.725	1.4	1.347	
44	12/27/1984	26	11.618	14.97	1.32	1.4356	25.8667	44	27-Dec-84	11.618	1.3	1.317	
45	11/22/1965	34	11.475	15.31	1.29	1.4356	25.8667	45	22-Nov-65	11.475	1.3	1.287	
46	11/15/1965	32	11.266	15.65	1.26	1.4356	25.8667	46	15-Nov-65	11.266	1.3	1.259	
47	3/23/1964	27	11.105	15.99	1.23	1.4356	25.8667	47	23-Mar-64	11.105	1.2	1.232	
48	3/14/2003	27	10.957	16.33	1.21	1.4356	25.8667	48	14-Mar-03	10.957	1.2	1.206	

Existing Conditions Flow
(Weibull, Complete Dura

Return Period	Flow (cfs)
25-year	32.566
10-year	25.867
5-year	20.558
2-year	14.356
1-year	9.779
6-month	5.497
3-month	1.405

Probability = 1/Tr

Weibull Tr=(N+1)/m
Tr=Return P
m=rank (m=
N=number o

Cunanne Tr= (N+a)/(m
Tr=Return P
m=rank (m=
N=number o
a=0.2
b=0.4

Rank	Start Date	Event Duration (hours)	Event Peak (CFS)	Exceedance Frequency (percent)	Return Period (years)	0.1Q2	Q10
49	3/5/1970	2	10.942	16.67	1.18	1.4356	25.8667
50	12/28/1977	25	10.811	17.01	1.16	1.4356	25.8667
51	12/20/1997	4	10.64	17.35	1.14	1.4356	25.8667
52	1/13/1997	18	10.421	17.69	1.12	1.4356	25.8667
53	3/20/1991	27	10.327	18.03	1.09	1.4356	25.8667
54	1/31/1979	7	10.288	18.37	1.07	1.4356	25.8667
55	1/3/1977	5	10.226	18.71	1.05	1.4356	25.8667
56	1/11/2001	8	9.888	19.05	1.04	1.4356	25.8667
57	1/10/1955	6	9.832	19.39	1.02	1.4356	25.8667
58	11/28/1970	4	9.788	19.73	1	1.4356	25.8667
59	3/27/1992	2	9.607	20.07	0.98	1.4356	25.8667
60	3/8/1968	5	9.242	20.41	0.97	1.4356	25.8667
61	2/20/1993	2	9.173	20.75	0.95	1.4356	25.8667
62	2/21/2000	29	9.121	21.09	0.94	1.4356	25.8667
63	12/2/1952	2	8.933	21.43	0.92	1.4356	25.8667
64	1/12/1960	6	8.754	21.77	0.91	1.4356	25.8667
65	3/24/1998	5	8.714	22.11	0.89	1.4356	25.8667
66	5/7/1971	4	8.69	22.45	0.88	1.4356	25.8667
67	2/19/1998	5	8.658	22.79	0.87	1.4356	25.8667
68	11/22/1973	5	8.543	23.13	0.85	1.4356	25.8667
69	3/15/1952	23	8.269	23.47	0.84	1.4356	25.8667
70	1/14/1960	22	8.251	23.81	0.83	1.4356	25.8667
71	1/7/1957	30	8.175	24.15	0.82	1.4356	25.8667
72	1/14/1978	16	8.106	24.49	0.81	1.4356	25.8667
73	3/17/1982	10	8.105	24.83	0.79	1.4356	25.8667
74	2/26/1987	3	8.034	25.17	0.78	1.4356	25.8667
75	2/22/1969	6	8.014	25.51	0.77	1.4356	25.8667
76	3/14/1982	4	7.916	25.85	0.76	1.4356	25.8667
77	2/19/2007	14	7.681	26.19	0.75	1.4356	25.8667
78	2/15/1992	4	7.672	26.53	0.74	1.4356	25.8667
79	3/5/1995	11	7.666	26.87	0.73	1.4356	25.8667
80	1/15/1993	24	7.474	27.21	0.73	1.4356	25.8667
81	2/13/1973	2	7.379	27.55	0.72	1.4356	25.8667
82	3/1/1957	3	7.27	27.89	0.71	1.4356	25.8667
83	3/6/1958	14	7.17	28.23	0.7	1.4356	25.8667
84	1/11/2005	7	6.972	28.57	0.69	1.4356	25.8667
85	4/20/1983	24	6.928	28.91	0.68	1.4356	25.8667
86	1/9/1978	30	6.927	29.25	0.67	1.4356	25.8667
87	1/18/1973	5	6.921	29.59	0.67	1.4356	25.8667
88	4/3/1958	4	6.861	29.93	0.66	1.4356	25.8667
89	4/8/1965	7	6.813	30.27	0.65	1.4356	25.8667
90	4/13/1956	2	6.737	30.61	0.64	1.4356	25.8667
91	11/26/1967	6	6.701	30.95	0.64	1.4356	25.8667
92	3/27/1958	6	6.699	31.29	0.63	1.4356	25.8667
93	2/10/1978	3	6.662	31.63	0.62	1.4356	25.8667
94	2/14/1995	5	6.641	31.97	0.62	1.4356	25.8667
95	1/4/1974	9	6.442	32.31	0.61	1.4356	25.8667
96	2/8/1993	2	6.38	32.65	0.6	1.4356	25.8667
97	2/19/1980	31	6.347	32.99	0.6	1.4356	25.8667
98	1/9/2005	2	6.315	33.33	0.59	1.4356	25.8667
99	11/4/1987	21	6.278	33.67	0.59	1.4356	25.8667
100	2/24/2003	5	6.25	34.01	0.58	1.4356	25.8667
101	12/6/1966	5	6.209	34.35	0.57	1.4356	25.8667
102	1/27/2008	5	6.204	34.69	0.57	1.4356	25.8667

	Event Peak Flow		Return Period (years)		
			Plotting Position		
Event Rank	Start Date	Flow (cfs)	Weibull	Cunnane	
49	5-Mar-70	10.942	1.2	1.181	
50	28-Dec-77	10.811	1.2	1.157	
51	20-Dec-97	10.640	1.1	1.134	
52	13-Jan-97	10.421	1.1	1.112	
53	20-Mar-91	10.327	1.1	1.091	
54	31-Jan-79	10.288	1.1	1.071	
55	3-Jan-77	10.226	1.1	1.051	
56	11-Jan-01	9.888	1.0	1.032	
57	10-Jan-55	9.832	1.0	1.014	<<1
58	28-Nov-70	9.788	1.0	0.996	<<1
59	27-Mar-92	9.607	1.0	0.979	
60	8-Mar-68	9.242	1.0	0.963	
61	20-Feb-93	9.173	1.0	0.947	
62	21-Feb-00	9.121	0.9	0.932	
63	2-Dec-52	8.933	0.9	0.917	
64	12-Jan-60	8.754	0.9	0.902	
65	24-Mar-98	8.714	0.9	0.889	
66	7-May-71	8.690	0.9	0.875	
67	19-Feb-98	8.658	0.9	0.862	
68	22-Nov-73	8.543	0.9	0.849	
69	15-Mar-52	8.269	0.8	0.837	
70	14-Jan-60	8.251	0.8	0.825	
71	7-Jan-57	8.175	0.8	0.813	
72	14-Jan-78	8.106	0.8	0.802	
73	17-Mar-82	8.105	0.8	0.791	
74	26-Feb-87	8.034	0.8	0.780	
75	22-Feb-69	8.014	0.8	0.769	
76	14-Mar-82	7.916	0.8	0.759	
77	19-Feb-07	7.681	0.8	0.749	
78	15-Feb-92	7.672	0.7	0.740	
79	5-Mar-95	7.666	0.7	0.730	
80	15-Jan-93	7.474	0.7	0.721	
81	13-Feb-73	7.379	0.7	0.712	
82	1-Mar-57	7.270	0.7	0.703	
83	6-Mar-58	7.170	0.7	0.695	
84	11-Jan-05	6.972	0.7	0.687	
85	20-Apr-83	6.928	0.7	0.678	
86	9-Jan-78	6.927	0.7	0.671	
87	18-Jan-73	6.921	0.7	0.663	
88	3-Apr-58	6.861	0.7	0.655	
89	8-Apr-65	6.813	0.7	0.648	
90	13-Apr-56	6.737	0.6	0.641	
91	26-Nov-67	6.701	0.6	0.634	
92	27-Mar-58	6.699	0.6	0.627	
93	10-Feb-78	6.662	0.6	0.620	
94	14-Feb-95	6.641	0.6	0.613	
95	4-Jan-74	6.442	0.6	0.607	
96	8-Feb-93	6.380	0.6	0.600	
97	19-Feb-80	6.347	0.6	0.594	
98	9-Jan-05	6.315	0.6	0.588	
99	4-Nov-87	6.278	0.6	0.582	
100	24-Feb-03	6.250	0.6	0.576	
101	6-Dec-66	6.209	0.6	0.571	
102	27-Jan-08	6.204	0.6	0.565	

(Weibull, Complete Dura

Return Period	Flow (cfs)

Rank	Start Date	Event Duration (hours)	Event Peak (CFS)	Exceedance Frequency (percent)	Return Period (years)	0.1Q2	Q10
103	12/11/1984	5	5.986	35.03	0.56	1.4356	25.8667
104	3/28/1961	3	5.936	35.37	0.56	1.4356	25.8667
105	12/27/1971	8	5.9	35.71	0.55	1.4356	25.8667
106	3/27/1998	5	5.898	36.05	0.55	1.4356	25.8667
107	5/11/1998	4	5.806	36.39	0.54	1.4356	25.8667
108	3/8/1973	8	5.758	36.73	0.54	1.4356	25.8667
109	12/24/1959	3	5.733	37.07	0.53	1.4356	25.8667
110	1/22/1967	3	5.667	37.41	0.53	1.4356	25.8667
111	1/7/1974	15	5.653	37.76	0.52	1.4356	25.8667
112	11/16/1972	3	5.595	38.1	0.52	1.4356	25.8667
113	4/2/1965	30	5.584	38.44	0.51	1.4356	25.8667
114	2/25/1962	3	5.527	38.78	0.51	1.4356	25.8667
115	3/21/1983	7	5.509	39.12	0.5	1.4356	25.8667
116	11/21/1978	2	5.448	39.46	0.5	1.4356	25.8667
117	3/5/2005	3	5.383	39.8	0.5	1.4356	25.8667
118	1/27/1956	7	5.297	40.14	0.49	1.4356	25.8667
119	12/19/1970	5	5.259	40.48	0.49	1.4356	25.8667
120	3/11/1978	14	5.146	40.82	0.48	1.4356	25.8667
121	1/16/1973	1	5.043	41.16	0.48	1.4356	25.8667
122	3/15/1965	3	5.033	41.5	0.48	1.4356	25.8667
123	1/16/1952	6	4.981	41.84	0.47	1.4356	25.8667
124	1/26/1997	6	4.978	42.18	0.47	1.4356	25.8667
125	11/11/1972	1	4.977	42.52	0.46	1.4356	25.8667
126	3/28/1993	2	4.945	42.86	0.46	1.4356	25.8667
127	4/1/1982	3	4.942	43.2	0.46	1.4356	25.8667
128	4/20/1988	6	4.924	43.54	0.45	1.4356	25.8667
129	3/26/1991	7	4.922	43.88	0.45	1.4356	25.8667
130	1/29/1957	4	4.88	44.22	0.45	1.4356	25.8667
131	2/3/1958	14	4.875	44.56	0.44	1.4356	25.8667
132	3/25/1989	7	4.806	44.9	0.44	1.4356	25.8667
133	3/10/1986	3	4.789	45.24	0.44	1.4356	25.8667
134	1/13/1952	7	4.776	45.58	0.43	1.4356	25.8667
135	1/17/1990	7	4.613	45.92	0.43	1.4356	25.8667
136	1/6/1979	1	4.511	46.26	0.43	1.4356	25.8667
137	12/18/1984	13	4.475	46.6	0.42	1.4356	25.8667
138	2/21/2005	10	4.408	46.94	0.42	1.4356	25.8667
139	5/8/1977	2	4.384	47.28	0.42	1.4356	25.8667
140	10/17/1971	2	4.29	47.62	0.41	1.4356	25.8667
141	2/11/1959	22	4.142	47.96	0.41	1.4356	25.8667
142	2/27/1983	16	4.134	48.3	0.41	1.4356	25.8667
143	3/20/1992	2	3.987	48.64	0.41	1.4356	25.8667
144	2/7/1976	6	3.969	48.98	0.4	1.4356	25.8667
145	1/25/1954	4	3.899	49.32	0.4	1.4356	25.8667
146	10/10/1986	3	3.885	49.66	0.4	1.4356	25.8667
147	3/6/1980	7	3.857	50	0.39	1.4356	25.8667
148	4/13/1976	4	3.831	50.34	0.39	1.4356	25.8667
149	1/20/1962	6	3.807	50.68	0.39	1.4356	25.8667
150	11/15/1952	1	3.73	51.02	0.39	1.4356	25.8667
151	11/28/2002	5	3.729	51.36	0.38	1.4356	25.8667
152	3/8/1974	7	3.709	51.7	0.38	1.4356	25.8667
153	1/20/1982	10	3.681	52.04	0.38	1.4356	25.8667
154	1/5/1992	6	3.641	52.38	0.38	1.4356	25.8667
155	11/30/1982	2	3.637	52.72	0.37	1.4356	25.8667
156	6/10/1990	3	3.633	53.06	0.37	1.4356	25.8667

Event Rank	Event Peak Flow		Return Period (years)		
	Start Date	Flow (cfs)	Plotting Position		
			Weibull	Cunnane	
103	11-Dec-84	5.986	0.6	0.559	
104	28-Mar-61	5.936	0.6	0.554	
105	27-Dec-71	5.900	0.6	0.549	
106	27-Mar-98	5.898	0.5	0.544	
107	11-May-98	5.806	0.5	0.538	
108	8-Mar-73	5.758	0.5	0.533	
109	24-Dec-59	5.733	0.5	0.528	
110	22-Jan-67	5.667	0.5	0.524	
111	7-Jan-74	5.653	0.5	0.519	
112	16-Nov-72	5.595	0.5	0.514	
113	2-Apr-65	5.584	0.5	0.510	
114	25-Feb-62	5.527	0.5	0.505	
115	21-Mar-83	5.509	0.5	0.501	<<1/2
116	21-Nov-78	5.448	0.5	0.496	<<1/2
117	5-Mar-05	5.383	0.5	0.492	
118	27-Jan-56	5.297	0.5	0.488	
119	19-Dec-70	5.259	0.5	0.484	
120	11-Mar-78	5.146	0.5	0.480	
121	16-Jan-73	5.043	0.5	0.476	
122	15-Mar-65	5.033	0.5	0.472	
123	16-Jan-52	4.981	0.5	0.468	
124	26-Jan-97	4.978	0.5	0.464	
125	11-Nov-72	4.977	0.5	0.461	
126	28-Mar-93	4.945	0.5	0.457	
127	1-Apr-82	4.942	0.5	0.453	
128	20-Apr-88	4.924	0.5	0.450	
129	26-Mar-91	4.922	0.5	0.446	
130	29-Jan-57	4.880	0.4	0.443	
131	3-Feb-58	4.875	0.4	0.439	
132	25-Mar-89	4.806	0.4	0.436	
133	10-Mar-86	4.789	0.4	0.433	
134	13-Jan-52	4.776	0.4	0.430	
135	17-Jan-90	4.613	0.4	0.426	
136	6-Jan-79	4.511	0.4	0.423	
137	18-Dec-84	4.475	0.4	0.420	
138	21-Feb-05	4.408	0.4	0.417	
139	8-May-77	4.384	0.4	0.414	
140	17-Oct-71	4.290	0.4	0.411	
141	11-Feb-59	4.142	0.4	0.408	
142	27-Feb-83	4.134	0.4	0.405	
143	20-Mar-92	3.987	0.4	0.402	
144	7-Feb-76	3.969	0.4	0.400	
145	25-Jan-54	3.899	0.4	0.397	
146	10-Oct-86	3.885	0.4	0.394	
147	6-Mar-80	3.857	0.4	0.391	
148	13-Apr-76	3.831	0.4	0.389	
149	20-Jan-62	3.807	0.4	0.386	
150	15-Nov-52	3.730	0.4	0.384	
151	28-Nov-02	3.729	0.4	0.381	
152	8-Mar-74	3.709	0.4	0.379	
153	20-Jan-82	3.681	0.4	0.376	
154	5-Jan-92	3.641	0.4	0.374	
155	30-Nov-82	3.637	0.4	0.371	
156	10-Jun-90	3.633	0.4	0.369	

(Weibull, Complete Dura

Return Period	Flow (cfs)

Rank	Start Date	Event Duration (hours)	Event Peak (CFS)	Exceedance Frequency (percent)	Return Period (years)	0.1Q2	Q10
157	2/11/1973	1	3.599	53.4	0.37	1.4356	25.8667
158	4/13/2003	2	3.578	53.74	0.37	1.4356	25.8667
159	2/2/1983	36	3.556	54.08	0.36	1.4356	25.8667
160	12/16/1984	2	3.515	54.42	0.36	1.4356	25.8667
161	3/7/1952	6	3.39	54.76	0.36	1.4356	25.8667
162	2/19/1962	3	3.389	55.1	0.36	1.4356	25.8667
163	2/17/1980	10	3.3	55.44	0.36	1.4356	25.8667
164	10/12/1987	2	3.282	55.78	0.35	1.4356	25.8667
165	12/29/1992	2	3.262	56.12	0.35	1.4356	25.8667
166	1/16/1955	2	3.245	56.46	0.35	1.4356	25.8667
167	1/27/1957	2	3.219	56.8	0.35	1.4356	25.8667
168	1/26/1969	3	3.141	57.14	0.35	1.4356	25.8667
169	11/24/1978	14	3.119	57.48	0.34	1.4356	25.8667
170	12/25/1988	5	3.081	57.82	0.34	1.4356	25.8667
171	12/7/1986	1	3.046	58.16	0.34	1.4356	25.8667
172	3/31/1998	4	3.044	58.5	0.34	1.4356	25.8667
173	12/29/1991	2	2.984	58.84	0.34	1.4356	25.8667
174	1/9/1980	5	2.969	59.18	0.33	1.4356	25.8667
175	1/12/1993	36	2.946	59.52	0.33	1.4356	25.8667
176	4/27/1960	6	2.937	59.86	0.33	1.4356	25.8667
177	1/11/1980	4	2.91	60.2	0.33	1.4356	25.8667
178	3/8/1975	15	2.906	60.54	0.33	1.4356	25.8667
179	3/18/1983	7	2.904	60.88	0.32	1.4356	25.8667
180	3/19/1991	4	2.87	61.22	0.32	1.4356	25.8667
181	3/16/1958	5	2.843	61.56	0.32	1.4356	25.8667
182	4/7/1958	5	2.84	61.9	0.32	1.4356	25.8667
183	8/28/1951	2	2.786	62.24	0.32	1.4356	25.8667
184	3/1/1981	20	2.74	62.59	0.32	1.4356	25.8667
185	1/8/1998	25	2.736	62.93	0.31	1.4356	25.8667
186	12/20/1952	5	2.728	63.27	0.31	1.4356	25.8667
187	2/11/2003	49	2.68	63.61	0.31	1.4356	25.8667
188	12/2/1961	2	2.608	63.95	0.31	1.4356	25.8667
189	3/5/1981	2	2.607	64.29	0.31	1.4356	25.8667
190	10/14/1957	6	2.566	64.63	0.31	1.4356	25.8667
191	8/16/1977	9	2.518	64.97	0.3	1.4356	25.8667
192	1/25/1969	7	2.488	65.31	0.3	1.4356	25.8667
193	4/20/1957	12	2.481	65.65	0.3	1.4356	25.8667
194	12/13/1965	23	2.479	65.99	0.3	1.4356	25.8667
195	12/28/1952	1	2.46	66.33	0.3	1.4356	25.8667
196	12/9/1982	6	2.444	66.67	0.3	1.4356	25.8667
197	12/8/1972	10	2.436	67.01	0.29	1.4356	25.8667
198	3/10/1975	26	2.42	67.35	0.29	1.4356	25.8667
199	1/13/1957	7	2.403	67.69	0.29	1.4356	25.8667
200	1/24/1962	4	2.343	68.03	0.29	1.4356	25.8667
201	3/13/1998	4	2.295	68.37	0.29	1.4356	25.8667
202	1/6/1959	5	2.293	68.71	0.29	1.4356	25.8667
203	12/10/1985	23	2.273	69.05	0.29	1.4356	25.8667
204	12/5/1997	2	2.262	69.39	0.28	1.4356	25.8667
205	11/20/1963	3	2.248	69.73	0.28	1.4356	25.8667
206	3/25/1977	3	2.212	70.07	0.28	1.4356	25.8667
207	1/26/2001	2	2.085	70.41	0.28	1.4356	25.8667
208	3/11/1973	5	2.052	70.75	0.28	1.4356	25.8667
209	3/13/1952	3	2.035	71.09	0.28	1.4356	25.8667
210	1/16/1979	2	2.019	71.43	0.28	1.4356	25.8667

	Event Peak Flow		Return Period (years)	
Event Rank	Start Date	Flow (cfs)	Plotting Position Weibull	Cunnane
157	11-Feb-73	3.599	0.4	0.366
158	13-Apr-03	3.578	0.4	0.364
159	2-Feb-83	3.556	0.4	0.362
160	16-Dec-84	3.515	0.4	0.360
161	7-Mar-52	3.390	0.4	0.357
162	19-Feb-62	3.389	0.4	0.355
163	17-Feb-80	3.300	0.4	0.353
164	12-Oct-87	3.282	0.4	0.351
165	29-Dec-92	3.262	0.4	0.349
166	16-Jan-55	3.245	0.4	0.347
167	27-Jan-57	3.219	0.3	0.344
168	26-Jan-69	3.141	0.3	0.342
169	24-Nov-78	3.119	0.3	0.340
170	25-Dec-88	3.081	0.3	0.338
171	7-Dec-86	3.046	0.3	0.336
172	31-Mar-98	3.044	0.3	0.334
173	29-Dec-91	2.984	0.3	0.333
174	9-Jan-80	2.969	0.3	0.331
175	12-Jan-93	2.946	0.3	0.329
176	27-Apr-60	2.937	0.3	0.327
177	11-Jan-80	2.910	0.3	0.325
178	8-Mar-75	2.906	0.3	0.323
179	18-Mar-83	2.904	0.3	0.321
180	19-Mar-91	2.870	0.3	0.320
181	16-Mar-58	2.843	0.3	0.318
182	7-Apr-58	2.840	0.3	0.316
183	28-Aug-51	2.786	0.3	0.314
184	1-Mar-81	2.740	0.3	0.313
185	8-Jan-98	2.736	0.3	0.311
186	20-Dec-52	2.728	0.3	0.309
187	11-Feb-03	2.680	0.3	0.308
188	2-Dec-61	2.608	0.3	0.306
189	5-Mar-81	2.607	0.3	0.304
190	14-Oct-57	2.566	0.3	0.303
191	16-Aug-77	2.518	0.3	0.301
192	25-Jan-69	2.488	0.3	0.300
193	20-Apr-57	2.481	0.3	0.298
194	13-Dec-65	2.479	0.3	0.296
195	28-Dec-52	2.460	0.3	0.295
196	9-Dec-82	2.444	0.3	0.293
197	8-Dec-72	2.436	0.3	0.292
198	10-Mar-75	2.420	0.3	0.290
199	13-Jan-57	2.403	0.3	0.289
200	24-Jan-62	2.343	0.3	0.288
201	13-Mar-98	2.295	0.3	0.286
202	6-Jan-59	2.293	0.3	0.285
203	10-Dec-85	2.273	0.3	0.283
204	5-Dec-97	2.262	0.3	0.282
205	20-Nov-63	2.248	0.3	0.281
206	25-Mar-77	2.212	0.3	0.279
207	26-Jan-01	2.085	0.3	0.278
208	11-Mar-73	2.052	0.3	0.276
209	13-Mar-52	2.035	0.3	0.275
210	16-Jan-79	2.019	0.3	0.274

(Weibull, Complete Dura

Return Period	Flow (cfs)

Rank	Start Date	Event Duration (hours)	Event Peak (CFS)	Exceedance Frequency (percent)	Return Period (years)	0.1Q2	Q10
211	3/11/1995	18	1.97	71.77	0.27	1.4356	25.8667
212	3/26/1980	1	1.956	72.11	0.27	1.4356	25.8667
213	4/1/1958	1	1.951	72.45	0.27	1.4356	25.8667
214	2/25/1969	3	1.919	72.79	0.27	1.4356	25.8667
215	2/1/1996	1	1.917	73.13	0.27	1.4356	25.8667
216	1/28/1998	4	1.903	73.47	0.27	1.4356	25.8667
217	1/31/1993	2	1.766	73.81	0.27	1.4356	25.8667
218	4/7/1978	4	1.756	74.15	0.27	1.4356	25.8667
219	4/4/1987	1	1.751	74.49	0.26	1.4356	25.8667
220	2/5/1998	4	1.743	74.83	0.26	1.4356	25.8667
221	1/10/1960	2	1.718	75.17	0.26	1.4356	25.8667
222	4/1/1999	4	1.639	75.51	0.26	1.4356	25.8667
223	2/12/1978	15	1.629	75.85	0.26	1.4356	25.8667
224	1/17/1988	2	1.624	76.19	0.26	1.4356	25.8667
225	3/24/1958	1	1.621	76.53	0.26	1.4356	25.8667
226	3/20/1973	2	1.604	76.87	0.26	1.4356	25.8667
227	1/7/1987	1	1.553	77.21	0.26	1.4356	25.8667
228	2/28/2006	2	1.546	77.55	0.25	1.4356	25.8667
229	1/5/1977	16	1.492	77.89	0.25	1.4356	25.8667
230	3/16/1986	1	1.486	78.23	0.25	1.4356	25.8667
231	2/21/1959	9	1.457	78.57	0.25	1.4356	25.8667
232	12/28/1992	1	1.36	78.91	0.25	1.4356	25.8667
233	1/27/1999	2	1.349	79.25	0.25	1.4356	25.8667
234	11/24/1984	7	1.347	79.59	0.25	1.4356	25.8667
235	4/21/1988	6	1.311	79.93	0.25	1.4356	25.8667
236	4/6/1975	2	1.302	80.27	0.25	1.4356	25.8667
237	3/31/1965	1	1.21	80.61	0.24	1.4356	25.8667
238	2/6/1969	2	1.177	80.95	0.24	1.4356	25.8667
239	4/15/1976	2	1.149	81.29	0.24	1.4356	25.8667
240	4/30/1955	31	1.124	81.63	0.24	1.4356	25.8667
241	3/17/1963	1	1.081	81.97	0.24	1.4356	25.8667
242	4/11/1967	4	1.066	82.31	0.24	1.4356	25.8667
243	11/30/1952	2	1.019	82.65	0.24	1.4356	25.8667
244	11/22/1984	17	1.019	82.99	0.24	1.4356	25.8667
245	9/10/1976	12	1.011	83.33	0.24	1.4356	25.8667
246	3/31/1978	3	0.964	83.67	0.24	1.4356	25.8667
247	1/14/1990	2	0.921	84.01	0.23	1.4356	25.8667
248	1/25/1995	3	0.92	84.35	0.23	1.4356	25.8667
249	1/18/1979	3	0.898	84.69	0.23	1.4356	25.8667
250	9/25/1986	1	0.88	85.03	0.23	1.4356	25.8667
251	3/21/2006	1	0.856	85.37	0.23	1.4356	25.8667
252	4/28/1994	2	0.807	85.71	0.23	1.4356	25.8667
253	4/12/1999	1	0.769	86.05	0.23	1.4356	25.8667
254	12/4/1972	1	0.716	86.39	0.23	1.4356	25.8667
255	4/2/2004	1	0.668	86.73	0.23	1.4356	25.8667
256	3/10/1980	7	0.647	87.07	0.23	1.4356	25.8667
257	3/13/1996	3	0.639	87.41	0.23	1.4356	25.8667
258	12/11/1951	5	0.637	87.76	0.22	1.4356	25.8667
259	10/30/2000	1	0.622	88.1	0.22	1.4356	25.8667
260	2/12/2005	1	0.587	88.44	0.22	1.4356	25.8667
261	1/27/1983	1	0.583	88.78	0.22	1.4356	25.8667
262	11/25/2001	2	0.553	89.12	0.22	1.4356	25.8667
263	2/8/1959	1	0.489	89.46	0.22	1.4356	25.8667
264	12/1/1998	2	0.451	89.8	0.22	1.4356	25.8667

	Event Peak Flow		Return Period (years) Plotting Position		
Event Rank	Start Date	Flow (cfs)	Weibull	Cunnane	
211	11-Mar-95	1.970	0.3	0.273	
212	26-Mar-80	1.956	0.3	0.271	
213	1-Apr-58	1.951	0.3	0.270	
214	25-Feb-69	1.919	0.3	0.269	
215	1-Feb-96	1.917	0.3	0.267	
216	28-Jan-98	1.903	0.3	0.266	
217	31-Jan-93	1.766	0.3	0.265	
218	7-Apr-78	1.756	0.3	0.264	
219	4-Apr-87	1.751	0.3	0.263	
220	5-Feb-98	1.743	0.3	0.261	
221	10-Jan-60	1.718	0.3	0.260	
222	1-Apr-99	1.639	0.3	0.259	
223	12-Feb-78	1.629	0.3	0.258	
224	17-Jan-88	1.624	0.3	0.257	
225	24-Mar-58	1.621	0.3	0.256	
226	20-Mar-73	1.604	0.3	0.254	
227	7-Jan-87	1.553	0.3	0.253	
228	28-Feb-06	1.546	0.3	0.252	
229	5-Jan-77	1.492	0.3	0.251	
230	16-Mar-86	1.486	0.3	0.250	<<1/4
231	21-Feb-59	1.457	0.3	0.249	<<1/4
232	28-Dec-92	1.360	0.3	0.248	
233	27-Jan-99	1.349	0.2	0.247	
234	24-Nov-84	1.347	0.2	0.246	
235	21-Apr-88	1.311	0.2	0.245	
236	6-Apr-75	1.302	0.2	0.244	
237	31-Mar-65	1.210	0.2	0.243	
238	6-Feb-69	1.177	0.2	0.242	
239	15-Apr-76	1.149	0.2	0.241	
240	30-Apr-55	1.124	0.2	0.240	
241	17-Mar-63	1.081	0.2	0.239	
242	11-Apr-67	1.066	0.2	0.238	
243	30-Nov-52	1.019	0.2	0.237	
244	22-Nov-84	1.019	0.2	0.236	
245	10-Sep-76	1.011	0.2	0.235	
246	31-Mar-78	0.964	0.2	0.234	
247	14-Jan-90	0.921	0.2	0.233	
248	25-Jan-95	0.920	0.2	0.232	
249	18-Jan-79	0.898	0.2	0.231	
250	25-Sep-86	0.880	0.2	0.230	
251	21-Mar-06	0.856	0.2	0.229	
252	28-Apr-94	0.807	0.2	0.228	
253	12-Apr-99	0.769	0.2	0.227	
254	4-Dec-72	0.716	0.2	0.226	
255	2-Apr-04	0.668	0.2	0.225	
256	10-Mar-80	0.647	0.2	0.225	
257	13-Mar-96	0.639	0.2	0.224	
258	11-Dec-51	0.637	0.2	0.223	
259	30-Oct-00	0.622	0.2	0.222	
260	12-Feb-05	0.587	0.2	0.221	
261	27-Jan-83	0.583	0.2	0.220	
262	25-Nov-01	0.553	0.2	0.219	
263	8-Feb-59	0.489	0.2	0.219	
264	1-Dec-98	0.451	0.2	0.218	

(Weibull, Complete Dura

Return Period	Flow (cfs)

Rank	Start Date	Event Duration (hours)	Event Peak (CFS)	Exceedance Frequency (percent)	Return Period (years)	0.1Q2	Q10
265	2/7/1978	1	0.407	90.14	0.22	1.4356	25.8667
266	12/15/2002	2	0.399	90.48	0.22	1.4356	25.8667
267	3/27/1979	1	0.382	90.82	0.22	1.4356	25.8667
268	8/19/1984	1	0.374	91.16	0.22	1.4356	25.8667
269	3/19/1979	1	0.358	91.5	0.22	1.4356	25.8667
270	4/10/1998	1	0.333	91.84	0.21	1.4356	25.8667
271	11/18/1964	1	0.331	92.18	0.21	1.4356	25.8667
272	4/28/1980	1	0.297	92.52	0.21	1.4356	25.8667
273	2/18/2005	1	0.274	92.86	0.21	1.4356	25.8667
274	4/11/1952	1	0.266	93.2	0.21	1.4356	25.8667
275	2/10/1960	1	0.261	93.54	0.21	1.4356	25.8667
276	1/26/1961	2	0.241	93.88	0.21	1.4356	25.8667
277	12/5/2004	1	0.234	94.22	0.21	1.4356	25.8667
278	2/16/1980	1	0.234	94.56	0.21	1.4356	25.8667
279	1/22/1962	2	0.224	94.9	0.21	1.4356	25.8667
280	12/17/1978	1	0.223	95.24	0.21	1.4356	25.8667
281	11/13/1978	1	0.215	95.58	0.21	1.4356	25.8667
282	3/12/1996	1	0.205	95.92	0.21	1.4356	25.8667
283	1/12/2001	1	0.189	96.26	0.2	1.4356	25.8667
284	2/19/2005	1	0.182	96.6	0.2	1.4356	25.8667
285	3/2/1953	1	0.169	96.94	0.2	1.4356	25.8667
286	3/11/2006	8	0.167	97.28	0.2	1.4356	25.8667
287	2/2/1960	1	0.164	97.62	0.2	1.4356	25.8667
288	4/18/2000	1	0.152	97.96	0.2	1.4356	25.8667
289	12/17/1957	1	0.144	98.3	0.2	1.4356	25.8667
290	2/14/2008	1	0.125	98.64	0.2	1.4356	25.8667
291	11/26/1960	1	0.125	98.98	0.2	1.4356	25.8667
292	3/21/1979	1	0.122	99.32	0.2	1.4356	25.8667
293	1/22/1964	1	0.113	99.66	0.2	1.4356	25.8667

	Event Peak Flow		Return Period (years)	
Event	Start	Flow	Plotting Position	
Rank	Date	(cfs)	Weibull	Cunnane
265	7-Feb-78	0.407	0.2	0.217
266	15-Dec-02	0.399	0.2	0.216
267	27-Mar-79	0.382	0.2	0.215
268	19-Aug-84	0.374	0.2	0.214
269	19-Mar-79	0.358	0.2	0.214
270	10-Apr-98	0.333	0.2	0.213
271	18-Nov-64	0.331	0.2	0.212
272	28-Apr-80	0.297	0.2	0.211
273	18-Feb-05	0.274	0.2	0.211
274	11-Apr-52	0.266	0.2	0.210
275	10-Feb-60	0.261	0.2	0.209
276	26-Jan-61	0.241	0.2	0.208
277	5-Dec-04	0.234	0.2	0.207
278	16-Feb-80	0.234	0.2	0.207
279	22-Jan-62	0.224	0.2	0.206
280	17-Dec-78	0.223	0.2	0.205
281	13-Nov-78	0.215	0.2	0.205
282	12-Mar-96	0.205	0.2	0.204
283	12-Jan-01	0.189	0.2	0.203
284	19-Feb-05	0.182	0.2	0.202
285	2-Mar-53	0.169	0.2	0.202
286	11-Mar-06	0.167	0.2	0.201
287	2-Feb-60	0.164	0.2	0.200
288	18-Apr-00	0.152	0.2	0.200
289	17-Dec-57	0.144	0.2	0.199
290	14-Feb-08	0.125	0.2	0.198
291	26-Nov-60	0.125	0.2	0.197
292	21-Mar-79	0.122	0.2	0.197
293	22-Jan-64	0.113	0.2	0.196

(Weibull, Complete Dura

Return Period	Flow (cfs)

<<from SWMM5 stats, proposed>>
<<24hr Event Separation Time, Q threshold = 0.0000 cfs>>

0	0.4075

Cunnane: for LPIII distribution, b>3/8 with positive skewness

TABLE A-2
Plotting Position Analysis - Complete Duration Series (by Eve
Flow Results for Node Outlet

PoR (yrs)	10/17/1948	Start
57.21	12/31/2005	Finish

Otay Industrial Park
Statistics - Node POC_1 Total Inflow

Rank	Start Date	Event Duration (hours)	Event Peak (CFS)	Exceedance Frequency (percent)	Return Period (years)
1	2/13/1998	323	13.04	0.16	58
2	10/14/2006	72	12.651	0.32	29
3	2/2/1998	209	12.577	0.48	19.33
4	2/2/1988	72	11.768	0.64	14.5
5	11/21/1996	86	11.693	0.8	11.6
6	11/12/1976	72	11.677	0.96	9.67
7	2/6/1992	130	11.323	1.12	8.29
8	12/29/1951	107	11.13	1.28	7.25
9	2/24/1983	274	10.873	1.44	6.44
10	2/22/2004	147	10.342	1.6	5.8
11	2/27/1978	213	10.336	1.76	5.27
12	1/3/1995	106	10.209	1.92	4.83
13	11/25/1985	85	10.165	2.08	4.46
14	10/30/1998	64	9.76	2.24	4.14
15	2/15/1986	75	9.713	2.4	3.87
16	11/14/1965	119	9.677	2.56	3.63
17	1/14/1969	85	9.491	2.72	3.41
18	2/27/1991	108	9.168	2.88	3.22
19	3/21/1954	150	9.134	3.04	3.05
20	10/27/2004	93	8.816	3.21	2.9
21	2/18/2005	191	8.796	3.37	2.76
22	2/16/1959	87	8.226	3.53	2.64
23	11/22/1965	120	8.172	3.69	2.52
24	2/28/1970	165	8.144	3.85	2.42
25	1/28/1980	120	8.035	4.01	2.32
26	1/5/1993	356	7.999	4.17	2.23
27	1/12/1997	125	7.827	4.33	2.15
28	1/3/2005	261	7.826	4.49	2.07
29	12/7/1992	72	7.747	4.65	2
30	1/16/1955	128	7.658	4.81	1.93
31	1/22/1967	92	7.645	4.97	1.87
32	1/13/1952	192	7.566	5.13	1.81
33	2/13/1995	87	7.554	5.29	1.76
34	3/8/1968	80	7.437	5.45	1.71
35	12/26/1984	94	7.426	5.61	1.66
36	2/3/1976	211	7.404	5.77	1.61
37	1/27/1983	108	7.298	5.93	1.57
38	12/20/1997	82	7.046	6.09	1.53
39	1/7/1957	207	7.018	6.25	1.49
40	12/17/1970	175	7.016	6.41	1.45
41	10/17/2004	158	7.003	6.57	1.41
42	1/14/1978	172	6.606	6.73	1.38
43	1/10/1960	185	6.574	6.89	1.35
44	3/5/1995	85	6.507	7.05	1.32
45	12/30/1976	238	6.409	7.21	1.29
46	1/8/2001	156	6.272	7.37	1.26

	Event Peak Flow		Return Period (years)		
			Plotting Position		
Event Rank	Start Date	Flow (cms)	Weibull	Cunnane	
1	13-Feb-98	13.040	58.2	96.862	
2	14-Oct-06	12.651	29.1	36.038	<<25
3	2-Feb-98	12.577	19.4	22.137	<<25
4	2-Feb-88	11.768	14.6	15.975	
5	21-Nov-96	11.693	11.6	12.497	
6	12-Nov-76	11.677	9.7	10.262	<<10
7	6-Feb-92	11.323	8.3	8.705	<<10
8	29-Dec-51	11.130	7.3	7.559	
9	24-Feb-83	10.873	6.5	6.679	
10	22-Feb-04	10.342	5.8	5.983	
11	27-Feb-78	10.336	5.3	5.418	<<5
12	3-Jan-95	10.209	4.9	4.951	<<5
13	25-Nov-85	10.165	4.5	4.558	
14	30-Oct-98	9.760	4.2	4.222	
15	15-Feb-86	9.713	3.9	3.933	
16	14-Nov-65	9.677	3.6	3.681	
17	14-Jan-69	9.491	3.4	3.459	
18	27-Feb-91	9.168	3.2	3.262	
19	21-Mar-54	9.134	3.1	3.087	
20	27-Oct-04	8.816	2.9	2.929	
21	18-Feb-05	8.796	2.8	2.787	
22	16-Feb-59	8.226	2.6	2.658	
23	22-Nov-65	8.172	2.5	2.540	
24	28-Feb-70	8.144	2.4	2.433	
25	28-Jan-80	8.035	2.3	2.334	
26	5-Jan-93	7.999	2.2	2.242	
27	12-Jan-97	7.827	2.2	2.158	
28	3-Jan-05	7.826	2.1	2.080	
29	7-Dec-92	7.747	2.0	2.007	<<2
30	16-Jan-55	7.658	1.9	1.939	<<2
31	22-Jan-67	7.645	1.9	1.876	
32	13-Jan-52	7.566	1.8	1.817	
33	13-Feb-95	7.554	1.8	1.761	
34	8-Mar-68	7.437	1.7	1.708	
35	26-Dec-84	7.426	1.7	1.659	
36	3-Feb-76	7.404	1.6	1.612	
37	27-Jan-83	7.298	1.6	1.568	
38	20-Dec-97	7.046	1.5	1.527	
39	7-Jan-57	7.018	1.5	1.487	
40	17-Dec-70	7.016	1.5	1.450	
41	17-Oct-04	7.003	1.4	1.414	
42	14-Jan-78	6.606	1.4	1.380	
43	10-Jan-60	6.574	1.4	1.347	
44	5-Mar-95	6.507	1.3	1.317	
45	30-Dec-76	6.409	1.3	1.287	
46	8-Jan-01	6.272	1.3	1.259	

Proposed Conditions Flows
(Cunnane, Complete Duration by Event)

Return Period	Flow (cfs)	RetPer
25-year	12.620	25
10-year	11.753	10
5-year	10.252	5
2-year	7.738	2
1-year	5.525	1
6-month	2.807	0.500
3-month	0.667	0.250

Rank	Start Date	Event Duration (hours)	Event Peak (CFS)	Exceedance Frequency (percent)	Return Period (years)
47	12/4/1966	130	6.254	7.53	1.23
48	3/19/1991	121	6.175	7.69	1.21
49	3/12/1982	218	6.153	7.85	1.18
50	2/19/1993	244	6.118	8.01	1.16
51	3/21/1964	142	6.108	8.17	1.14
52	11/28/1970	73	5.982	8.33	1.12
53	12/18/1967	90	5.679	8.49	1.09
54	10/17/1972	134	5.672	8.65	1.07
55	2/19/2007	124	5.588	8.81	1.05
56	4/12/1956	81	5.559	8.97	1.04
57	1/6/1959	70	5.549	9.13	1.02
58	1/4/1974	162	5.529	9.29	1
59	10/9/1986	72	5.392	9.46	0.98
60	3/31/1965	307	5.228	9.62	0.97
61	8/16/1977	77	5.201	9.78	0.95
62	5/8/1977	78	5.058	9.94	0.94
63	3/17/1983	240	5.023	10.1	0.92
64	8/28/1951	72	4.983	10.26	0.91
65	2/23/1987	121	4.976	10.42	0.89
66	1/20/1962	160	4.944	10.58	0.88
67	1/9/1980	133	4.82	10.74	0.87
68	4/1/1958	203	4.639	10.9	0.85
69	1/14/1990	164	4.639	11.06	0.84
70	1/10/1955	74	4.606	11.22	0.83
71	2/7/1959	174	4.542	11.38	0.82
72	2/3/1958	101	4.535	11.54	0.81
73	11/19/1967	147	4.502	11.7	0.79
74	3/27/1971	69	4.469	11.86	0.78
75	9/10/1976	83	4.439	12.02	0.77
76	3/4/2005	69	4.341	12.18	0.76
77	1/26/1961	79	4.33	12.34	0.75
78	6/9/1990	82	4.321	12.5	0.74
79	12/7/1984	149	4.31	12.66	0.73
80	12/25/1977	157	4.268	12.82	0.73
81	1/20/1982	81	4.266	12.98	0.72
82	12/4/1972	172	4.258	13.14	0.71
83	2/20/2000	132	4.248	13.3	0.7
84	3/6/1958	77	4.223	13.46	0.69
85	3/7/1952	280	4.2	13.62	0.68
86	9/25/1986	66	4.118	13.78	0.67
87	11/11/1985	86	3.933	13.94	0.67
88	4/14/1988	70	3.85	14.1	0.66
89	12/6/1986	89	3.839	14.26	0.65
90	1/9/1978	95	3.738	14.42	0.64
91	12/10/1985	91	3.73	14.58	0.64
92	2/11/2003	120	3.702	14.74	0.63
93	2/18/1969	260	3.657	14.9	0.62
94	10/25/1951	64	3.629	15.06	0.62
95	11/21/1978	128	3.502	15.22	0.61
96	11/4/1987	86	3.447	15.38	0.6
97	1/26/1997	71	3.436	15.54	0.6
98	1/25/1957	173	3.42	15.71	0.59

	Event Peak Flow		Return Period (years)		
			Plotting Position		
Event Rank	Start Date	Flow (cms)	Weibull	Cunnane	
47	4-Dec-66	6.254	1.2	1.232	
48	19-Mar-91	6.175	1.2	1.206	
49	12-Mar-82	6.153	1.2	1.181	
50	19-Feb-93	6.118	1.2	1.157	
51	21-Mar-64	6.108	1.1	1.134	
52	28-Nov-70	5.982	1.1	1.112	
53	18-Dec-67	5.679	1.1	1.091	
54	17-Oct-72	5.672	1.1	1.071	
55	19-Feb-07	5.588	1.1	1.051	
56	12-Apr-56	5.559	1.0	1.032	
57	6-Jan-59	5.549	1.0	1.014	<<1
58	4-Jan-74	5.529	1.0	0.996	<<1
59	9-Oct-86	5.392	1.0	0.979	
60	31-Mar-65	5.228	1.0	0.963	
61	16-Aug-77	5.201	1.0	0.947	
62	8-May-77	5.058	0.9	0.932	
63	17-Mar-83	5.023	0.9	0.917	
64	28-Aug-51	4.983	0.9	0.902	
65	23-Feb-87	4.976	0.9	0.889	
66	20-Jan-62	4.944	0.9	0.875	
67	9-Jan-80	4.820	0.9	0.862	
68	1-Apr-58	4.639	0.9	0.849	
69	14-Jan-90	4.639	0.8	0.837	
70	10-Jan-55	4.606	0.8	0.825	
71	7-Feb-59	4.542	0.8	0.813	
72	3-Feb-58	4.535	0.8	0.802	
73	19-Nov-67	4.502	0.8	0.791	
74	27-Mar-71	4.469	0.8	0.780	
75	10-Sep-76	4.439	0.8	0.769	
76	4-Mar-05	4.341	0.8	0.759	
77	26-Jan-61	4.330	0.8	0.749	
78	9-Jun-90	4.321	0.7	0.740	
79	7-Dec-84	4.310	0.7	0.730	
80	25-Dec-77	4.268	0.7	0.721	
81	20-Jan-82	4.266	0.7	0.712	
82	4-Dec-72	4.258	0.7	0.703	
83	20-Feb-00	4.248	0.7	0.695	
84	6-Mar-58	4.223	0.7	0.687	
85	7-Mar-52	4.200	0.7	0.678	
86	25-Sep-86	4.118	0.7	0.671	
87	11-Nov-85	3.933	0.7	0.663	
88	14-Apr-88	3.850	0.7	0.655	
89	6-Dec-86	3.839	0.7	0.648	
90	9-Jan-78	3.738	0.6	0.641	
91	10-Dec-85	3.730	0.6	0.634	
92	11-Feb-03	3.702	0.6	0.627	
93	18-Feb-69	3.657	0.6	0.620	
94	25-Oct-51	3.629	0.6	0.613	
95	21-Nov-78	3.502	0.6	0.607	
96	4-Nov-87	3.447	0.6	0.600	
97	26-Jan-97	3.436	0.6	0.594	
98	25-Jan-57	3.420	0.6	0.588	

(Cunnane, Complete Duration by Event)

Return Period	Flow (cfs)	
		RetPer

Rank	Start Date	Event Duration (hours)	Event Peak (CFS)	Exceedance Frequency (percent)	Return Period (years)
99	3/28/1961	77	3.398	15.87	0.59
100	1/27/1956	72	3.343	16.03	0.58
101	3/27/1958	67	3.315	16.19	0.57
102	1/28/1979	189	3.193	16.35	0.57
103	3/7/1974	79	3.164	16.51	0.56
104	12/22/1971	220	3.162	16.67	0.56
105	12/9/1982	79	3.141	16.83	0.55
106	2/13/1980	243	3.137	16.99	0.55
107	3/25/1989	73	3.104	17.15	0.54
108	3/1/1976	99	3.093	17.31	0.54
109	2/25/1981	269	3.058	17.47	0.53
110	2/11/2005	98	2.936	17.63	0.53
111	3/14/2003	93	2.905	17.79	0.52
112	1/5/1992	106	2.898	17.95	0.52
113	4/20/1983	85	2.86	18.11	0.51
114	3/25/1991	87	2.848	18.27	0.51
115	1/29/2007	93	2.839	18.43	0.5
116	3/17/1963	70	2.816	18.59	0.5
117	2/21/1959	77	2.8	18.75	0.5
118	4/20/1988	103	2.751	18.91	0.49
119	1/26/2001	80	2.745	19.07	0.49
120	12/17/1978	120	2.739	19.23	0.48
121	1/31/1996	73	2.683	19.39	0.48
122	1/3/1991	75	2.654	19.55	0.48
123	10/11/1987	91	2.649	19.71	0.47
124	2/13/1954	73	2.636	19.87	0.47
125	11/9/1982	83	2.628	20.03	0.46
126	11/30/2007	74	2.623	20.19	0.46
127	4/13/1976	112	2.561	20.35	0.46
128	3/11/1995	82	2.478	20.51	0.45
129	12/16/1984	149	2.458	20.67	0.45
130	1/16/1973	114	2.433	20.83	0.45
131	4/13/2003	71	2.429	20.99	0.44
132	2/19/1962	102	2.396	21.15	0.44
133	9/4/1963	65	2.391	21.31	0.44
134	3/6/1980	71	2.324	21.47	0.43
135	2/11/1973	106	2.289	21.63	0.43
136	2/28/2006	73	2.286	21.79	0.43
137	12/28/1952	134	2.281	21.96	0.42
138	3/1/1957	64	2.273	22.12	0.42
139	4/30/1955	90	2.268	22.28	0.42
140	3/16/1958	66	2.263	22.44	0.41
141	1/18/1969	279	2.262	22.6	0.41
142	3/5/1975	250	2.256	22.76	0.41
143	1/17/1988	78	2.23	22.92	0.41
144	4/1/1999	75	2.219	23.08	0.4
145	2/28/1960	77	2.218	23.24	0.4
146	3/24/1998	237	2.183	23.4	0.4
147	3/1/1988	86	2.125	23.56	0.39
148	3/9/1978	126	2.118	23.72	0.39
149	1/25/1999	108	2.11	23.88	0.39
150	3/12/1996	90	2.097	24.04	0.39

Event Rank	Event Peak Flow: Start Date	Event Peak Flow: Flow (cms)	Return Period (years), Plotting Position: Weibull	Return Period (years), Plotting Position: Cunnane	
99	28-Mar-61	3.398	0.6	0.582	
100	27-Jan-56	3.343	0.6	0.576	
101	27-Mar-58	3.315	0.6	0.571	
102	28-Jan-79	3.193	0.6	0.565	
103	7-Mar-74	3.164	0.6	0.559	
104	22-Dec-71	3.162	0.6	0.554	
105	9-Dec-82	3.141	0.6	0.549	
106	13-Feb-80	3.137	0.5	0.544	
107	25-Mar-89	3.104	0.5	0.538	
108	1-Mar-76	3.093	0.5	0.533	
109	25-Feb-81	3.058	0.5	0.528	
110	11-Feb-05	2.936	0.5	0.524	
111	14-Mar-03	2.905	0.5	0.519	
112	5-Jan-92	2.898	0.5	0.514	
113	20-Apr-83	2.860	0.5	0.510	
114	25-Mar-91	2.848	0.5	0.505	
115	29-Jan-07	2.839	0.5	0.501	<<1/2
116	17-Mar-63	2.816	0.5	0.496	<<1/2
117	21-Feb-59	2.800	0.5	0.492	
118	20-Apr-88	2.751	0.5	0.488	
119	26-Jan-01	2.745	0.5	0.484	
120	17-Dec-78	2.739	0.5	0.480	
121	31-Jan-96	2.683	0.5	0.476	
122	3-Jan-91	2.654	0.5	0.472	
123	11-Oct-87	2.649	0.5	0.468	
124	13-Feb-54	2.636	0.5	0.464	
125	9-Nov-82	2.628	0.5	0.461	
126	30-Nov-07	2.623	0.5	0.457	
127	13-Apr-76	2.561	0.5	0.453	
128	11-Mar-95	2.478	0.5	0.450	
129	16-Dec-84	2.458	0.5	0.446	
130	16-Jan-73	2.433	0.4	0.443	
131	13-Apr-03	2.429	0.4	0.439	
132	19-Feb-62	2.396	0.4	0.436	
133	4-Sep-63	2.391	0.4	0.433	
134	6-Mar-80	2.324	0.4	0.430	
135	11-Feb-73	2.289	0.4	0.426	
136	28-Feb-06	2.286	0.4	0.423	
137	28-Dec-52	2.281	0.4	0.420	
138	1-Mar-57	2.273	0.4	0.417	
139	30-Apr-55	2.268	0.4	0.414	
140	16-Mar-58	2.263	0.4	0.411	
141	18-Jan-69	2.262	0.4	0.408	
142	5-Mar-75	2.256	0.4	0.405	
143	17-Jan-88	2.230	0.4	0.402	
144	1-Apr-99	2.219	0.4	0.400	
145	28-Feb-60	2.218	0.4	0.397	
146	24-Mar-98	2.183	0.4	0.394	
147	1-Mar-88	2.125	0.4	0.391	
148	9-Mar-78	2.118	0.4	0.389	
149	25-Jan-99	2.110	0.4	0.386	
150	12-Mar-96	2.097	0.4	0.384	

(Cunnane, Complete Duration by Event)

Return Period	Flow (cfs)	
		RetPer

Rank	Start Date	Event Duration (hours)	Event Peak (CFS)	Exceedance Frequency (percent)	Return Period (years)
151	11/26/1967	65	2.075	24.2	0.38
152	3/20/1992	91	2.044	24.36	0.38
153	12/5/1997	95	2.019	24.52	0.38
154	12/27/1992	106	2.013	24.68	0.38
155	2/7/1993	80	1.984	24.84	0.37
156	11/23/1973	91	1.966	25	0.37
157	12/20/1952	66	1.947	25.16	0.37
158	5/7/1971	65	1.944	25.32	0.37
159	12/9/1965	216	1.928	25.48	0.36
160	1/4/1987	124	1.916	25.64	0.36
161	1/5/1979	110	1.914	25.8	0.36
162	2/5/1978	256	1.913	25.96	0.36
163	4/11/1967	78	1.894	26.12	0.36
164	1/24/1954	84	1.877	26.28	0.35
165	1/19/1954	93	1.872	26.44	0.35
166	3/17/1954	67	1.861	26.6	0.35
167	11/20/1963	78	1.856	26.76	0.35
168	2/25/1996	99	1.829	26.92	0.35
169	3/10/1980	68	1.812	27.08	0.34
170	2/9/1963	94	1.778	27.24	0.34
171	3/2/1992	76	1.728	27.4	0.34
172	12/24/1959	86	1.723	27.56	0.34
173	1/8/1998	94	1.715	27.72	0.34
174	12/11/1951	77	1.714	27.88	0.33
175	9/17/1963	88	1.71	28.04	0.33
176	3/10/2006	90	1.706	28.21	0.33
177	11/11/1972	196	1.628	28.37	0.33
178	11/14/1952	100	1.592	28.53	0.33
179	1/27/2008	90	1.59	28.69	0.32
180	11/28/1982	108	1.577	28.85	0.32
181	2/10/1970	83	1.57	29.01	0.32
182	11/16/1984	84	1.548	29.17	0.32
183	12/24/1994	85	1.543	29.33	0.32
184	3/26/1992	155	1.539	29.49	0.32
185	10/11/1957	129	1.537	29.65	0.31
186	3/25/1977	65	1.518	29.81	0.31
187	1/24/1995	108	1.513	29.97	0.31
188	3/27/1979	80	1.503	30.13	0.31
189	1/2/1990	76	1.499	30.29	0.31
190	2/6/1969	68	1.489	30.45	0.31
191	3/6/1973	209	1.42	30.61	0.3
192	2/24/2003	107	1.373	30.77	0.3
193	11/30/1952	111	1.356	30.93	0.3
194	1/31/1993	62	1.35	31.09	0.3
195	12/28/1991	113	1.346	31.25	0.3
196	4/5/1975	134	1.315	31.41	0.3
197	4/1/1964	68	1.309	31.57	0.29
198	2/17/1994	97	1.246	31.73	0.29
199	3/31/1978	117	1.238	31.89	0.29
200	4/27/1960	68	1.159	32.05	0.29
201	4/20/1957	76	1.153	32.21	0.29
202	12/25/1988	89	1.128	32.37	0.29

	Event Peak Flow		Return Period (years)	
			Plotting Position	
Event Rank	Start Date	Flow (cms)	Weibull	Cunnane
151	26-Nov-67	2.075	0.4	0.381
152	20-Mar-92	2.044	0.4	0.379
153	5-Dec-97	2.019	0.4	0.376
154	27-Dec-92	2.013	0.4	0.374
155	7-Feb-93	1.984	0.4	0.371
156	23-Nov-73	1.966	0.4	0.369
157	20-Dec-52	1.947	0.4	0.366
158	7-May-71	1.944	0.4	0.364
159	9-Dec-65	1.928	0.4	0.362
160	4-Jan-87	1.916	0.4	0.360
161	5-Jan-79	1.914	0.4	0.357
162	5-Feb-78	1.913	0.4	0.355
163	11-Apr-67	1.894	0.4	0.353
164	24-Jan-54	1.877	0.4	0.351
165	19-Jan-54	1.872	0.4	0.349
166	17-Mar-54	1.861	0.4	0.347
167	20-Nov-63	1.856	0.3	0.344
168	25-Feb-96	1.829	0.3	0.342
169	10-Mar-80	1.812	0.3	0.340
170	9-Feb-63	1.778	0.3	0.338
171	2-Mar-92	1.728	0.3	0.336
172	24-Dec-59	1.723	0.3	0.334
173	8-Jan-98	1.715	0.3	0.333
174	11-Dec-51	1.714	0.3	0.331
175	17-Sep-63	1.710	0.3	0.329
176	10-Mar-06	1.706	0.3	0.327
177	11-Nov-72	1.628	0.3	0.325
178	14-Nov-52	1.592	0.3	0.323
179	27-Jan-08	1.590	0.3	0.321
180	28-Nov-82	1.577	0.3	0.320
181	10-Feb-70	1.570	0.3	0.318
182	16-Nov-84	1.548	0.3	0.316
183	24-Dec-94	1.543	0.3	0.314
184	26-Mar-92	1.539	0.3	0.313
185	11-Oct-57	1.537	0.3	0.311
186	25-Mar-77	1.518	0.3	0.309
187	24-Jan-95	1.513	0.3	0.308
188	27-Mar-79	1.503	0.3	0.306
189	2-Jan-90	1.499	0.3	0.304
190	6-Feb-69	1.489	0.3	0.303
191	6-Mar-73	1.420	0.3	0.301
192	24-Feb-03	1.373	0.3	0.300
193	30-Nov-52	1.356	0.3	0.298
194	31-Jan-93	1.350	0.3	0.296
195	28-Dec-91	1.346	0.3	0.295
196	5-Apr-75	1.315	0.3	0.293
197	1-Apr-64	1.309	0.3	0.292
198	17-Feb-94	1.246	0.3	0.290
199	31-Mar-78	1.238	0.3	0.289
200	27-Apr-60	1.159	0.3	0.288
201	20-Apr-57	1.153	0.3	0.286
202	25-Dec-88	1.128	0.3	0.285

(Cunnane, Complete Duration by Event)

Return Period	Flow (cfs)	RetPer

Rank	Start Date	Event Duration (hours)	Event Peak (CFS)	Exceedance Frequency (percent)	Return Period (years)
203	12/2/1961	75	1.113	32.53	0.29
204	11/10/1978	141	1.087	32.69	0.28
205	3/1/1979	72	1.037	32.85	0.28
206	11/27/1981	107	1.029	33.01	0.28
207	12/27/1964	75	1.026	33.17	0.28
208	11/7/2002	88	1.017	33.33	0.28
209	2/25/1962	92	1.007	33.49	0.28
210	1/12/1954	95	0.996	33.65	0.28
211	11/17/1964	68	0.991	33.81	0.27
212	2/15/1992	65	0.99	33.97	0.27
213	2/17/1990	81	0.99	34.13	0.27
214	12/30/1981	134	0.956	34.29	0.27
215	5/11/1998	68	0.883	34.46	0.27
216	3/7/1992	99	0.864	34.62	0.27
217	4/1/1982	62	0.86	34.78	0.27
218	1/5/2008	110	0.821	34.94	0.27
219	1/15/1979	131	0.806	35.1	0.26
220	2/6/1966	72	0.795	35.26	0.26
221	2/2/1960	65	0.773	35.42	0.26
222	11/18/1973	79	0.767	35.58	0.26
223	4/2/2004	62	0.743	35.74	0.26
224	11/28/2002	69	0.735	35.9	0.26
225	2/2/1983	123	0.72	36.06	0.26
226	4/7/1978	67	0.702	36.22	0.26
227	12/19/1990	101	0.702	36.38	0.26
228	10/28/1974	141	0.697	36.54	0.25
229	12/28/2004	100	0.697	36.7	0.25
230	3/26/1993	114	0.695	36.86	0.25
231	11/12/2003	64	0.685	37.02	0.25
232	2/19/1958	71	0.669	37.18	0.25
233	11/10/1954	68	0.646	37.34	0.25
234	11/6/1960	66	0.638	37.5	0.25
235	3/8/1986	131	0.635	37.66	0.25
236	12/6/1996	148	0.619	37.82	0.25
237	2/7/1994	95	0.599	37.98	0.24
238	3/15/1965	64	0.584	38.14	0.24
239	1/10/1995	191	0.544	38.3	0.24
240	4/21/2001	67	0.522	38.46	0.24
241	11/29/1985	121	0.516	38.62	0.24
242	4/3/1987	62	0.502	38.78	0.24
243	12/18/1962	69	0.5	38.94	0.24
244	1/28/1998	66	0.5	39.1	0.24
245	11/23/1952	62	0.499	39.26	0.24
246	3/19/1981	64	0.499	39.42	0.24
247	11/28/1998	232	0.497	39.58	0.23
248	4/28/1980	117	0.497	39.74	0.23
249	12/5/2004	75	0.497	39.9	0.23
250	4/2/1974	59	0.494	40.06	0.23
251	1/21/1996	104	0.493	40.22	0.23
252	11/26/1960	59	0.492	40.38	0.23
253	3/20/1973	75	0.492	40.54	0.23
254	2/6/1965	68	0.492	40.71	0.23

	Event Peak Flow		Return Period (years)		
			Plotting Position		
Event Rank	Start Date	Flow (cms)	Weibull	Cunnane	
203	2-Dec-61	1.113	0.3	0.283	
204	10-Nov-78	1.087	0.3	0.282	
205	1-Mar-79	1.037	0.3	0.281	
206	27-Nov-81	1.029	0.3	0.279	
207	27-Dec-64	1.026	0.3	0.278	
208	7-Nov-02	1.017	0.3	0.276	
209	25-Feb-62	1.007	0.3	0.275	
210	12-Jan-54	0.996	0.3	0.274	
211	17-Nov-64	0.991	0.3	0.273	
212	15-Feb-92	0.990	0.3	0.271	
213	17-Feb-90	0.990	0.3	0.270	
214	30-Dec-81	0.956	0.3	0.269	
215	11-May-98	0.883	0.3	0.267	
216	7-Mar-92	0.864	0.3	0.266	
217	1-Apr-82	0.860	0.3	0.265	
218	5-Jan-08	0.821	0.3	0.264	
219	15-Jan-79	0.806	0.3	0.263	
220	6-Feb-66	0.795	0.3	0.261	
221	2-Feb-60	0.773	0.3	0.260	
222	18-Nov-73	0.767	0.3	0.259	
223	2-Apr-04	0.743	0.3	0.258	
224	28-Nov-02	0.735	0.3	0.257	
225	2-Feb-83	0.720	0.3	0.256	
226	7-Apr-78	0.702	0.3	0.254	
227	19-Dec-90	0.702	0.3	0.253	
228	28-Oct-74	0.697	0.3	0.252	
229	28-Dec-04	0.697	0.3	0.251	
230	26-Mar-93	0.695	0.3	0.250	<<1/4
231	12-Nov-03	0.685	0.3	0.249	<<1/4
232	19-Feb-58	0.669	0.3	0.248	
233	10-Nov-54	0.646	0.2	0.247	
234	6-Nov-60	0.638	0.2	0.246	
235	8-Mar-86	0.635	0.2	0.245	
236	6-Dec-96	0.619	0.2	0.244	
237	7-Feb-94	0.599	0.2	0.243	
238	15-Mar-65	0.584	0.2	0.242	
239	10-Jan-95	0.544	0.2	0.241	
240	21-Apr-01	0.522	0.2	0.240	
241	29-Nov-85	0.516	0.2	0.239	
242	3-Apr-87	0.502	0.2	0.238	
243	18-Dec-62	0.500	0.2	0.237	
244	28-Jan-98	0.500	0.2	0.236	
245	23-Nov-52	0.499	0.2	0.235	
246	19-Mar-81	0.499	0.2	0.234	
247	28-Nov-98	0.497	0.2	0.233	
248	28-Apr-80	0.497	0.2	0.232	
249	5-Dec-04	0.497	0.2	0.231	
250	2-Apr-74	0.494	0.2	0.230	
251	21-Jan-96	0.493	0.2	0.229	
252	26-Nov-60	0.492	0.2	0.228	
253	20-Mar-73	0.492	0.2	0.227	
254	6-Feb-65	0.492	0.2	0.226	

(Cunnane, Complete Duration by Event)

Return Period	Flow (cfs)	RetPer

Rank	Start Date	Event Duration (hours)	Event Peak (CFS)	Exceedance Frequency (percent)	Return Period (years)
255	3/16/1986	68	0.491	40.87	0.23
256	2/2/1985	103	0.491	41.03	0.23
257	1/25/1994	72	0.488	41.19	0.23
258	11/14/1953	67	0.487	41.35	0.22
259	10/29/1987	132	0.485	41.51	0.22
260	3/13/1998	61	0.485	41.67	0.22
261	3/1/1953	82	0.484	41.83	0.22
262	11/6/1963	69	0.484	41.99	0.22
263	3/17/1979	154	0.481	42.15	0.22
264	1/28/1981	95	0.481	42.31	0.22
265	12/29/1965	67	0.479	42.47	0.22
266	2/13/1968	57	0.478	42.63	0.22
267	4/1/1968	64	0.477	42.79	0.22
268	3/25/1994	66	0.474	42.95	0.22
269	1/28/1982	61	0.473	43.11	0.22
270	2/14/2008	54	0.473	43.27	0.21
271	11/22/1951	55	0.471	43.43	0.21
272	4/10/1952	60	0.471	43.59	0.21
273	12/24/1968	91	0.47	43.75	0.21
274	4/2/1981	67	0.47	43.91	0.21
275	12/21/1965	63	0.47	44.07	0.21
276	10/16/1971	83	0.468	44.23	0.21
277	1/6/1952	64	0.467	44.39	0.21
278	2/27/1997	63	0.467	44.55	0.21
279	1/30/1966	63	0.465	44.71	0.21
280	10/6/1977	62	0.465	44.87	0.21
281	9/22/1987	61	0.464	45.03	0.21
282	12/2/1955	109	0.464	45.19	0.21
283	1/30/1986	78	0.462	45.35	0.2
284	11/14/1955	53	0.462	45.51	0.2
285	5/22/2006	53	0.462	45.67	0.2
286	12/4/1980	55	0.461	45.83	0.2
287	2/3/2008	61	0.46	45.99	0.2
288	1/15/1970	80	0.46	46.15	0.2
289	10/30/2000	53	0.459	46.31	0.2
290	11/21/1984	141	0.458	46.47	0.2
291	12/23/1982	49	0.458	46.63	0.2
292	10/20/1979	62	0.457	46.79	0.2
293	3/1/1952	57	0.456	46.96	0.2
294	3/24/1958	52	0.456	47.12	0.2
295	12/5/1957	65	0.455	47.28	0.2
296	11/25/1983	49	0.455	47.44	0.2
297	2/8/1981	60	0.454	47.6	0.2
298	2/23/1953	59	0.452	47.76	0.19
299	5/11/1957	64	0.451	47.92	0.19
300	4/3/1997	54	0.451	48.08	0.19
301	12/15/2002	142	0.451	48.24	0.19
302	1/21/1964	71	0.449	48.4	0.19
303	3/26/1980	48	0.449	48.56	0.19
304	12/15/1957	80	0.448	48.72	0.19
305	2/21/1979	65	0.447	48.88	0.19
306	8/17/1984	94	0.445	49.04	0.19

Event	Event Peak Flow		Return Period (years)	
	Start	Flow	Plotting Position	
Rank	Date	(cms)	Weibull	Cunnane
255	16-Mar-86	0.491	0.2	0.225
256	2-Feb-85	0.491	0.2	0.225
257	25-Jan-94	0.488	0.2	0.224
258	14-Nov-53	0.487	0.2	0.223
259	29-Oct-87	0.485	0.2	0.222
260	13-Mar-98	0.485	0.2	0.221
261	1-Mar-53	0.484	0.2	0.220
262	6-Nov-63	0.484	0.2	0.219
263	17-Mar-79	0.481	0.2	0.219
264	28-Jan-81	0.481	0.2	0.218
265	29-Dec-65	0.479	0.2	0.217
266	13-Feb-68	0.478	0.2	0.216
267	1-Apr-68	0.477	0.2	0.215
268	25-Mar-94	0.474	0.2	0.214
269	28-Jan-82	0.473	0.2	0.214
270	14-Feb-08	0.473	0.2	0.213
271	22-Nov-51	0.471	0.2	0.212
272	10-Apr-52	0.471	0.2	0.211
273	24-Dec-68	0.470	0.2	0.211
274	2-Apr-81	0.470	0.2	0.210
275	21-Dec-65	0.470	0.2	0.209
276	16-Oct-71	0.468	0.2	0.208
277	6-Jan-52	0.467	0.2	0.207
278	27-Feb-97	0.467	0.2	0.207
279	30-Jan-66	0.465	0.2	0.206
280	6-Oct-77	0.465	0.2	0.205
281	22-Sep-87	0.464	0.2	0.205
282	2-Dec-55	0.464	0.2	0.204
283	30-Jan-86	0.462	0.2	0.203
284	14-Nov-55	0.462	0.2	0.202
285	22-May-06	0.462	0.2	0.202
286	4-Dec-80	0.461	0.2	0.201
287	3-Feb-08	0.460	0.2	0.200
288	15-Jan-70	0.460	0.2	0.200
289	30-Oct-00	0.459	0.2	0.199
290	21-Nov-84	0.458	0.2	0.198
291	23-Dec-82	0.458	0.2	0.197
292	20-Oct-79	0.457	0.2	0.197
293	1-Mar-52	0.456	0.2	0.196
294	24-Mar-58	0.456	0.2	0.195
295	5-Dec-57	0.455	0.2	0.195
296	25-Nov-83	0.455	0.2	0.194
297	8-Feb-81	0.454	0.2	0.194
298	23-Feb-53	0.452	0.2	0.193
299	11-May-57	0.451	0.2	0.192
300	3-Apr-97	0.451	0.2	0.192
301	15-Dec-02	0.451	0.2	0.191
302	21-Jan-64	0.449	0.2	0.190
303	26-Mar-80	0.449	0.2	0.190
304	15-Dec-57	0.448	0.2	0.189
305	21-Feb-79	0.447	0.2	0.188
306	17-Aug-84	0.445	0.2	0.188

(Cunnane, Complete Duration by Event)

Return Period	Flow (cfs)	RetPer

Rank	Start Date	Event Duration (hours)	Event Peak (CFS)	Exceedance Frequency (percent)	Return Period (years)
307	2/29/1964	73	0.445	49.2	0.19
308	4/26/1963	51	0.445	49.36	0.19
309	2/9/1960	77	0.444	49.52	0.19
310	11/25/2001	51	0.442	49.68	0.19
311	11/27/1975	73	0.441	49.84	0.19
312	1/27/1966	51	0.441	50	0.19
313	1/30/1978	50	0.439	50.16	0.19
314	3/19/1994	53	0.438	50.32	0.18
315	12/5/1951	49	0.437	50.48	0.18
316	1/26/1958	61	0.437	50.64	0.18
317	4/16/1995	75	0.437	50.8	0.18
318	1/18/1980	68	0.436	50.96	0.18
319	10/27/1991	48	0.436	51.12	0.18
320	12/17/1991	51	0.435	51.28	0.18
321	4/4/2006	57	0.434	51.44	0.18
322	3/21/1980	46	0.434	51.6	0.18
323	1/9/1991	46	0.432	51.76	0.18
324	2/4/1999	47	0.429	51.92	0.18
325	12/11/1993	118	0.429	52.08	0.18
326	11/6/1969	51	0.428	52.24	0.18
327	3/13/1969	55	0.425	52.4	0.18
328	4/6/1986	48	0.422	52.56	0.18
329	4/12/1999	45	0.418	52.72	0.18
330	1/31/1956	48	0.412	52.88	0.18
331	12/25/2003	50	0.411	53.04	0.18
332	11/17/1986	55	0.41	53.21	0.17
333	9/30/1983	46	0.41	53.37	0.17
334	11/19/1990	51	0.41	53.53	0.17
335	2/7/1962	56	0.409	53.69	0.17
336	3/22/1975	45	0.409	53.85	0.17
337	2/9/1982	72	0.408	54.01	0.17
338	11/11/1958	52	0.407	54.17	0.17
339	11/15/1958	55	0.406	54.33	0.17
340	1/9/1982	63	0.405	54.49	0.17
341	3/2/2004	47	0.403	54.65	0.17
342	2/28/1973	48	0.399	54.81	0.17
343	11/5/2001	46	0.394	54.97	0.17
344	3/30/1954	43	0.394	55.13	0.17
345	11/8/1998	45	0.39	55.29	0.17
346	3/11/1958	53	0.39	55.45	0.17
347	4/30/1983	44	0.39	55.61	0.17
348	1/2/1998	49	0.387	55.77	0.17
349	3/26/1981	46	0.386	55.93	0.17
350	12/30/1974	86	0.386	56.09	0.17
351	4/23/1980	43	0.385	56.25	0.17
352	12/18/1977	44	0.384	56.41	0.16
353	10/31/1957	42	0.383	56.57	0.16
354	12/4/1971	43	0.383	56.73	0.16
355	10/22/1976	41	0.382	56.89	0.16
356	11/25/1970	53	0.381	57.05	0.16
357	3/4/1961	44	0.381	57.21	0.16
358	1/2/2006	43	0.377	57.37	0.16

	Event Peak Flow		Return Period (years)	
			Plotting Position	
Event Rank	Start Date	Flow (cms)	Weibull	Cunnane
307	29-Feb-64	0.445	0.2	0.187
308	26-Apr-63	0.445	0.2	0.187
309	9-Feb-60	0.444	0.2	0.186
310	25-Nov-01	0.442	0.2	0.185
311	27-Nov-75	0.441	0.2	0.185
312	27-Jan-66	0.441	0.2	0.184
313	30-Jan-78	0.439	0.2	0.184
314	19-Mar-94	0.438	0.2	0.183
315	5-Dec-51	0.437	0.2	0.182
316	26-Jan-58	0.437	0.2	0.182
317	16-Apr-95	0.437	0.2	0.181
318	18-Jan-80	0.436	0.2	0.181
319	27-Oct-91	0.436	0.2	0.180
320	17-Dec-91	0.435	0.2	0.180
321	4-Apr-06	0.434	0.2	0.179
322	21-Mar-80	0.434	0.2	0.178
323	9-Jan-91	0.432	0.2	0.178
324	4-Feb-99	0.429	0.2	0.177
325	11-Dec-93	0.429	0.2	0.177
326	6-Nov-69	0.428	0.2	0.176
327	13-Mar-69	0.425	0.2	0.176
328	6-Apr-86	0.422	0.2	0.175
329	12-Apr-99	0.418	0.2	0.175
330	31-Jan-56	0.412	0.2	0.174
331	25-Dec-03	0.411	0.2	0.174
332	17-Nov-86	0.410	0.2	0.173
333	30-Sep-83	0.410	0.2	0.173
334	19-Nov-90	0.410	0.2	0.172
335	7-Feb-62	0.409	0.2	0.172
336	22-Mar-75	0.409	0.2	0.171
337	9-Feb-82	0.408	0.2	0.171
338	11-Nov-58	0.407	0.2	0.170
339	15-Nov-58	0.406	0.2	0.169
340	9-Jan-82	0.405	0.2	0.169
341	2-Mar-04	0.403	0.2	0.169
342	28-Feb-73	0.399	0.2	0.168
343	5-Nov-01	0.394	0.2	0.168
344	30-Mar-54	0.394	0.2	0.167
345	8-Nov-98	0.390	0.2	0.167
346	11-Mar-58	0.390	0.2	0.166
347	30-Apr-83	0.390	0.2	0.166
348	2-Jan-98	0.387	0.2	0.165
349	26-Mar-81	0.386	0.2	0.165
350	30-Dec-74	0.386	0.2	0.164
351	23-Apr-80	0.385	0.2	0.164
352	18-Dec-77	0.384	0.2	0.163
353	31-Oct-57	0.383	0.2	0.163
354	4-Dec-71	0.383	0.2	0.162
355	22-Oct-76	0.382	0.2	0.162
356	25-Nov-70	0.381	0.2	0.161
357	4-Mar-61	0.381	0.2	0.161
358	2-Jan-06	0.377	0.2	0.160

(Cunnane, Complete Duration by Event)

Return Period	Flow (cfs)	
		RetPer

Rank	Start Date	Event Duration (hours)	Event Peak (CFS)	Exceedance Frequency (percent)	Return Period (years)
359	2/3/2004	50	0.376	57.53	0.16
360	1/2/2004	41	0.374	57.69	0.16
361	4/1/1956	41	0.374	57.85	0.16
362	2/3/1975	64	0.373	58.01	0.16
363	3/31/1967	59	0.368	58.17	0.16
364	4/10/1998	137	0.364	58.33	0.16
365	11/25/1988	45	0.363	58.49	0.16
366	12/15/1988	106	0.363	58.65	0.16
367	11/21/1955	38	0.362	58.81	0.16
368	2/8/1986	50	0.362	58.97	0.16
369	3/18/1962	42	0.361	59.13	0.16
370	2/16/1971	86	0.36	59.29	0.16
371	12/30/1966	40	0.36	59.46	0.16
372	4/18/2000	41	0.358	59.62	0.16
373	12/21/1959	40	0.357	59.78	0.16
374	7/28/1968	40	0.357	59.94	0.16
375	1/30/1973	39	0.357	60.1	0.15
376	9/16/1978	40	0.356	60.26	0.15
377	11/9/1964	86	0.355	60.42	0.15
378	4/20/2007	41	0.354	60.58	0.15
379	6/5/1993	40	0.354	60.74	0.15
380	12/12/1975	38	0.352	60.9	0.15
381	3/10/1970	36	0.351	61.06	0.15
382	3/16/1957	36	0.351	61.22	0.15
383	1/9/1973	41	0.351	61.38	0.15
384	11/2/1957	65	0.35	61.54	0.15
385	4/25/1994	89	0.347	61.7	0.15
386	2/19/1960	38	0.345	61.86	0.15
387	12/10/1954	41	0.345	62.02	0.15
388	3/18/1968	35	0.345	62.18	0.15
389	3/29/2006	37	0.344	62.34	0.15
390	4/14/1971	46	0.344	62.5	0.15
391	1/28/2005	47	0.343	62.66	0.15
392	3/24/1966	38	0.341	62.82	0.15
393	4/18/1967	46	0.341	62.98	0.15
394	3/22/2005	57	0.339	63.14	0.15
395	2/23/1957	40	0.339	63.3	0.15
396	10/22/1987	47	0.337	63.46	0.15
397	1/2/1997	64	0.334	63.62	0.15
398	1/11/1981	48	0.333	63.78	0.15
399	3/19/2006	64	0.331	63.94	0.15
400	3/21/1995	70	0.331	64.1	0.14
401	11/21/2004	37	0.329	64.26	0.14
402	4/1/1980	34	0.327	64.42	0.14
403	11/11/2000	33	0.326	64.58	0.14
404	3/2/1980	42	0.325	64.74	0.14
405	12/19/1951	37	0.324	64.9	0.14
406	1/24/2008	40	0.322	65.06	0.14
407	12/10/1961	33	0.321	65.22	0.14
408	2/4/1990	32	0.318	65.38	0.14
409	1/4/1973	32	0.317	65.54	0.14
410	12/28/1989	35	0.315	65.71	0.14

	Event Peak Flow		Return Period (years)	
			Plotting Position	
Event Rank	Start Date	Flow (cms)	Weibull	Cunnane
359	3-Feb-04	0.376	0.2	0.160
360	2-Jan-04	0.374	0.2	0.160
361	1-Apr-56	0.374	0.2	0.159
362	3-Feb-75	0.373	0.2	0.159
363	31-Mar-67	0.368	0.2	0.158
364	10-Apr-98	0.364	0.2	0.158
365	25-Nov-88	0.363	0.2	0.157
366	15-Dec-88	0.363	0.2	0.157
367	21-Nov-55	0.362	0.2	0.157
368	8-Feb-86	0.362	0.2	0.156
369	18-Mar-62	0.361	0.2	0.156
370	16-Feb-71	0.360	0.2	0.155
371	30-Dec-66	0.360	0.2	0.155
372	18-Apr-00	0.358	0.2	0.154
373	21-Dec-59	0.357	0.2	0.154
374	28-Jul-68	0.357	0.2	0.154
375	30-Jan-73	0.357	0.2	0.153
376	16-Sep-78	0.356	0.2	0.153
377	9-Nov-64	0.355	0.2	0.152
378	20-Apr-07	0.354	0.2	0.152
379	5-Jun-93	0.354	0.2	0.152
380	12-Dec-75	0.352	0.2	0.151
381	10-Mar-70	0.351	0.2	0.151
382	16-Mar-57	0.351	0.2	0.150
383	9-Jan-73	0.351	0.2	0.150
384	2-Nov-57	0.350	0.2	0.150
385	25-Apr-94	0.347	0.2	0.149
386	19-Feb-60	0.345	0.2	0.149
387	10-Dec-54	0.345	0.2	0.148
388	18-Mar-68	0.345	0.2	0.148
389	29-Mar-06	0.344	0.1	0.148
390	14-Apr-71	0.344	0.1	0.147
391	28-Jan-05	0.343	0.1	0.147
392	24-Mar-66	0.341	0.1	0.147
393	18-Apr-67	0.341	0.1	0.146
394	22-Mar-05	0.339	0.1	0.146
395	23-Feb-57	0.339	0.1	0.145
396	22-Oct-87	0.337	0.1	0.145
397	2-Jan-97	0.334	0.1	0.145
398	11-Jan-81	0.333	0.1	0.144
399	19-Mar-06	0.331	0.1	0.144
400	21-Mar-95	0.331	0.1	0.144
401	21-Nov-04	0.329	0.1	0.143
402	1-Apr-80	0.327	0.1	0.143
403	11-Nov-00	0.326	0.1	0.143
404	2-Mar-80	0.325	0.1	0.142
405	19-Dec-51	0.324	0.1	0.142
406	24-Jan-08	0.322	0.1	0.141
407	10-Dec-61	0.321	0.1	0.141
408	4-Feb-90	0.318	0.1	0.141
409	4-Jan-73	0.317	0.1	0.140
410	28-Dec-89	0.315	0.1	0.140

(Cunnane, Complete Duration by Event)

Return Period	Flow (cfs)	RetPer

Rank	Start Date	Event Duration (hours)	Event Peak (CFS)	Exceedance Frequency (percent)	Return Period (years)
411	11/20/1983	39	0.314	65.87	0.14
412	7/31/1991	33	0.314	66.03	0.14
413	12/7/2007	66	0.314	66.19	0.14
414	6/16/1995	57	0.312	66.35	0.14
415	1/23/1997	31	0.31	66.51	0.14
416	6/10/1957	34	0.309	66.67	0.14
417	12/9/1969	33	0.309	66.83	0.14
418	12/14/1961	63	0.308	66.99	0.14
419	2/21/1995	29	0.306	67.15	0.14
420	3/21/1969	33	0.304	67.31	0.14
421	2/27/1955	45	0.301	67.47	0.14
422	2/17/1955	48	0.3	67.63	0.14
423	3/13/1991	70	0.299	67.79	0.14
424	3/25/1999	36	0.297	67.95	0.14
425	12/20/1986	29	0.297	68.11	0.14
426	2/12/2000	53	0.297	68.27	0.14
427	10/1/1959	31	0.295	68.43	0.14
428	3/26/1982	31	0.294	68.59	0.14
429	2/19/2006	31	0.293	68.75	0.14
430	3/14/1967	33	0.293	68.91	0.13
431	11/20/1961	32	0.291	69.07	0.13
432	3/27/1974	31	0.29	69.23	0.13
433	4/15/1978	30	0.29	69.39	0.13
434	12/25/1983	65	0.289	69.55	0.13
435	5/6/1995	30	0.288	69.71	0.13
436	3/5/1998	30	0.282	69.87	0.13
437	4/4/1976	29	0.282	70.03	0.13
438	10/21/1957	31	0.281	70.19	0.13
439	1/1/2000	33	0.28	70.35	0.13
440	1/2/1955	61	0.279	70.51	0.13
441	8/14/1983	35	0.279	70.67	0.13
442	12/21/2001	29	0.278	70.83	0.13
443	6/6/1969	28	0.277	70.99	0.13
444	3/23/1962	26	0.276	71.15	0.13
445	2/6/1973	36	0.276	71.31	0.13
446	2/4/1994	43	0.275	71.47	0.13
447	2/25/1958	25	0.273	71.63	0.13
448	1/8/1975	25	0.271	71.79	0.13
449	3/5/2000	32	0.27	71.96	0.13
450	3/15/1999	28	0.27	72.12	0.13
451	11/14/1988	27	0.268	72.28	0.13
452	3/2/1974	47	0.268	72.44	0.13
453	12/9/1970	25	0.268	72.6	0.13
454	1/10/1963	29	0.267	72.76	0.13
455	12/18/1992	26	0.265	72.92	0.13
456	1/5/1988	29	0.263	73.08	0.13
457	3/29/1982	36	0.262	73.24	0.13
458	2/9/1975	42	0.26	73.4	0.13
459	3/16/1977	29	0.26	73.56	0.13
460	3/18/2002	27	0.258	73.72	0.13
461	1/13/1962	26	0.257	73.88	0.13
462	11/25/1961	28	0.256	74.04	0.13

Event Rank	Event Peak Flow Start Date	Event Peak Flow Flow (cms)	Return Period (years) Plotting Position Weibull	Return Period (years) Plotting Position Cunnane
411	20-Nov-83	0.314	0.1	0.140
412	31-Jul-91	0.314	0.1	0.139
413	7-Dec-07	0.314	0.1	0.139
414	16-Jun-95	0.312	0.1	0.139
415	23-Jan-97	0.310	0.1	0.138
416	10-Jun-57	0.309	0.1	0.138
417	9-Dec-69	0.309	0.1	0.138
418	14-Dec-61	0.308	0.1	0.137
419	21-Feb-95	0.306	0.1	0.137
420	21-Mar-69	0.304	0.1	0.137
421	27-Feb-55	0.301	0.1	0.136
422	17-Feb-55	0.300	0.1	0.136
423	13-Mar-91	0.299	0.1	0.136
424	25-Mar-99	0.297	0.1	0.135
425	20-Dec-86	0.297	0.1	0.135
426	12-Feb-00	0.297	0.1	0.135
427	1-Oct-59	0.295	0.1	0.135
428	26-Mar-82	0.294	0.1	0.134
429	19-Feb-06	0.293	0.1	0.134
430	14-Mar-67	0.293	0.1	0.134
431	20-Nov-61	0.291	0.1	0.133
432	27-Mar-74	0.290	0.1	0.133
433	15-Apr-78	0.290	0.1	0.133
434	25-Dec-83	0.289	0.1	0.132
435	6-May-95	0.288	0.1	0.132
436	5-Mar-98	0.282	0.1	0.132
437	4-Apr-76	0.282	0.1	0.131
438	21-Oct-57	0.281	0.1	0.131
439	1-Jan-00	0.280	0.1	0.131
440	2-Jan-55	0.279	0.1	0.131
441	14-Aug-83	0.279	0.1	0.130
442	21-Dec-01	0.278	0.1	0.130
443	6-Jun-69	0.277	0.1	0.130
444	23-Mar-62	0.276	0.1	0.129
445	6-Feb-73	0.276	0.1	0.129
446	4-Feb-94	0.275	0.1	0.129
447	25-Feb-58	0.273	0.1	0.129
448	8-Jan-75	0.271	0.1	0.128
449	5-Mar-00	0.270	0.1	0.128
450	15-Mar-99	0.270	0.1	0.128
451	14-Nov-88	0.268	0.1	0.127
452	2-Mar-74	0.268	0.1	0.127
453	9-Dec-70	0.268	0.1	0.127
454	10-Jan-63	0.267	0.1	0.127
455	18-Dec-92	0.265	0.1	0.126
456	5-Jan-88	0.263	0.1	0.126
457	29-Mar-82	0.262	0.1	0.126
458	9-Feb-75	0.260	0.1	0.125
459	16-Mar-77	0.260	0.1	0.125
460	18-Mar-02	0.258	0.1	0.125
461	13-Jan-62	0.257	0.1	0.125
462	25-Nov-61	0.256	0.1	0.124

(Cunnane, Complete Duration by Event)

Return Period	Flow (cfs)	RetPer

Rank	Start Date	Event Duration (hours)	Event Peak (CFS)	Exceedance Frequency (percent)	Return Period (years)
463	11/19/1982	23	0.255	74.2	0.13
464	12/10/1959	27	0.255	74.36	0.13
465	12/16/1987	23	0.252	74.52	0.12
466	9/6/1972	90	0.249	74.68	0.12
467	1/31/1955	25	0.249	74.84	0.12
468	3/11/1965	25	0.247	75	0.12
469	12/16/1990	22	0.247	75.16	0.12
470	12/5/1987	26	0.246	75.32	0.12
471	1/16/1996	27	0.245	75.48	0.12
472	3/28/1985	34	0.24	75.64	0.12
473	1/18/1998	22	0.238	75.8	0.12
474	3/9/1957	26	0.238	75.96	0.12
475	2/4/1989	34	0.237	76.12	0.12
476	3/20/1953	24	0.235	76.28	0.12
477	4/17/1963	25	0.232	76.44	0.12
478	4/18/1996	22	0.231	76.6	0.12
479	2/26/1966	23	0.23	76.76	0.12
480	3/22/1958	21	0.23	76.92	0.12
481	1/30/1975	20	0.227	77.08	0.12
482	10/7/1983	21	0.227	77.24	0.12
483	1/24/1979	53	0.226	77.4	0.12
484	10/25/1989	25	0.226	77.56	0.12
485	4/18/1957	23	0.226	77.72	0.12
486	2/20/1985	20	0.222	77.88	0.12
487	4/27/1956	22	0.221	78.04	0.12
488	12/28/2002	19	0.221	78.21	0.12
489	2/16/1964	26	0.22	78.37	0.12
490	2/11/1962	31	0.219	78.53	0.12
491	1/28/1968	22	0.219	78.69	0.12
492	3/25/1975	22	0.219	78.85	0.12
493	12/16/1967	20	0.219	79.01	0.12
494	3/2/1995	22	0.218	79.17	0.12
495	3/25/1961	22	0.218	79.33	0.12
496	11/28/1996	18	0.215	79.49	0.12
497	3/19/1957	17	0.215	79.65	0.12
498	2/10/1997	19	0.213	79.81	0.12
499	11/20/1951	23	0.213	79.97	0.12
500	9/17/1965	21	0.212	80.13	0.12
501	2/14/1979	18	0.21	80.29	0.12
502	1/5/1989	21	0.209	80.45	0.12
503	5/21/1957	18	0.206	80.61	0.12
504	2/17/1997	17	0.206	80.77	0.12
505	11/29/2004	17	0.205	80.93	0.11
506	3/2/1966	16	0.205	81.09	0.11
507	11/10/1994	21	0.205	81.25	0.11
508	3/28/1960	21	0.204	81.41	0.11
509	1/24/1965	17	0.204	81.57	0.11
510	1/7/1965	17	0.204	81.73	0.11
511	1/21/1956	21	0.203	81.89	0.11
512	12/6/1956	21	0.2	82.05	0.11
513	9/24/1958	19	0.193	82.21	0.11
514	1/1/1974	19	0.192	82.37	0.11

	Event Peak Flow		Return Period (years)	
			Plotting Position	
Event Rank	Start Date	Flow (cms)	Weibull	Cunnane
463	19-Nov-82	0.255	0.1	0.124
464	10-Dec-59	0.255	0.1	0.124
465	16-Dec-87	0.252	0.1	0.124
466	6-Sep-72	0.249	0.1	0.123
467	31-Jan-55	0.249	0.1	0.123
468	11-Mar-65	0.247	0.1	0.123
469	16-Dec-90	0.247	0.1	0.122
470	5-Dec-87	0.246	0.1	0.122
471	16-Jan-96	0.245	0.1	0.122
472	28-Mar-85	0.240	0.1	0.122
473	18-Jan-98	0.238	0.1	0.121
474	9-Mar-57	0.238	0.1	0.121
475	4-Feb-89	0.237	0.1	0.121
476	20-Mar-53	0.235	0.1	0.121
477	17-Apr-63	0.232	0.1	0.120
478	18-Apr-96	0.231	0.1	0.120
479	26-Feb-66	0.230	0.1	0.120
480	22-Mar-58	0.230	0.1	0.120
481	30-Jan-75	0.227	0.1	0.119
482	7-Oct-83	0.227	0.1	0.119
483	24-Jan-79	0.226	0.1	0.119
484	25-Oct-89	0.226	0.1	0.119
485	18-Apr-57	0.226	0.1	0.118
486	20-Feb-85	0.222	0.1	0.118
487	27-Apr-56	0.221	0.1	0.118
488	28-Dec-02	0.221	0.1	0.118
489	16-Feb-64	0.220	0.1	0.117
490	11-Feb-62	0.219	0.1	0.117
491	28-Jan-68	0.219	0.1	0.117
492	25-Mar-75	0.219	0.1	0.117
493	16-Dec-67	0.219	0.1	0.117
494	2-Mar-95	0.218	0.1	0.116
495	25-Mar-61	0.218	0.1	0.116
496	28-Nov-96	0.215	0.1	0.116
497	19-Mar-57	0.215	0.1	0.116
498	10-Feb-97	0.213	0.1	0.115
499	20-Nov-51	0.213	0.1	0.115
500	17-Sep-65	0.212	0.1	0.115
501	14-Feb-79	0.210	0.1	0.115
502	5-Jan-89	0.209	0.1	0.114
503	21-May-57	0.206	0.1	0.114
504	17-Feb-97	0.206	0.1	0.114
505	29-Nov-04	0.205	0.1	0.114
506	2-Mar-66	0.205	0.1	0.114
507	10-Nov-94	0.205	0.1	0.113
508	28-Mar-60	0.204	0.1	0.113
509	24-Jan-65	0.204	0.1	0.113
510	7-Jan-65	0.204	0.1	0.113
511	21-Jan-56	0.203	0.1	0.112
512	6-Dec-56	0.200	0.1	0.112
513	24-Sep-58	0.193	0.1	0.112
514	1-Jan-74	0.192	0.1	0.112

(Cunnane, Complete Duration by Event)

Return Period	Flow (cfs)	RetPer

Rank	Start Date	Event Duration (hours)	Event Peak (CFS)	Exceedance Frequency (percent)	Return Period (years)
515	4/24/1990	19	0.191	82.53	0.11
516	3/7/2002	22	0.191	82.69	0.11
517	2/22/1971	25	0.19	82.85	0.11
518	3/28/1963	16	0.19	83.01	0.11
519	12/17/1952	15	0.189	83.17	0.11
520	4/22/1967	15	0.188	83.33	0.11
521	3/11/1990	18	0.188	83.49	0.11
522	3/2/1958	15	0.187	83.65	0.11
523	3/3/1989	20	0.186	83.81	0.11
524	4/28/1953	17	0.184	83.97	0.11
525	11/15/1968	18	0.183	84.13	0.11
526	4/15/2000	19	0.183	84.29	0.11
527	4/25/1971	28	0.183	84.46	0.11
528	12/8/1991	17	0.18	84.62	0.11
529	12/20/1968	17	0.18	84.78	0.11
530	3/1/2007	12	0.179	84.94	0.11
531	2/24/1956	16	0.178	85.1	0.11
532	12/10/2006	22	0.176	85.26	0.11
533	4/21/1963	12	0.176	85.42	0.11
534	1/3/1978	69	0.172	85.58	0.11
535	3/2/1982	15	0.169	85.74	0.11
536	1/7/1985	24	0.166	85.9	0.11
537	1/21/1999	21	0.165	86.06	0.11
538	11/23/1993	13	0.163	86.22	0.11
539	10/17/1984	14	0.163	86.38	0.11
540	3/21/2007	42	0.159	86.54	0.11
541	4/18/1971	9	0.158	86.7	0.11
542	2/18/2004	17	0.156	86.86	0.11
543	12/11/2001	11	0.156	87.02	0.11
544	2/9/1989	10	0.156	87.18	0.11
545	11/26/1990	10	0.155	87.34	0.11
546	4/17/2004	18	0.155	87.5	0.11
547	12/3/1983	10	0.155	87.66	0.11
548	10/29/1981	13	0.154	87.82	0.11
549	11/2/1975	59	0.154	87.98	0.11
550	12/27/2006	19	0.153	88.14	0.11
551	1/3/2002	10	0.152	88.3	0.11
552	4/28/1952	11	0.152	88.46	0.11
553	2/13/1992	14	0.152	88.62	0.1
554	1/18/1983	10	0.152	88.78	0.1
555	1/16/1980	10	0.151	88.94	0.1
556	10/26/1980	12	0.151	89.1	0.1
557	10/30/1992	12	0.15	89.26	0.1
558	12/21/1981	10	0.15	89.42	0.1
559	4/14/2006	13	0.149	89.58	0.1
560	5/1/1985	11	0.149	89.74	0.1
561	8/10/1969	12	0.149	89.9	0.1
562	5/24/1977	18	0.148	90.06	0.1
563	11/18/1987	10	0.148	90.22	0.1
564	4/28/2005	11	0.147	90.38	0.1
565	6/22/1982	11	0.146	90.54	0.1
566	2/9/1985	8	0.145	90.71	0.1

	Event Peak Flow		Return Period (years)	
	Start	Flow	Plotting Position	
Event Rank	Date	(cms)	Weibull	Cunnane
515	24-Apr-90	0.191	0.1	0.112
516	7-Mar-02	0.191	0.1	0.111
517	22-Feb-71	0.190	0.1	0.111
518	28-Mar-63	0.190	0.1	0.111
519	17-Dec-52	0.189	0.1	0.111
520	22-Apr-67	0.188	0.1	0.110
521	11-Mar-90	0.188	0.1	0.110
522	2-Mar-58	0.187	0.1	0.110
523	3-Mar-89	0.186	0.1	0.110
524	28-Apr-53	0.184	0.1	0.110
525	15-Nov-68	0.183	0.1	0.109
526	15-Apr-00	0.183	0.1	0.109
527	25-Apr-71	0.183	0.1	0.109
528	8-Dec-91	0.180	0.1	0.109
529	20-Dec-68	0.180	0.1	0.109
530	1-Mar-07	0.179	0.1	0.108
531	24-Feb-56	0.178	0.1	0.108
532	10-Dec-06	0.176	0.1	0.108
533	21-Apr-63	0.176	0.1	0.108
534	3-Jan-78	0.172	0.1	0.108
535	2-Mar-82	0.169	0.1	0.107
536	7-Jan-85	0.166	0.1	0.107
537	21-Jan-99	0.165	0.1	0.107
538	23-Nov-93	0.163	0.1	0.107
539	17-Oct-84	0.163	0.1	0.107
540	21-Mar-07	0.159	0.1	0.106
541	18-Apr-71	0.158	0.1	0.106
542	18-Feb-04	0.156	0.1	0.106
543	11-Dec-01	0.156	0.1	0.106
544	9-Feb-89	0.156	0.1	0.106
545	26-Nov-90	0.155	0.1	0.105
546	17-Apr-04	0.155	0.1	0.105
547	3-Dec-83	0.155	0.1	0.105
548	29-Oct-81	0.154	0.1	0.105
549	2-Nov-75	0.154	0.1	0.105
550	27-Dec-06	0.153	0.1	0.104
551	3-Jan-02	0.152	0.1	0.104
552	28-Apr-52	0.152	0.1	0.104
553	13-Feb-92	0.152	0.1	0.104
554	18-Jan-83	0.152	0.1	0.104
555	16-Jan-80	0.151	0.1	0.103
556	26-Oct-80	0.151	0.1	0.103
557	30-Oct-92	0.150	0.1	0.103
558	21-Dec-81	0.150	0.1	0.103
559	14-Apr-06	0.149	0.1	0.103
560	1-May-85	0.149	0.1	0.103
561	10-Aug-69	0.149	0.1	0.102
562	24-May-77	0.148	0.1	0.102
563	18-Nov-87	0.148	0.1	0.102
564	28-Apr-05	0.147	0.1	0.102
565	22-Jun-82	0.146	0.1	0.102
566	9-Feb-85	0.145	0.1	0.101

(Cunnane, Complete Duration by Event)

Return Period	Flow (cfs)	RetPer

Rank	Start Date	Event Duration (hours)	Event Peak (CFS)	Exceedance Frequency (percent)	Return Period (years)
567	1/23/1983	9	0.145	90.87	0.1
568	4/9/1994	10	0.143	91.03	0.1
569	12/23/1977	8	0.143	91.19	0.1
570	1/25/2004	11	0.142	91.35	0.1
571	4/24/1994	10	0.141	91.51	0.1
572	3/11/1955	10	0.141	91.67	0.1
573	2/14/1987	9	0.141	91.83	0.1
574	1/25/1952	11	0.14	91.99	0.1
575	12/23/1995	10	0.139	92.15	0.1
576	2/8/1983	7	0.138	92.31	0.1
577	12/9/1983	8	0.138	92.47	0.1
578	10/18/2005	13	0.136	92.63	0.1
579	1/12/1970	8	0.136	92.79	0.1
580	5/29/1990	9	0.135	92.95	0.1
581	12/29/1982	7	0.135	93.11	0.1
582	11/13/2001	7	0.133	93.27	0.1
583	1/6/1953	30	0.132	93.43	0.1
584	7/15/1984	8	0.132	93.59	0.1
585	12/17/2006	7	0.132	93.75	0.1
586	12/20/1975	7	0.13	93.91	0.1
587	11/11/1969	6	0.13	94.07	0.1
588	4/8/1952	8	0.129	94.23	0.1
589	1/6/1955	6	0.128	94.39	0.1
590	9/17/1989	10	0.128	94.55	0.1
591	2/4/1973	6	0.128	94.71	0.1
592	11/15/1969	6	0.127	94.87	0.1
593	12/1/1973	6	0.127	95.03	0.1
594	3/9/1962	26	0.125	95.19	0.1
595	12/20/1998	6	0.125	95.35	0.1
596	12/17/1981	6	0.123	95.51	0.1
597	12/13/1971	6	0.122	95.67	0.1
598	1/5/1984	6	0.122	95.83	0.1
599	4/19/1981	7	0.121	95.99	0.1
600	12/1/1983	6	0.119	96.15	0.1
601	4/27/1970	6	0.119	96.31	0.1
602	1/20/1966	7	0.119	96.47	0.1
603	1/28/1985	7	0.119	96.63	0.1
604	10/5/1975	30	0.116	96.79	0.1
605	2/12/1952	6	0.116	96.96	0.1
606	12/4/1992	6	0.115	97.12	0.1
607	12/8/1981	4	0.115	97.28	0.1
608	3/13/1964	6	0.115	97.44	0.1
609	2/17/1974	5	0.115	97.6	0.1
610	6/20/1972	5	0.114	97.76	0.1
611	11/20/1953	4	0.113	97.92	0.09
612	4/26/2002	5	0.113	98.08	0.09
613	1/15/1998	4	0.111	98.24	0.09
614	1/21/1995	4	0.109	98.4	0.09
615	1/30/1985	3	0.109	98.56	0.09
616	3/4/1969	2	0.108	98.72	0.09
617	2/6/1956	3	0.107	98.88	0.09
618	1/16/1984	3	0.107	99.04	0.09

Event Rank	Event Peak Flow: Start Date	Event Peak Flow: Flow (cms)	Return Period (years) Plotting Position: Weibull	Return Period (years) Plotting Position: Cunnane
567	23-Jan-83	0.145	0.1	0.101
568	9-Apr-94	0.143	0.1	0.101
569	23-Dec-77	0.143	0.1	0.101
570	25-Jan-04	0.142	0.1	0.101
571	24-Apr-94	0.141	0.1	0.101
572	11-Mar-55	0.141	0.1	0.100
573	14-Feb-87	0.141	0.1	0.100
574	25-Jan-52	0.140	0.1	0.100
575	23-Dec-95	0.139	0.1	0.100
576	8-Feb-83	0.138	0.1	0.100
577	9-Dec-83	0.138	0.1	0.100
578	18-Oct-05	0.136	0.1	0.099
579	12-Jan-70	0.136	0.1	0.099
580	29-May-90	0.135	0.1	0.099
581	29-Dec-82	0.135	0.1	0.099
582	13-Nov-01	0.133	0.1	0.099
583	6-Jan-53	0.132	0.1	0.099
584	15-Jul-84	0.132	0.1	0.098
585	17-Dec-06	0.132	0.1	0.098
586	20-Dec-75	0.130	0.1	0.098
587	11-Nov-69	0.130	0.1	0.098
588	8-Apr-52	0.129	0.1	0.098
589	6-Jan-55	0.128	0.1	0.098
590	17-Sep-89	0.128	0.1	0.097
591	4-Feb-73	0.128	0.1	0.097
592	15-Nov-69	0.127	0.1	0.097
593	1-Dec-73	0.127	0.1	0.097
594	9-Mar-62	0.125	0.1	0.097
595	20-Dec-98	0.125	0.1	0.097
596	17-Dec-81	0.123	0.1	0.096
597	13-Dec-71	0.122	0.1	0.096
598	5-Jan-84	0.122	0.1	0.096
599	19-Apr-81	0.121	0.1	0.096
600	1-Dec-83	0.119	0.1	0.096
601	27-Apr-70	0.119	0.1	0.096
602	20-Jan-66	0.119	0.1	0.095
603	28-Jan-85	0.119	0.1	0.095
604	5-Oct-75	0.116	0.1	0.095
605	12-Feb-52	0.116	0.1	0.095
606	4-Dec-92	0.115	0.1	0.095
607	8-Dec-81	0.115	0.1	0.095
608	13-Mar-64	0.115	0.1	0.094
609	17-Feb-74	0.115	0.1	0.094
610	20-Jun-72	0.114	0.1	0.094
611	20-Nov-53	0.113	0.1	0.094
612	26-Apr-02	0.113	0.1	0.094
613	15-Jan-98	0.111	0.1	0.094
614	21-Jan-95	0.109	0.1	0.094
615	30-Jan-85	0.109	0.1	0.093
616	4-Mar-69	0.108	0.1	0.093
617	6-Feb-56	0.107	0.1	0.093
618	16-Jan-84	0.107	0.1	0.093

(Cunnane, Complete Duration by Event)

Return Period	Flow (cfs)	RetPer

Rank		Start Date	Event Duration (hours)	Event Peak (CFS)	Exceedance Frequency (percent)	Return Period (years)
	619	2/17/2000	3	0.106	99.2	0.09
	620	3/4/1973	2	0.105	99.36	0.09
	621	10/23/1992	2	0.104	99.52	0.09
	622	5/19/1957	2	0.103	99.68	0.09
	623	3/11/1999	2	0.101	99.84	0.09

	Event Peak Flow		Return Period (years)	
			Plotting Position	
Event Rank	Start Date	Flow (cms)	Weibull	Cunnane
619	17-Feb-00	0.106	0.1	0.093
620	4-Mar-73	0.105	0.1	0.093
621	23-Oct-92	0.104	0.1	0.092
622	19-May-57	0.103	0.1	0.092
623	11-Mar-99	0.101	0.1	0.092

(Cunnane, Complete Duration by Event)

Return Period	Flow (cfs)	RetPer

*Orifice Equation:
Qorif= CA[2g(h-Hd)]^0.5
q=discharge (cfs)
C=Orifice coefficient=0.61
A=area of orifice (sq in)
h=height of stored water (in)
Hd=drain height (in)

*Drain Coefficient
Cd=C(605/Alid)*(pi((D^2)/8)*(g/6)^.5

	IMP1	IMP2	IMP3	IMP4	IMP5	IMP6	IMP7
Discharge coefficient	0.61	0.61	0.61	0.61	0.61	0.61	0.61
Gravity constant	32.2	32.2	32.2	32.2	32.2	32.2	32.2
Drain Diameter (in)	2.50	1.50	1.50	1.75	1.75	2.00	2.00
Area LID (ft2)	31368	1920	2368	3603	1920	20296	17239
Drain coefficient	**0.0669**	**0.3932**	**0.3188**	**0.2852**	**0.5352**	**0.0661**	**0.0779**
Equivalent Drain Time (hr)							

Depth of gravel layer:	18 inches for all Bio-Retention cells	18 inches for all Bio-Retention cells	18 inches for all Bio-Retention cells	18 inches for all Bio-Retention cells	18 inches for all Bio-	18 inches for all Bio-Retention cells	18 inches for all Bio-Retention cells
Maximum Driving Head (h-hD) (in)	18	18	18	18	18	18	18
Qorif (cfs)	0.204270466	0.073537368	0.073537368	0.100092528	0.100092528	0.130733098	0.130733098

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.012)
--------------------------------------------------------------

Otay Industrial Park
Existing Conditions


*************
Element Count
*************
Number of rain gages ...... 1
Number of subcatchments ... 1
Number of nodes ........... 1
Number of links ........... 0
Number of pollutants ...... 0
Number of land uses ....... 0


****************
Raingage Summary
****************
                                                Data        Recording
Name                 Data Source                Type        Interval
------------------------------------------------------------------------
1                    C:\Users\nick.roberts\Desktop\SWMMM\Rain Data\lower_otay-2.txt


********************
Subcatchment Summary
********************
Name                      Area     Width   %Imperv    %Slope Rain Gage            Outlet
-----------------------------------------------------------------------------------------------------------
2                        53.26   2400.00      0.00    2.0000 1                    1


************
Node Summary
************
                                           Invert      Max.    Ponded    External
Name                 Type                   Elev.     Depth      Area    Inflow
-------------------------------------------------------------------------------
1                    OUTFALL                 0.00      0.00       0.0


*********************
Rainfall File Summary
*********************
Station    First        Last         Recording   Periods    Periods    Periods
ID         Date         Date         Frequency  w/Precip    Missing    Malfunc.
-------------------------------------------------------------------------------
1          08/28/1951   03/16/2008      60 min      8680          0          0


*********************************************************
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
*********************************************************

****************
Analysis Options
****************
Flow Units ............... CFS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... NO
  Water Quality .......... NO
Infiltration Method ...... GREEN_AMPT
Starting Date ............ 08/28/1951 01:00:00
Ending Date .............. 03/16/2008 20:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 01:00:00
Wet Time Step ............ 00:15:00
Dry Time Step ............ 04:00:00


**************************        Volume         Depth
Runoff Quantity Continuity     acre-feet        inches
**************************     ---------       -------
Total Precipitation ......      2631.843       592.980
Evaporation Loss .........       123.094        27.734
Infiltration Loss ........      2274.978       512.575
Surface Runoff ...........       287.873        64.861
Final Storage ............         0.000         0.000
Continuity Error (%) .....        -2.056


**************************        Volume        Volume
Flow Routing Continuity        acre-feet      10^6 gal
**************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
```

Wet Weather Inflow	287.873	93.808
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	287.873	93.808
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.000	

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS	Runoff Coeff
2	592.98	0.00	27.73	512.57	64.86	93.80	25.99	0.109

Analysis begun on: Wed Oct 04 10:54:10 2017
Analysis ended on: Wed Oct 04 10:54:24 2017
Total elapsed time: 00:00:14

Pre Development Subcatchment SWMM Input

Subcatchment 2

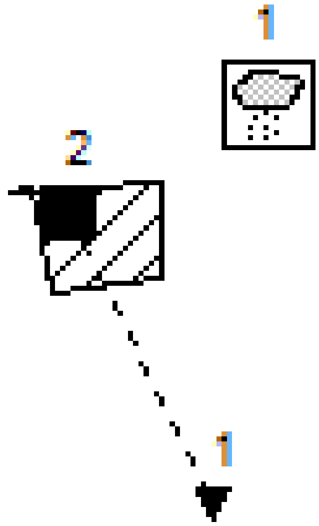
Property	Value
Name	2
X-Coordinate	1112.731
Y-Coordinate	7303.207
Description	
Tag	
Rain Gage	1
Outlet	1
Area	53.26
Width	2400
% Slope	2
% Imperv	0
N-Imperv	.012
N-Perv	.15
Dstore-Imperv	.05
Dstore-Perv	.1
%Zero-Imperv	25
Subarea Routing	OUTLET
Percent Routed	100
Infiltration	GREEN_AMPT
Groundwater	NO
Snow Pack	
LID Controls	0
Land Uses	0
Initial Buildup	NONE
Curb Length	0

Infiltration Editor

Infiltration Method: GREEN_AMPT

Property	Value
Suction Head	9
Conductivity	.025
Initial Deficit	0.33

Predevelopment Conditions SWMM Model Schematic and Model Setup



Rain Gage 1

Name	1
X-Coordinate	1587.302
Y-Coordinate	7539.683
Description	
Tag	
Rain Format	INTENSITY
Time Interval	1:00
Snow Catch Factor	1.0
Data Source	FILE
TIME SERIES:	
- Series Name	*
DATA FILE:	
- File Name	C:\Users\nick.roberts\Desktop\
- Station ID	1
- Rain Units	IN

Outfall 1

Name	1
X-Coordinate	1451.247
Y-Coordinate	6609.977
Description	
Tag	
Inflows	NO
Treatment	NO
Invert El.	0
Tide Gate	NO
Route To	
Type	FREE
Fixed Outfall	
Fixed Stage	0
Tidal Outfall	
Curve Name	*
Time Series Outfall	
Series Name	*

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.012)
--------------------------------------------------------------

Otay Industrial Park
Proposed Conditions


*********************
Rainfall File Summary
*********************
Station    First       Last         Recording   Periods    Periods    Periods
ID         Date        Date         Frequency  w/Precip    Missing    Malfunc.
-------------------------------------------------------------------------------
1          08/28/1951  03/16/2008      60 min      8680          0          0


*********************************************************
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
*********************************************************

****************
Analysis Options
****************
Flow Units ............... CFS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... YES
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Infiltration Method ...... GREEN_AMPT
Flow Routing Method ...... KINWAVE
Starting Date ............ 08/28/1951 01:00:00
Ending Date .............. 03/16/2008 20:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 01:00:00
Wet Time Step ............ 00:15:00
Dry Time Step ............ 04:00:00
Routing Time Step ........ 60.00 sec


**************************        Volume         Depth
Runoff Quantity Continuity     acre-feet        inches
**************************     ---------       -------
Initial LID Storage ......         0.267         0.060
Initial Snow Cover .......         0.000         0.000
Total Precipitation ......      2631.630       592.980
Evaporation Loss .........       621.835       140.117
Infiltration Loss ........       302.605        68.185
Surface Runoff ...........       486.087       109.529
LID Drainage .............      1230.616       277.292
Snow Removed .............         0.000         0.000
Final Snow Cover .........         0.000         0.000
Final Storage ............         0.796         0.179
Continuity Error (%) .....        -0.382


**************************        Volume        Volume
Flow Routing Continuity        acre-feet      10^6 gal
**************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......      1716.702       559.413
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.000         0.000
External Outflow .........      1640.510       534.585
Flooding Loss ............        70.216        22.881
Evaporation Loss .........         5.730         1.867
Exfiltration Loss ........         0.000         0.000
Initial Stored Volume ....         0.000         0.000
Final Stored Volume ......         0.000         0.000
Continuity Error (%) .....         0.014


********************************
Highest Flow Instability Indexes
********************************
All links are stable.


*************************
Routing Time Step Summary
*************************
Minimum Time Step           :    60.00 sec
Average Time Step           :    60.00 sec
Maximum Time Step           :    60.00 sec
Percent in Steady State     :     0.00
Average Iterations per Step :     1.00
Percent Not Converging      :     0.00
```

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Total Runoff in	Total Runoff 10^6 gal	Peak Runoff CFS	Runoff Coeff
DMA5	592.98	0.00	112.61	44.06	439.92	30.77	2.12	0.742
DMA4	592.98	0.00	124.24	0.00	471.89	34.05	2.23	0.796
DMA3	592.98	0.00	123.46	0.00	472.84	34.48	2.25	0.797
DMA1	592.98	0.00	116.90	91.29	386.18	289.00	19.70	0.651
DMA2	592.98	0.00	123.54	0.00	472.74	28.96	1.89	0.797
DMA6	592.98	0.00	113.42	39.08	444.17	53.96	3.70	0.749
DMA7	592.98	0.00	103.16	89.23	404.06	101.71	7.37	0.681
LID-1	592.98	21200.38	873.05	0.00	20914.09	408.94	26.35	0.960
LID-7	592.98	9464.70	857.52	0.00	9198.24	98.84	7.12	0.915
LID-2	592.98	24193.63	1291.02	0.00	23490.38	28.12	1.74	0.948
LID-3	592.98	23360.11	930.37	0.00	23019.59	33.98	2.06	0.961
LID-4	592.98	23706.83	930.82	0.00	23365.69	33.56	2.03	0.962
LID-5	592.98	25707.50	1318.43	0.00	24976.89	29.90	1.97	0.950
LID-6	592.98	4265.15	779.62	0.00	4077.41	51.59	1.92	0.839

****
LID Performance Summary
****

Subcatchment	LID Control	Total Inflow in	Evap Loss in	Infil Loss in	Surface Outflow in	Drain Outflow in	Initial Storage in	Final Storage in	Continuity Error %
LID-1	LID-1	21793.36	873.21	0.00	7495.06	13422.99	1.80	4.28	-0.00
LID-7	LID-7	10057.68	857.55	0.00	1061.80	8136.77	1.80	3.65	-0.00
LID-2	LID-2	24786.61	1291.07	0.00	4403.21	19088.09	1.80	6.91	-0.00
LID-3	LID-3	23953.09	930.40	0.00	4100.29	18920.16	1.80	4.90	-0.00
LID-4	LID-4	24299.81	930.85	0.00	4610.62	18755.91	1.80	5.04	-0.00
LID-5	LID-5	26300.48	1318.48	0.00	4321.02	20656.85	1.80	6.89	-0.00
LID-6	LID-6	4858.13	779.65	0.00	35.64	4041.91	1.80	2.76	-0.00

****
Node Depth Summary
****

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min	Reported Max Depth Feet
POC_1	OUTFALL	0.00	0.05	476.01	7151 05:03	0.05
DIV_1	DIVIDER	0.01	0.74	483.74	16971 16:16	0.72
DIV_7	DIVIDER	0.00	0.39	483.39	16971 16:01	0.39
DIV_6	DIVIDER	0.00	0.20	485.70	11509 17:01	0.20
Basin_1	STORAGE	0.00	1.88	484.38	16971 16:46	1.85
Basin_7	STORAGE	0.00	0.00	482.00	0 00:00	0.00
Basin_6	STORAGE	0.00	0.00	485.00	0 00:00	0.00

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent
POC_1	OUTFALL	0.00	13.18	16971 16:46	0	535	0.000
DIV_1	DIVIDER	26.35	26.35	16971 16:16	409	409	0.000
DIV_7	DIVIDER	7.12	7.12	16971 16:01	98.8	98.8	0.000
DIV_6	DIVIDER	1.92	1.92	11509 17:01	51.6	51.6	0.000
Basin_1	STORAGE	0.00	26.14	16971 16:16	0	193	0.031
Basin_7	STORAGE	0.00	6.99	16971 16:01	0	20.3	0.000
Basin_6	STORAGE	0.00	1.79	11509 17:01	0	2.56	0.000

****
Node Flooding Summary
****

Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CFS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 gal	Maximum Ponded Volume 1000 ft3
Basin_7	7299.88	6.99	16971 16:02	20.321	0.000
Basin_6	1971.98	1.79	11509 17:01	2.558	0.000

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 ft3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 ft3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
Basin_1	0.083	0	1	0	69.600	0	16971 16:46	12.72
Basin_7	0.000	0	0	0	0.000	0	0 00:00	0.00
Basin_6	0.000	0	0	0	0.000	0	0 00:00	0.00

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
POC_1	11.87	0.34	13.18	534.545
System	11.87	0.34	13.18	534.545

****
Link Flow Summary
****

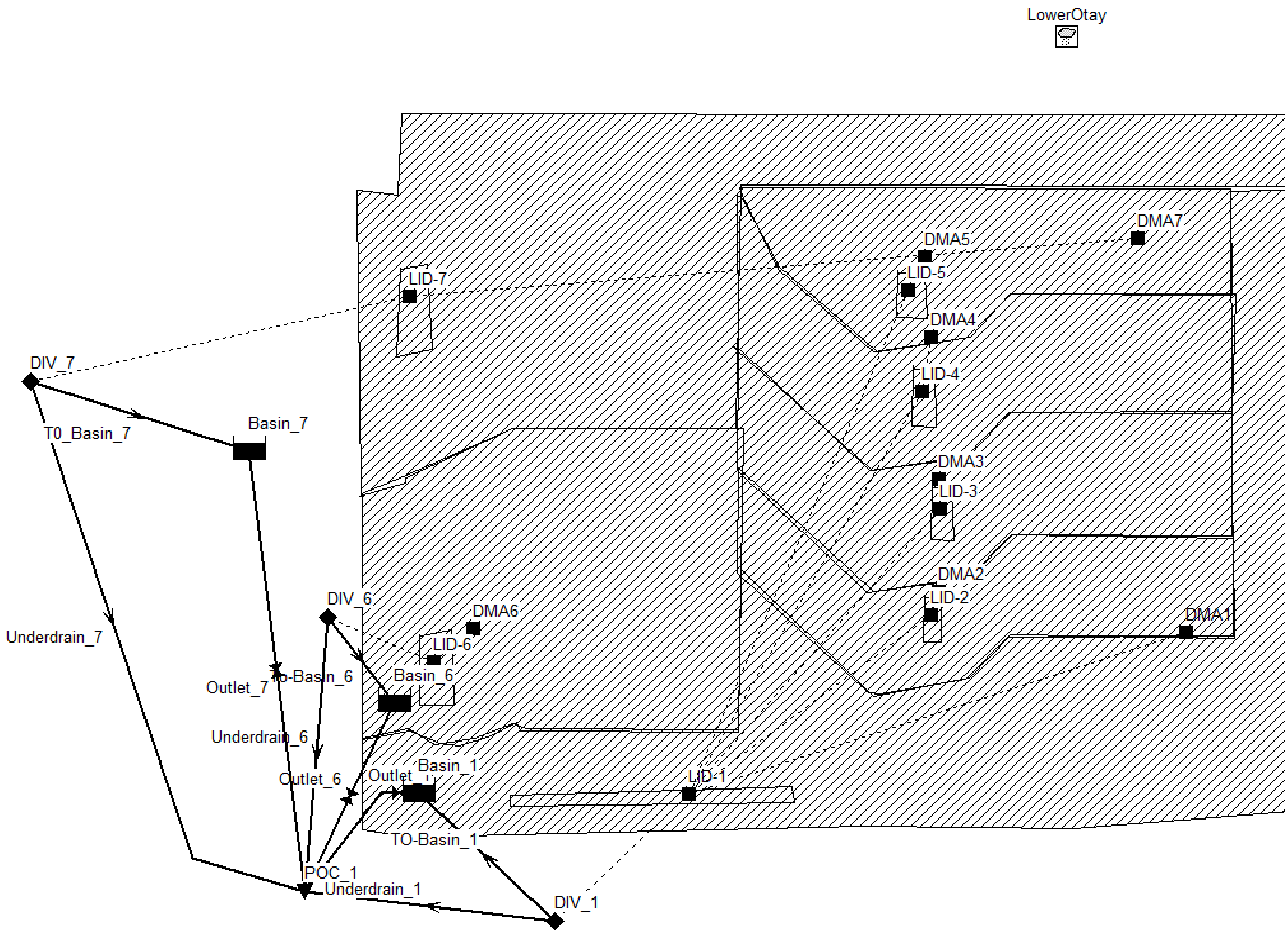
Link	Type	Maximum |Flow| CFS	Time of Max Occurrence days hr:min	Maximum |Veloc| ft/sec	Max/ Full Flow	Max/ Full Depth
TO-Basin_1	CONDUIT	26.14	16971 16:16	19.14	0.13	0.25
Underdrain_7	CONDUIT	0.13	7151 05:03	13.66	0.01	0.07
Underdrain_1	CONDUIT	0.21	7151 05:03	15.74	0.01	0.08
T0_Basin_7	CONDUIT	6.99	16971 16:01	12.99	0.04	0.13
To-Basin_6	CONDUIT	1.79	11509 17:01	8.56	0.01	0.07
Underdrain_6	CONDUIT	0.13	19538 00:18	19.21	0.00	0.03
Outlet_1	DUMMY	12.72	16971 16:46			
Outlet_6	DUMMY	0.00	0 00:00			
Outlet_7	DUMMY	0.00	0 00:00			

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Thu Oct 05 17:16:16 2017
Analysis ended on: Thu Oct 05 17:17:45 2017
Total elapsed time: 00:01:29

Post Development SWMM MODEL SCHEMATIC



Post Development Model Setup

Outfall POC_1

Property	Value
Name	POC_1
X-Coordinate	-1224.193
Y-Coordinate	3181.522
Description	
Tag	
Inflows	NO
Treatment	NO
Invert El.	475.96
Tide Gate	NO
Route To	
Type	FREE
Fixed Outfall	
Fixed Stage	0
Tidal Outfall	
Curve Name	*
Time Series Outfall	
Series Name	*

Rain Gage LowerOtay

Name	LowerOtay
X-Coordinate	3185.941
Y-Coordinate	8265.306
Description	
Tag	
Rain Format	INTENSITY
Time Interval	1:00
Snow Catch Factor	1.0
Data Source	FILE
TIME SERIES:	
- Series Name	*
DATA FILE:	
- File Name	C:\Users\nick.rob
- Station ID	1
- Rain Units	IN

Post Development Subcatchment SWMM Input

Subcatchment DMA1

Name	DMA1
X-Coordinate	3862.963
Y-Coordinate	4727.237
Description	
Tag	
Rain Gage	LowerOtay
Outlet	LID-1
Area	27.5599
Width	480
% Slope	0.5
% Imperv	82
N-Imperv	.012
N-Perv	.15
Dstore-Imperv	0.05
Dstore-Perv	.1
%Zero-Imperv	25
Subarea Routing	OUTLET
Percent Routed	100
Infiltration	GREEN_AMPT
Groundwater	NO
Snow Pack	
LID Controls	0
Land Uses	0
Initial Buildup	NONE
Curb Length	0

Infiltration Editor

Infiltration Method: GREEN_AMPT

Property	Value
Suction Head	9
Conductivity	0.025
Initial Deficit	0.33

Subcatchment DMA2

Name	DMA2
X-Coordinate	2430.241
Y-Coordinate	4969.361
Description	
Tag	
Rain Gage	LowerOtay
Outlet	LID-2
Area	2.2559
Width	150
% Slope	.5
% Imperv	100
N-Imperv	.012
N-Perv	.15
Dstore-Imperv	0.05
Dstore-Perv	.1
%Zero-Imperv	25
Subarea Routing	OUTLET
Percent Routed	100
Infiltration	GREEN_AMPT
Groundwater	NO
Snow Pack	
LID Controls	0
Land Uses	0
Initial Buildup	NONE
Curb Length	0

Infiltration Editor

Infiltration Method: GREEN_AMPT

Property	Value
Suction Head	9
Conductivity	0.025
Initial Deficit	0.33

Subcatchment DMA3

Name	DMA3
X-Coordinate	2430.241
Y-Coordinate	5639.060
Description	
Tag	
Rain Gage	LowerOtay
Outlet	LID-3
Area	2.6856
Width	180
% Slope	.5
% Imperv	100
N-Imperv	.012
N-Perv	.15
Dstore-Imperv	0.05
Dstore-Perv	.1
%Zero-Imperv	25
Subarea Routing	OUTLET
Percent Routed	100
Infiltration	GREEN_AMPT
Groundwater	NO
Snow Pack	
LID Controls	0
Land Uses	0
Initial Buildup	NONE
Curb Length	0

Infiltration Editor

Infiltration Method: GREEN_AMPT

Property	Value
Suction Head	9
Conductivity	0.025
Initial Deficit	0.33

Subcatchment DMA4

Name	DMA4
X-Coordinate	2384.424
Y-Coordinate	6485.201
Description	
Tag	
Rain Gage	LowerOtay
Outlet	LID-4
Area	2.6571
Width	165
% Slope	0.5
% Imperv	100
N-Imperv	.012
N-Perv	.15
Dstore-Imperv	0.05
Dstore-Perv	.1
%Zero-Imperv	25
Subarea Routing	OUTLET
Percent Routed	100
Infiltration	GREEN_AMPT
Groundwater	NO
Snow Pack	
LID Controls	0
Land Uses	0
Initial Buildup	NONE
Curb Length	0

Infiltration Editor

Infiltration Method: GREEN_AMPT

Property	Value
Suction Head	9
Conductivity	0.025
Initial Deficit	0.33

Post Development Subcatchment SWMM Input

Subcatchment DMA5

Property	Value
Name	DMA5
X-Coordinate	2347.869
Y-Coordinate	6966.110
Description	
Tag	
Rain Gage	LowerOtay
Outlet	LID-5
Area	2.5759
Width	185
% Slope	0.5
% Imperv	91
N-Imperv	.012
N-Perv	.15
Dstore-Imperv	.05
Dstore-Perv	.1
%Zero-Imperv	25
Subarea Routing	OUTLET
Percent Routed	100
Infiltration	GREEN_AMPT
Groundwater	NO
Snow Pack	
LID Controls	0
Land Uses	0
Initial Buildup	NONE
Curb Length	0

Infiltration Editor

Infiltration Method: GREEN_AMPT

Property	Value
Suction Head	9
Conductivity	0.025
Initial Deficit	0.33

Subcatchment DMA6

Property	Value
Name	DMA6
X-Coordinate	-252.120
Y-Coordinate	4748.319
Description	
Tag	
Rain Gage	LowerOtay
Outlet	LID-6
Area	4.4741
Width	333
% Slope	0.5
% Imperv	92
N-Imperv	.012
N-Perv	.15
Dstore-Imperv	.05
Dstore-Perv	.1
%Zero-Imperv	25
Subarea Routing	OUTLET
Percent Routed	100
Infiltration	GREEN_AMPT
Groundwater	NO
Snow Pack	
LID Controls	0
Land Uses	0
Initial Buildup	NONE
Curb Length	0

Infiltration Editor

Infiltration Method: GREEN_AMPT

Property	Value
Suction Head	9
Conductivity	0.025
Initial Deficit	0.33

Subcatchment DMA7

Property	Value
Name	DMA7
X-Coordinate	3576.486
Y-Coordinate	7070.532
Description	
Tag	
Rain Gage	LowerOtay
Outlet	LID-7
Area	9.27
Width	620
% Slope	0.5
% Imperv	82
N-Imperv	.012
N-Perv	.15
Dstore-Imperv	0.05
Dstore-Perv	.1
%Zero-Imperv	25
Subarea Routing	OUTLET
Percent Routed	100
Infiltration	GREEN_AMPT
Groundwater	NO
Snow Pack	
LID Controls	0
Land Uses	0
Initial Buildup	NONE
Curb Length	0

Infiltration Editor

Infiltration Method: GREEN_AMPT

Property	Value
Suction Head	9
Conductivity	0.025
Initial Deficit	0.33

Post Development LID DMAs and LID Controls

Subcatchment LID-1

Property	Value
Name	LID-1
X-Coordinate	992.726
Y-Coordinate	3764.668
Description	
Tag	
Rain Gage	LowerOtay
Outlet	DIV_1
Area	.72011
Width	40
% Slope	0
% Imperv	0
N-Imperv	.012
N-Perv	.15
Dstore-Imperv	0.05
Dstore-Perv	.1
%Zero-Imperv	25
Subarea Routing	OUTLET
Percent Routed	100
Infiltration	GREEN_AMPT
Groundwater	NO
Snow Pack	
LID Controls	1
Land Uses	0
Initial Buildup	NONE
Curb Length	0

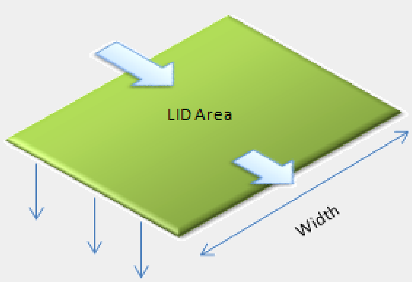
Infiltration Editor

Infiltration Method: GREEN_AMPT

Property	Value
Suction Head	9
Conductivity	0.025
Initial Deficit	0.33

LID Usage Editor

LID Control Name: LID-1



Detailed Report File (Optional)

LID Occupies Full Subcatchment

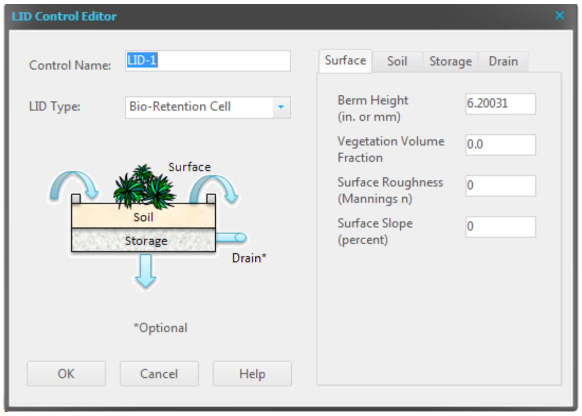
Area of Each Unit (sq ft or sq m)	31363.20
Number of Units	1
% of Subcatchment Occupied	100.0
Surface Width per Unit (ft or m)	40
% Initially Saturated	0
% of Impervious Area Treated	100

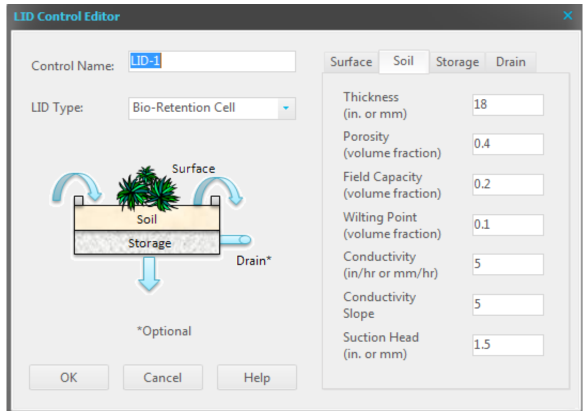
Send Drain Flow To:
(Leave blank to use outlet of current subcatchment)

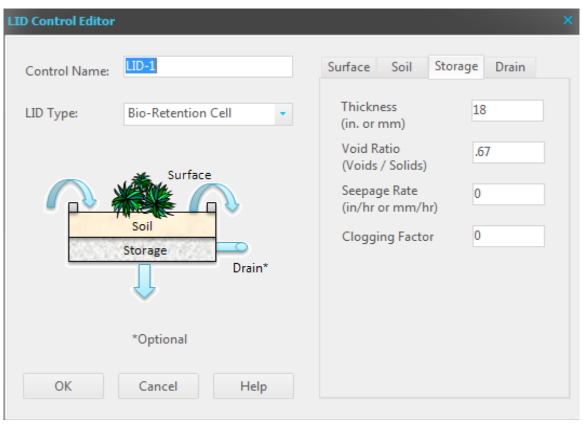
Return all Outflow to Pervious Area

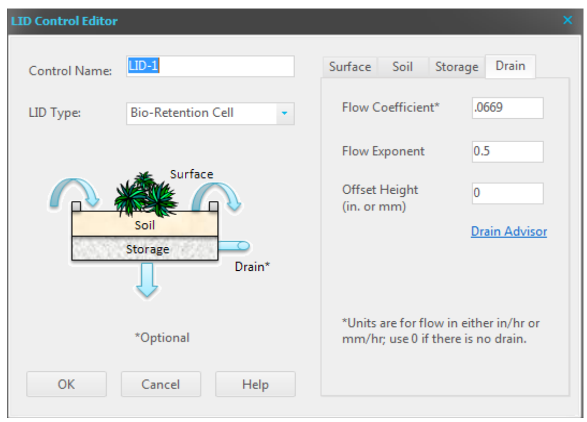
OK Cancel Help

Post Development LID DMAs and LID Controls









Post Development LID DMAs and LID Controls

Subcatchment LID-2

Name	LID-2
X-Coordinate	2388.699
Y-Coordinate	4826.543
Description	
Tag	
Rain Gage	LowerOtay
Outlet	LID-1
Area	.04408
Width	15
% Slope	0
% Imperv	0
N-Imperv	.012
N-Perv	.15
Dstore-Imperv	0.05
Dstore-Perv	.1
%Zero-Imperv	25
Subarea Routing	OUTLET
Percent Routed	100
Infiltration	GREEN_AMPT
Groundwater	NO
Snow Pack	
LID Controls	1
Land Uses	0
Initial Buildup	NONE
Curb Length	0

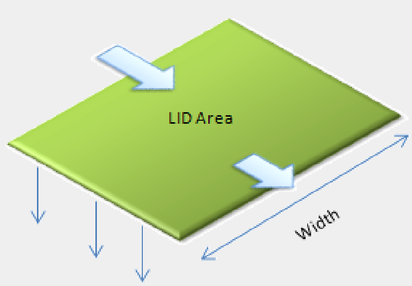
Infiltration Editor

Infiltration Method: GREEN_AMPT

Property	Value
Suction Head	9
Conductivity	0.025
Initial Deficit	0.33

LID Usage Editor

LID Control Name: LID-2



Detailed Report File (Optional)

LID Occupies Full Subcatchment

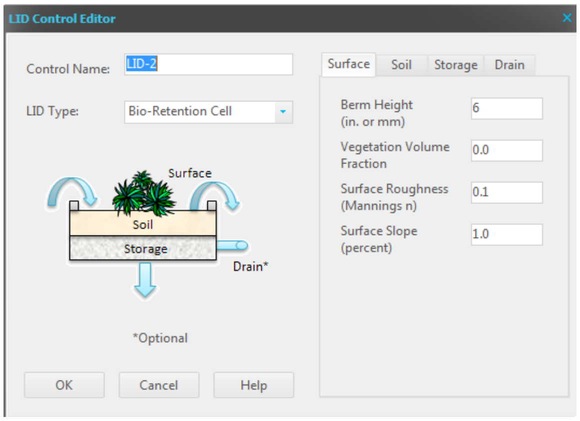
Area of Each Unit (sq ft or sq m)	1920.12
Number of Units	1
% of Subcatchment Occupied	100.0
Surface Width per Unit (ft or m)	15
% Initially Saturated	0
% of Impervious Area Treated	0

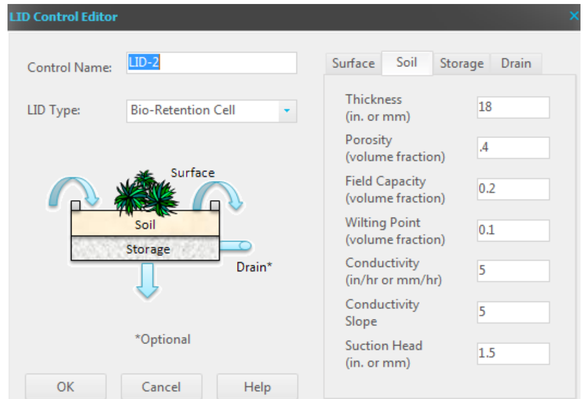
Send Drain Flow To:
(Leave blank to use outlet of current subcatchment)

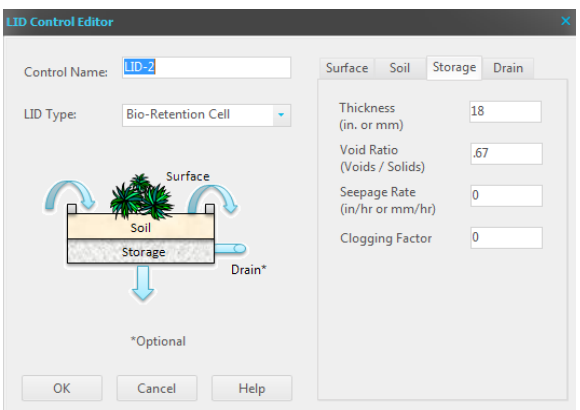
Return all Outflow to Pervious Area

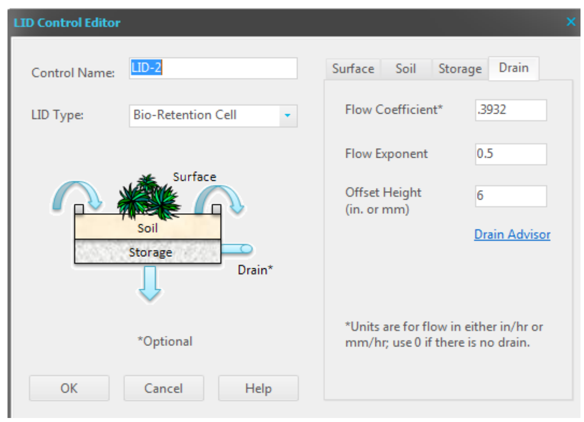
OK Cancel Help

Post Development LID DMAs and LID Controls









Post Development LID DMAs and LID Controls

Subcatchment LID-3

Name	LID-3
X-Coordinate	2440.011
Y-Coordinate	5460.620
Description	
Tag	
Rain Gage	LowerOtay
Outlet	LID-1
Area	.05436
Width	15
% Slope	0
% Imperv	0
N-Imperv	.012
N-Perv	.15
Dstore-Imperv	0.05
Dstore-Perv	.1
%Zero-Imperv	25
Subarea Routing	OUTLET
Percent Routed	100
Infiltration	GREEN_AMPT
Groundwater	NO
Snow Pack	
LID Controls	1
Land Uses	0
Initial Buildup	NONE
Curb Length	0

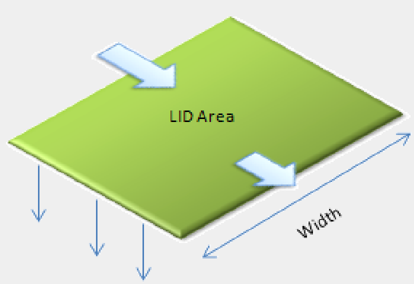
Infiltration Editor

Infiltration Method: GREEN_AMPT

Property	Value
Suction Head	9
Conductivity	0.025
Initial Deficit	0.33

LID Usage Editor

LID Control Name: LID-3



Detailed Report File (Optional)

LID Occupies Full Subcatchment

Area of Each Unit (sq ft or sq m): 2367.92

Number of Units: 1

% of Subcatchment Occupied: 100.0

Surface Width per Unit (ft or m): 15

% Initially Saturated: 0

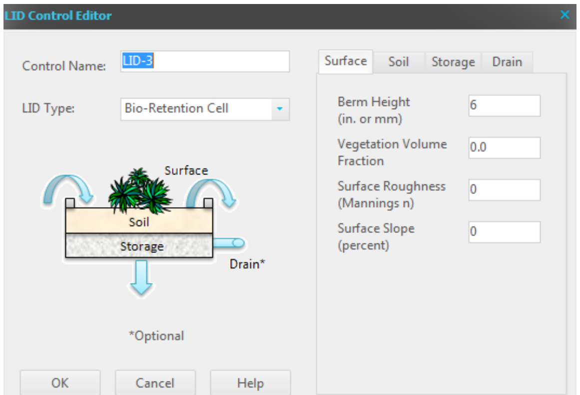
% of Impervious Area Treated: 0

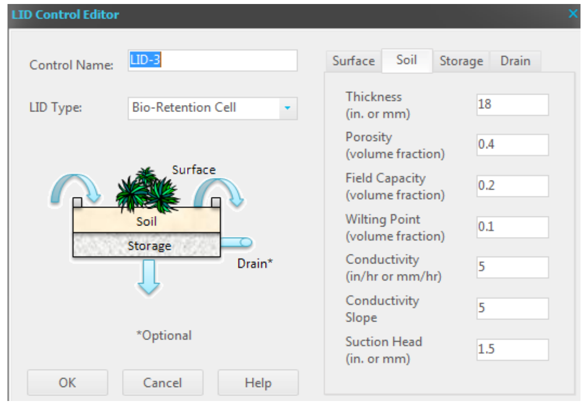
Send Drain Flow To:
(Leave blank to use outlet of current subcatchment)

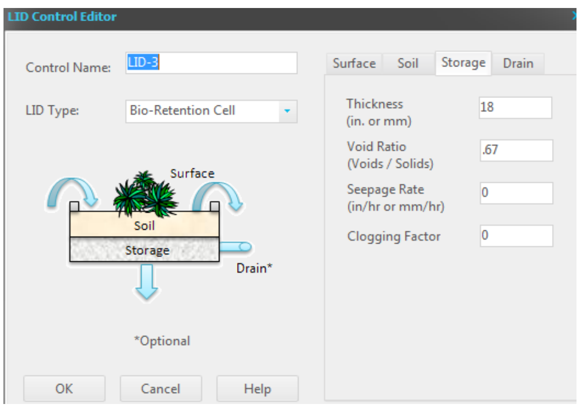
Return all Outflow to Pervious Area

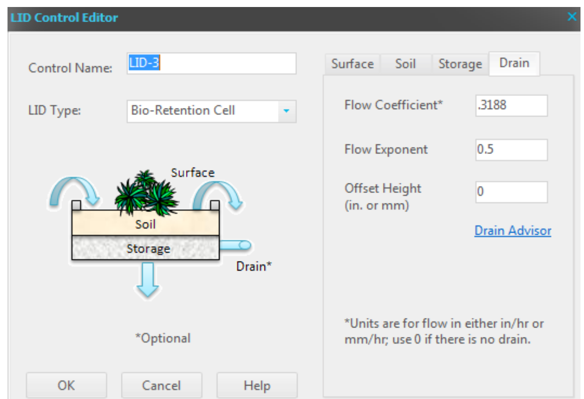
OK Cancel Help

Post Development LID DMAs and LID Controls

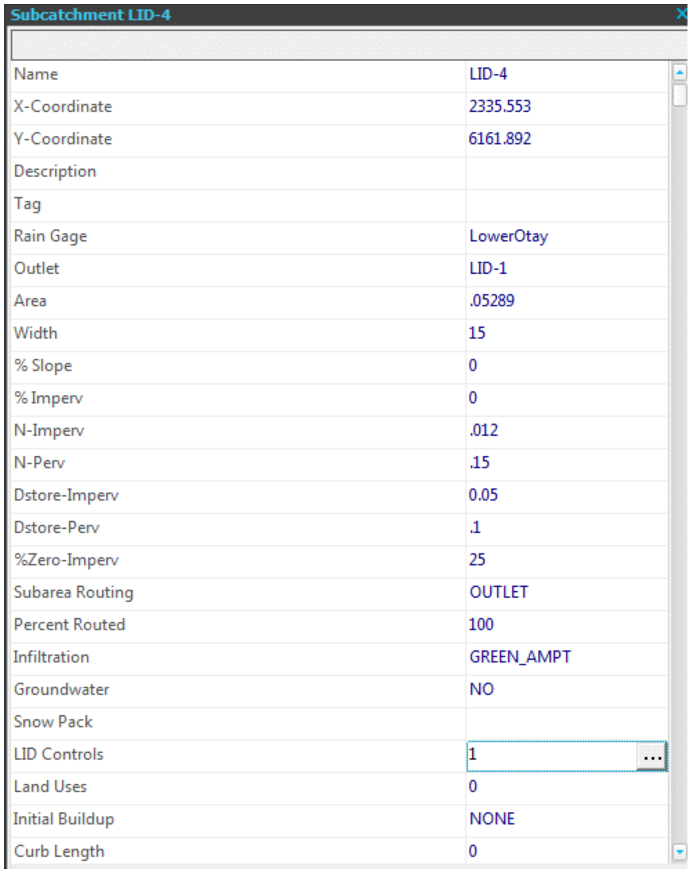






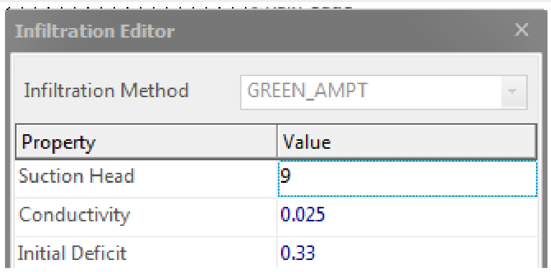


Post Development LID DMAs and LID Controls



Subcatchment LID-4

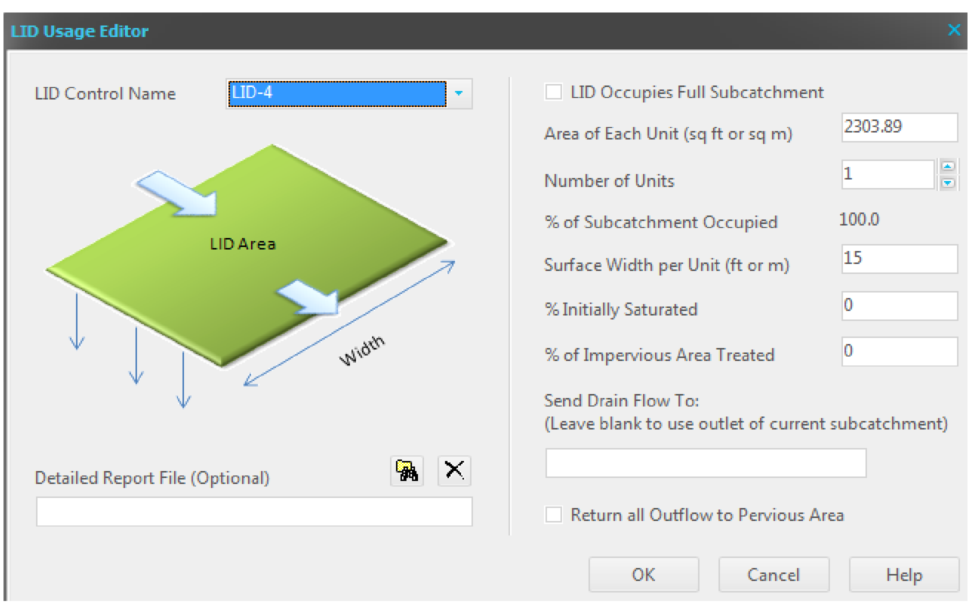
Name	LID-4
X-Coordinate	2335.553
Y-Coordinate	6161.892
Description	
Tag	
Rain Gage	LowerOtay
Outlet	LID-1
Area	.05289
Width	15
% Slope	0
% Imperv	0
N-Imperv	.012
N-Perv	.15
Dstore-Imperv	0.05
Dstore-Perv	.1
%Zero-Imperv	25
Subarea Routing	OUTLET
Percent Routed	100
Infiltration	GREEN_AMPT
Groundwater	NO
Snow Pack	
LID Controls	1
Land Uses	0
Initial Buildup	NONE
Curb Length	0



Infiltration Editor

Infiltration Method GREEN_AMPT

Property	Value
Suction Head	9
Conductivity	0.025
Initial Deficit	0.33



LID Usage Editor

LID Control Name: LID-4

Detailed Report File (Optional)

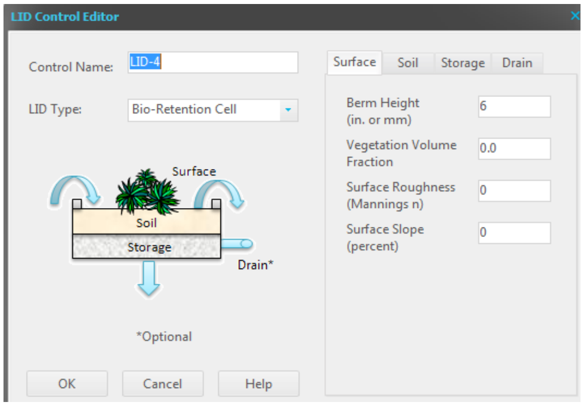
LID Occupies Full Subcatchment	☐
Area of Each Unit (sq ft or sq m)	2303.89
Number of Units	1
% of Subcatchment Occupied	100.0
Surface Width per Unit (ft or m)	15
% Initially Saturated	0
% of Impervious Area Treated	0

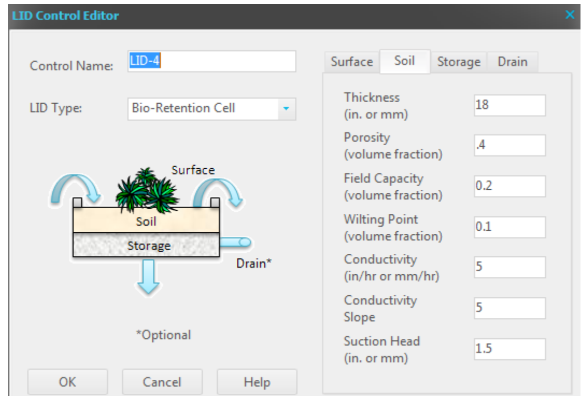
Send Drain Flow To:
(Leave blank to use outlet of current subcatchment)

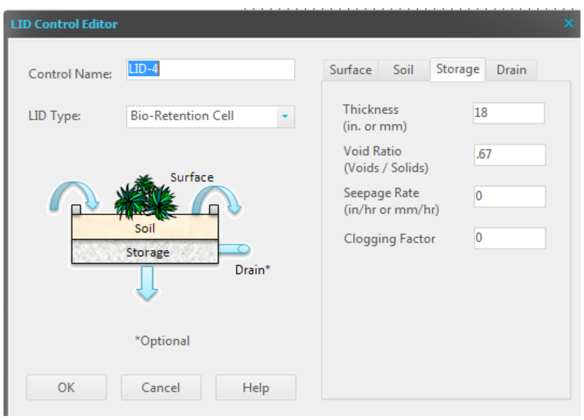
☐ Return all Outflow to Pervious Area

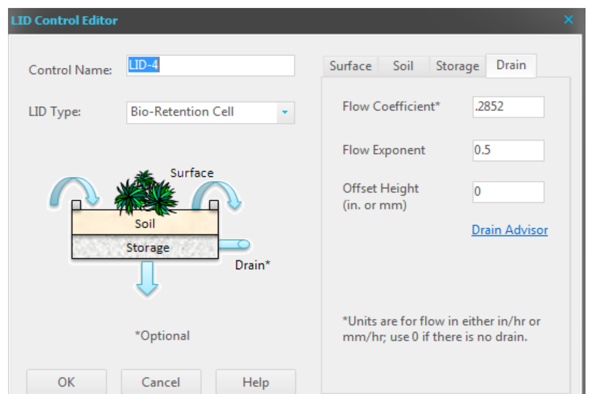
OK Cancel Help

Post Development LID DMAs and LID Controls

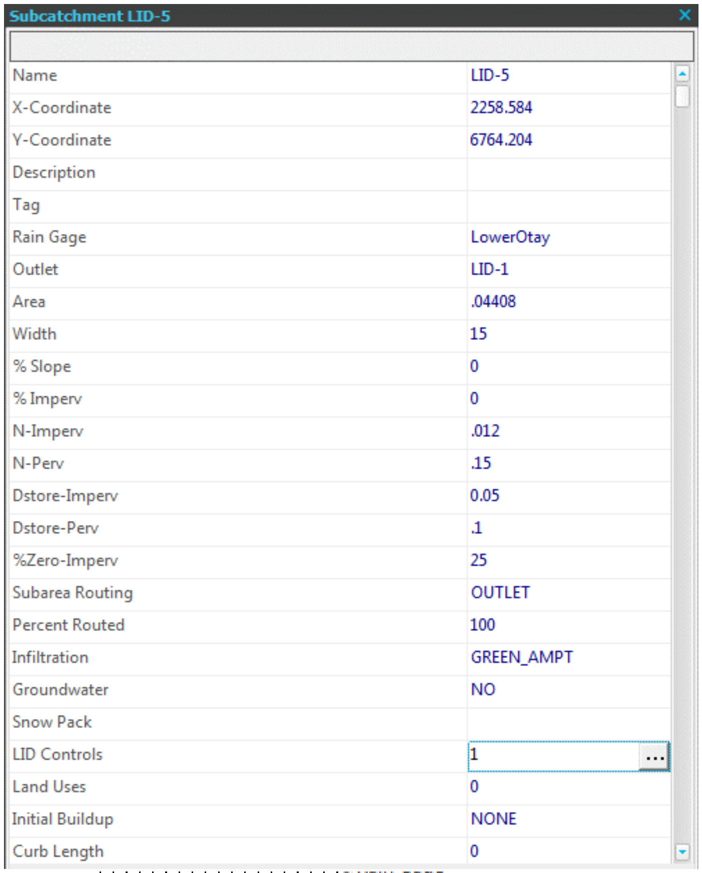


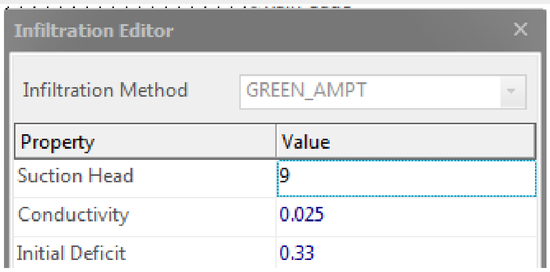


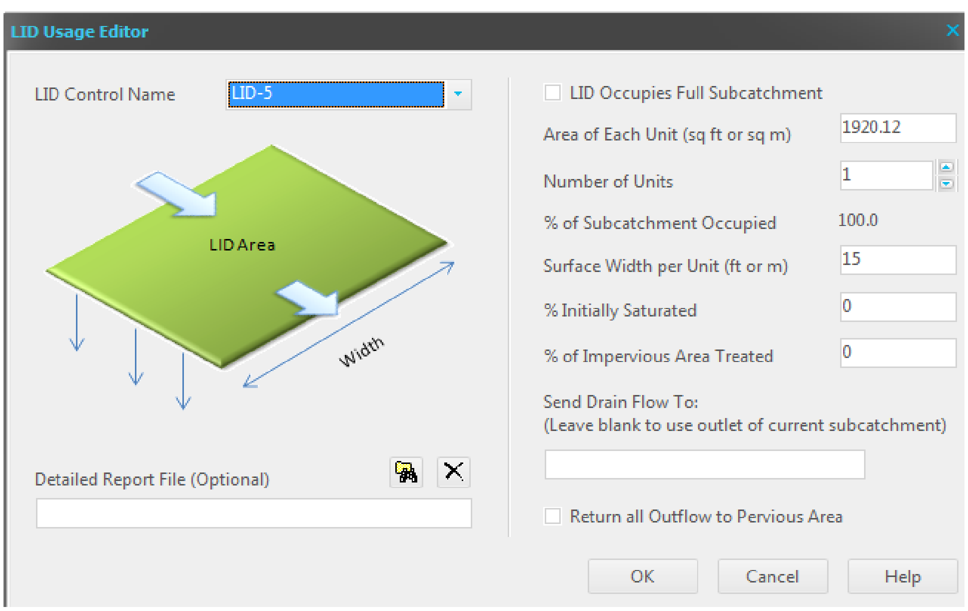




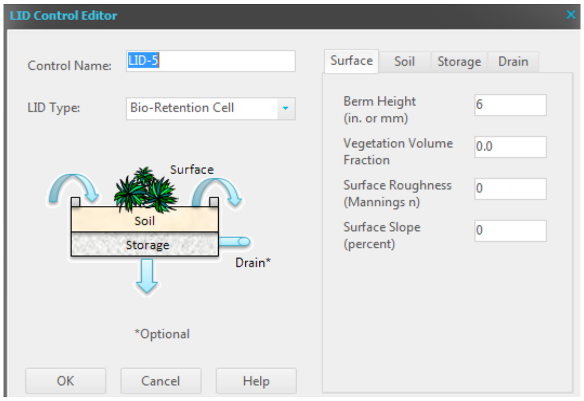
Post Development LID DMAs and LID Controls

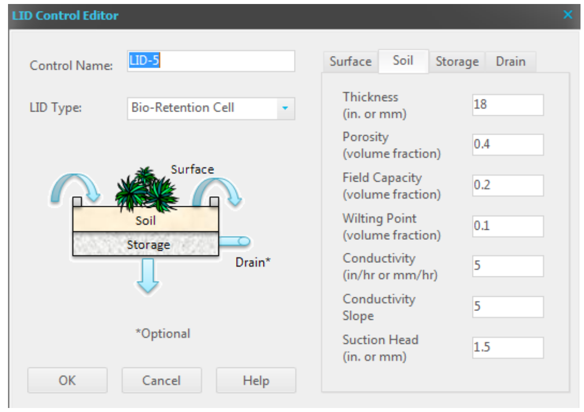


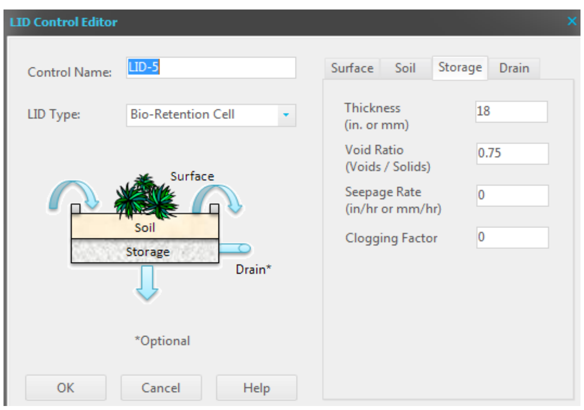


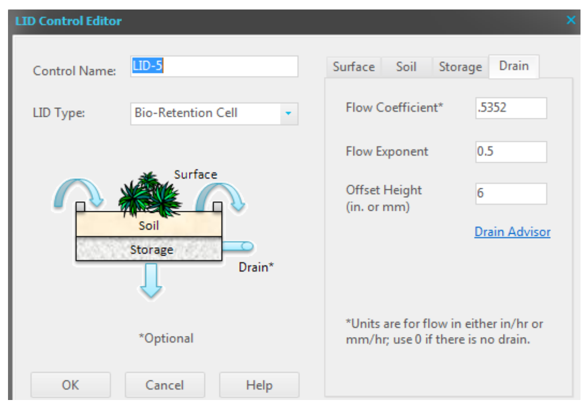


Post Development LID DMAs and LID Controls

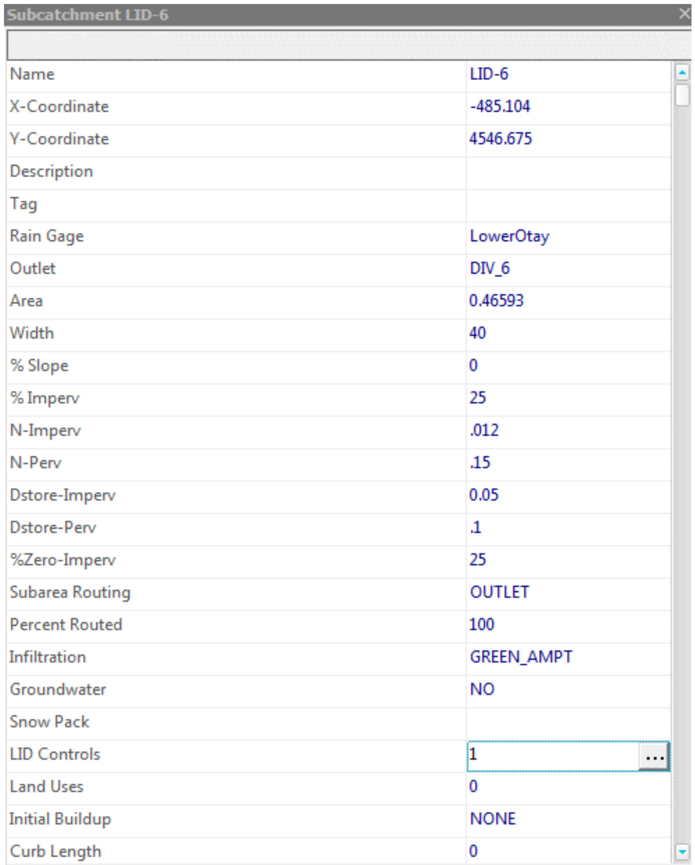




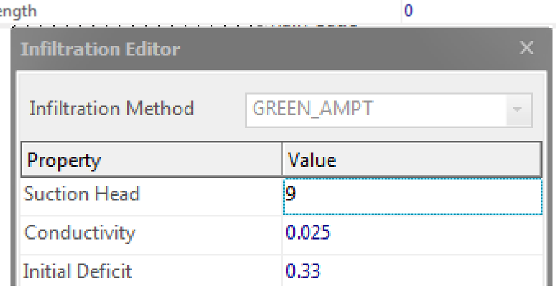




Post Development LID DMAs and LID Controls

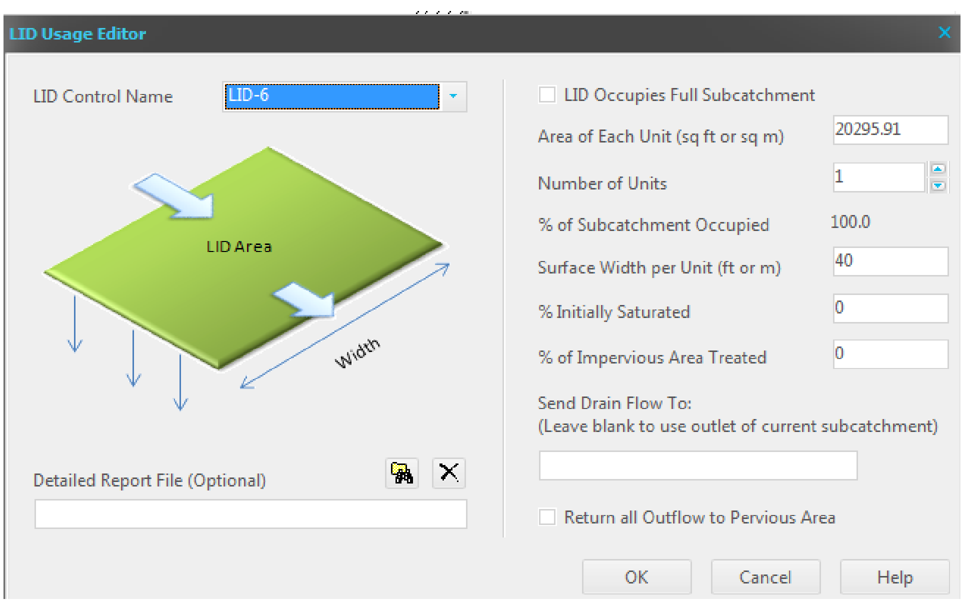

Subcatchment LID-6

Name	LID-6
X-Coordinate	-485.104
Y-Coordinate	4546.675
Description	
Tag	
Rain Gage	LowerOtay
Outlet	DIV_6
Area	0.46593
Width	40
% Slope	0
% Imperv	25
N-Imperv	.012
N-Perv	.15
Dstore-Imperv	0.05
Dstore-Perv	.1
%Zero-Imperv	25
Subarea Routing	OUTLET
Percent Routed	100
Infiltration	GREEN_AMPT
Groundwater	NO
Snow Pack	
LID Controls	1
Land Uses	0
Initial Buildup	NONE
Curb Length	0

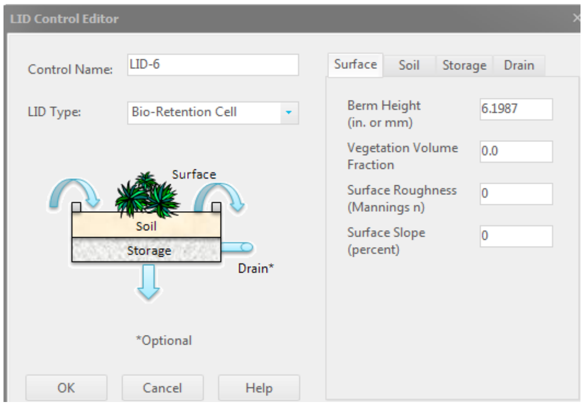

Infiltration Editor

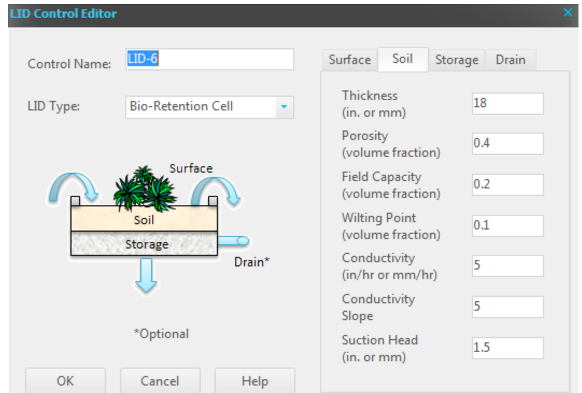
Infiltration Method GREEN_AMPT

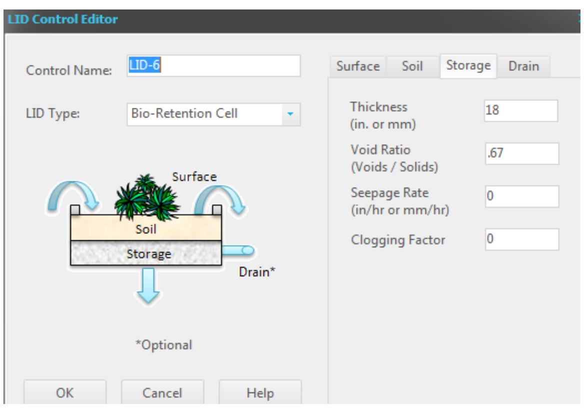
Property	Value
Suction Head	9
Conductivity	0.025
Initial Deficit	0.33

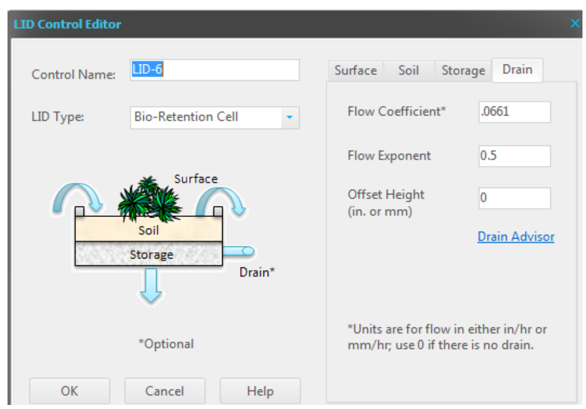


Post Development LID DMAs and LID Controls









Post Development LID DMAs and LID Controls

Subcatchment LID-7

Property	Value
Name	LID-7
X-Coordinate	-622.861
Y-Coordinate	6726.941
Description	
Tag	
Rain Gage	LowerOtay
Outlet	DIV_7
Area	.39575
Width	50
% Slope	0
% Imperv	0
N-Imperv	.012
N-Perv	.15
Dstore-Imperv	0.05
Dstore-Perv	.1
%Zero-Imperv	25
Subarea Routing	OUTLET
Percent Routed	100
Infiltration	GREEN_AMPT
Groundwater	NO
Snow Pack	
LID Controls	1
Land Uses	0
Initial Buildup	NONE
Curb Length	0

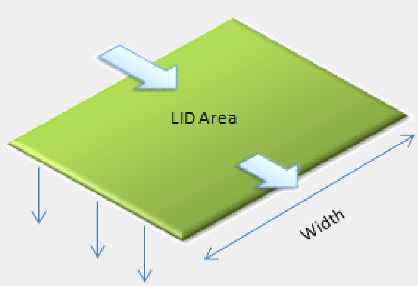
Infiltration Editor

Infiltration Method: GREEN_AMPT

Property	Value
Suction Head	9
Conductivity	0.025
Initial Deficit	0.33

LID Usage Editor

LID Control Name: LID-7



Detailed Report File (Optional)

- [ ] LID Occupies Full Subcatchment

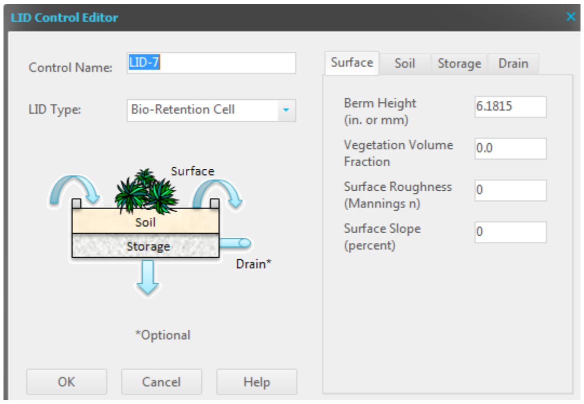
Area of Each Unit (sq ft or sq m)	17238.87
Number of Units	1
% of Subcatchment Occupied	100.0
Surface Width per Unit (ft or m)	50
% Initially Saturated	0
% of Impervious Area Treated	100

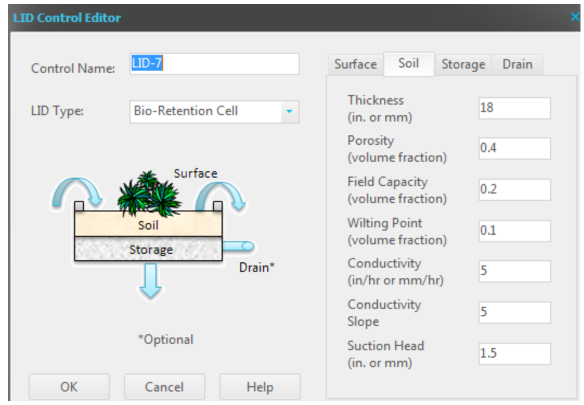
Send Drain Flow To:
(Leave blank to use outlet of current subcatchment)

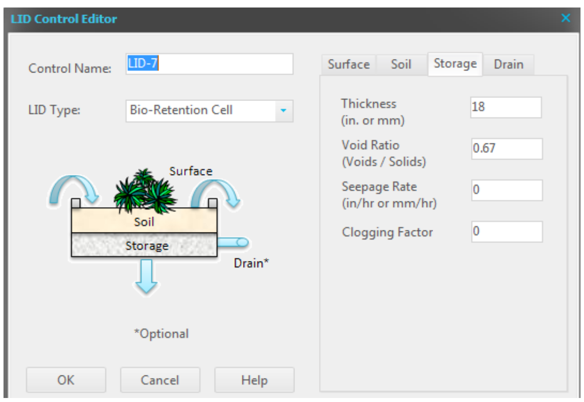
- [ ] Return all Outflow to Pervious Area

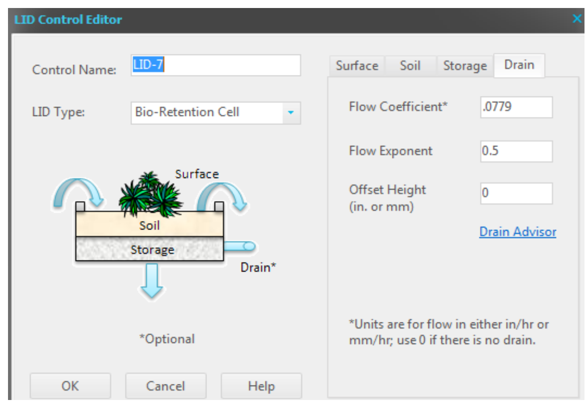
OK | Cancel | Help

Post Development LID DMAs and LID Controls

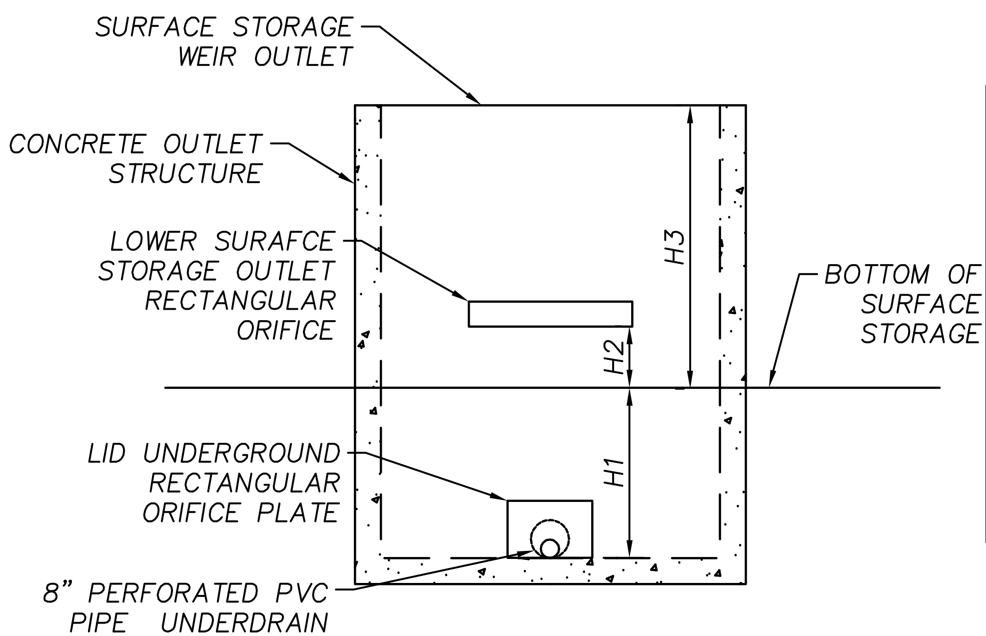








BASIN OUTLET STRUCTURE DETAIL



TYPICAL OUTLET STRUCTURE DETAIL

BASIN ID	LID ORIFICE PLATE		LOWER SURFACE RECTANGULAR ORIFICE			SURFACE STORAGE WEIR OUTLET	
	H1	DIAMETER	H2	LENGTH	HEIGHT	H3	LENGTH
	INCHES	INCHES	INCHES	INCHES	INCHES	FT	FT
1	36	2.5	6	48	6	3.3	18
2	36	1.5	N/A	N/A	N/A	0.5	10
3	36	1.5	N/A	N/A	N/A	0.5	10
4	36	1.75	N/A	N/A	N/A	0.5	10
5	36	1.75	N/A	N/A	N/A	0.5	10
6	36	2	6	12	1	1.3	12
7	36	2	6	12	1	2	12

BASIN SPECIFIC OUTLET TABLE

BASIN 1

BASIN 1 STAGE STORAGE						
Section (Type)	Elevation (F)	Stage (F)	Surface Area (SF)	Incremental Volume (CF)	Total Volume (CF)	Elevation
	-3.0	0.0	30957	0.0	4127.6	479
Gravel	-2.5	0.5	30957	6191.4	10319.0	479.5
	-2.0	1.0	30957	6191.4	16510.4	480
	-1.5	1.5	30957	6191.4	22701.8	480.5
Media	-1.0	2.0	30957	3095.7	25797.5	481
	-0.5	2.5	30957	3095.7	28893.2	481.5
	0.0	3.0	30957	3095.7	31988.9	482
Trapezoidial Basin	0.5	3.5	33024.0	16512.0	48500.9	482.5
	1.0	4.0	35091.0	17545.5	66046.4	483.0
	1.5	4.5	37191.0	18595.5	84641.9	483.5
	2.0	5.0	39291.0	19645.5	104287.4	484.0
	2.5	5.5	41424.3	20712.2	124999.6	484.5
	3.0	6.0	43557.6	21778.8	146778.4	485.0
	3.5	6.5	45724.2	22862.1	169640.5	485.5
	4.0	7.0	47890.8	23945.4	193585.9	486.0
	4.5	7.5	50090.6	25045.3	218631.2	486.5
	5.0	8.0	52290.4	26145.2	244776.4	487.0
	5.5	8.5	0.0	0.0	244776.4	
	6.0	9.0	0.0	0.0	244776.4	
	6.5	9.5	0.0	0.0	244776.4	
	7.0	10.0	0.0	0.0	244776.4	

Porosity	
Media=	0.2
Gravel=	0.4

Total Storage= 244776.4

Effective Depth of Underground storage to the bottom orifice elevation

Bottom Surface		
Orifice Elevation	0.5 ft	6.00000 inches
Effiective Depth	0.5167 ft	6.20031 inches

Basin 1 Stage Discharge Table

Bottom Orifice Diameter	1	Inches
Number of Orifices	0	
Cg-Bottom	0.62	
Middle Orifice Diameter	1	Inches
Number of Orifices	0	
Cg-Middle	0.62	
invert elev	0	ft

Bottom Slot Opening		
Invert Elev.	0	ft
B (width)	4	ft
h (Height)	0.5	ft
Cw	3.1	
Top Slot		
Invert Elev.	0	ft
B (width)	0	ft
h (Height)	0	ft

Emergency Weir		
Invert Elev.	2.8	ft
L (Length)	18	ft

h (ft)	**H/D-Bttm**	**H/D-Middle**	**Qbttm-orif**	**Qbttm-weir**	**Qtotal - Low**	**Qmid-orif**	**Qmid-weir**	**Qtot-mid**	**Qslot-low**	**Qslot-top**	**Qemer**	**h (ft)**	**Total Q**
ft	**-**	**-**	**cfs**	**cfs**	**cfs**	**cfs**	**cfs**	**cfs**	**cfs**	**cfs**	**cfs**	**ft**	**cfs**
0	0.0	0.0	0.00000		0.00000	0.00000		0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.1	1.2	1.2	0.00000		0.00000	0.00000		0.00000	0.39212	0.00000	0.00000	0.10000	0.39212
0.2	2.4	2.4	0.00000		0.00000	0.00000		0.00000	1.10909	0.00000	0.00000	0.20000	1.10909
0.3	3.6	3.6	0.00000		0.00000	0.00000		0.00000	2.03753	0.00000	0.00000	0.30000	2.03753
0.4	4.8	4.8	0.00000		0.00000	0.00000		0.00000	3.13698	0.00000	0.00000	0.40000	3.13698
0.5	6.0	6.0	0.00000		0.00000	0.00000		0.00000	4.38406	0.00000	0.00000	0.50000	4.38406
0.6	7.2	7.2	0.00000		0.00000	0.00000		0.00000	5.88706	0.00000	0.00000	0.60000	5.88706
0.7	8.4	8.4	0.00000		0.00000	0.00000		0.00000	6.67530	0.00000	0.00000	0.70000	6.67530
0.8	9.6	9.6	0.00000		0.00000	0.00000		0.00000	7.37982	0.00000	0.00000	0.80000	7.37982
0.9	10.8	10.8	0.00000		0.00000	0.00000		0.00000	8.02271	0.00000	0.00000	0.90000	8.02271
1	12.0	12.0	0.00000		0.00000	0.00000		0.00000	8.61778	0.00000	0.00000	1.00000	8.61778
1.1	13.2	13.2	0.00000		0.00000	0.00000		0.00000	9.17432	0.00000	0.00000	1.10000	9.17432
1.2	14.4	14.4	0.00000		0.00000	0.00000		0.00000	9.69899	0.00000	0.00000	1.20000	9.69899
1.3	15.6	15.6	0.00000		0.00000	0.00000		0.00000	10.19669	0.00000	0.00000	1.30000	10.19669
1.4	16.8	16.8	0.00000		0.00000	0.00000		0.00000	10.67121	0.00000	0.00000	1.40000	10.67121
1.5	18.0	18.0	0.00000		0.00000	0.00000		0.00000	11.12550	0.00000	0.00000	1.50000	11.12550
1.6	19.2	19.2	0.00000		0.00000	0.00000		0.00000	11.56196	0.00000	0.00000	1.60000	11.56196
1.7	20.4	20.4	0.00000		0.00000	0.00000		0.00000	11.98253	0.00000	0.00000	1.70000	11.98253
1.8	21.6	21.6	0.00000		0.00000	0.00000		0.00000	12.38883	0.00000	0.00000	1.80000	12.38883
1.9	22.8	22.8	0.00000		0.00000	0.00000		0.00000	12.78223	0.00000	0.00000	1.90000	12.78223
2	24.0	24.0	0.00000		0.00000	0.00000		0.00000	13.16387	0.00000	0.00000	2.00000	13.16387
2.1	25.2	25.2	0.00000		0.00000	0.00000		0.00000	13.53476	0.00000	0.00000	2.10000	13.53476
2.2	26.4	26.4	0.00000		0.00000	0.00000		0.00000	13.89575	0.00000	0.00000	2.20000	13.89575
2.3	27.6	27.6	0.00000		0.00000	0.00000		0.00000	14.24759	0.00000	0.00000	2.30000	14.24759
2.4	28.8	28.8	0.00000		0.00000	0.00000		0.00000	14.59096	0.00000	0.00000	2.40000	14.59096
2.5	30.0	30.0	0.00000		0.00000	0.00000		0.00000	14.92643	0.00000	0.00000	2.50000	14.92643
2.6	31.2	31.2	0.00000		0.00000	0.00000		0.00000	15.25452	0.00000	0.00000	2.60000	15.25452
2.7	32.4	32.4	0.00000		0.00000	0.00000		0.00000	15.57570	0.00000	0.00000	2.70000	15.57570
2.8	33.6	33.6	0.00000		0.00000	0.00000		0.00000	15.89040	0.00000	0.00000	2.80000	15.89040

Basin 1 Stage Discharge Table

h (ft)	H/D-Bttm	H/D-Middle	Qbttm-orif	Qbttm-weir	Qtotal - Low	Qmid-orif	Qmid-weir	Qtot-mid	Qslot-low	Qslot-top	Qemer	h (ft)	Total Q
ft	-	-	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	ft	cfs
2.9	34.8	34.8	0.00000		0.00000	0.00000		0.00000	16.19898	0.00000	1.76455	2.90000	17.96353
3	36.0	36.0	0.00000		0.00000	0.00000		0.00000	16.50179	0.00000	4.99090	3.00000	21.49269
3.1	37.2	37.2	0.00000		0.00000	0.00000		0.00000	16.79914	0.00000	9.16888	3.10000	25.96802
3.2	38.4	38.4	0.00000		0.00000	0.00000		0.00000	17.09132	0.00000	14.11641	3.20000	31.20773
3.3	39.6	39.6	0.00000		0.00000	0.00000		0.00000	17.37859	0.00000	19.72828	3.30000	37.10687
3.4	40.8	40.8	0.00000		0.00000	0.00000		0.00000	17.66119	0.00000	25.93350	3.40000	43.59468
3.5	42.0	42.0	0.00000		0.00000	0.00000		0.00000	17.93933	0.00000	32.67994	3.50000	50.61927
3.6	43.2	43.2	0.00000		0.00000	0.00000		0.00000	18.21323	0.00000	39.92723	3.60000	58.14046
3.7	44.4	44.4	0.00000		0.00000	0.00000		0.00000	18.48307	0.00000	47.64288	3.70000	66.12595
3.8	45.6	45.6	0.00000		0.00000	0.00000		0.00000	18.74903	0.00000	55.80000	3.80000	74.54903
3.9	46.8	46.8	0.00000		0.00000	0.00000		0.00000	19.01127	0.00000	64.37589	3.90000	83.38715
4	48.0	48.0	0.00000		0.00000	0.00000		0.00000	19.26994	0.00000	73.35100	4.00000	92.62094

Post Development Detention Basin Stage Storage Discharge Input

Storage Unit Basin_1

Name	Basin_1
X-Coordinate	-571.749
Y-Coordinate	3766.816
Description	
Tag	
Inflows	NO
Treatment	NO
Invert El.	482.5
Max. Depth	486
Initial Depth	0
Ponded Area	0
Evap. Factor	1
Seepage Loss	NO
Storage Curve	TABULAR
Functional Curve	
Coefficient	1000
Exponent	0
Constant	0
Tabular Curve	
Curve Name	Basin_1

Storage Curve Editor

Curve Name: Basin_1

Description:

	Depth (ft)	Area (ft2)
1	0	33024.0
2	.5	35091.0
3	1	37191.0
4	1.5	39291.0
5	2	41424.3
6	2.5	43557.6
7	3	45724.2
8	3.5	47890.8
9		
10		
11		

View... Load... Save... OK Cancel Help

Rating Curve Editor

Curve Name: Outlet1

Description:

	Head (ft)	Outflow (CFS)
1	0.00000	0.00000
2	0.10000	0.39212
3	0.20000	1.10909
4	0.30000	2.03753
5	0.40000	3.13698
6	0.50000	4.38406
7	0.60000	5.88706
8	0.70000	6.67530
9	0.80000	7.37982
10	0.90000	8.02271
11	1.00000	8.61778
12	1.10000	9.17432
13	1.20000	9.69899
14	1.30000	10.19669
15	1.40000	10.67121
16	1.50000	11.12550
17	1.60000	11.56196
18	1.70000	11.98253
19	1.80000	12.38883
20	1.90000	12.78223
21	2.00000	13.16387
22	2.10000	13.53476
23	2.20000	13.89575
24	2.30000	14.24759
25	2.40000	14.59096
26	2.50000	14.92643
27	2.60000	15.25452
28	2.70000	15.57570
29	2.80000	15.89040
30	2.90000	17.96353
31	3.00000	21.49269
32	3.10000	25.96802
33	3.20000	31.20773

View... Load... Save... OK Cancel Help

BASIN 6

BASIN 7 STAGE STORAGE					
Section (Type)	Elevation (F)	Stage (F)	Surface Area (SF)	Incremental Volume (CF)	Total Volume (CF)
	-3.0	0.0	20297	0.0	2706.3 DS
Gravel	-2.5	0.5	20297	4059.4	6765.7
	-2.0	1.0	20297	4059.4	10825.1
	-1.5	1.5	20297	4059.4	14884.5
Media	-1.0	2.0	20297	2029.7	16914.2
	-0.5	2.5	20297	2029.7	18943.9
	0.0	3.0	20297	2029.7	20973.6
Trapezoidia	0.5	3.5	21525.1	10762.6	31736.1
	1.0	4.0	22768.9	11384.5	43120.6
	1.5	4.5	24028.6	12014.3	55134.9
	2.0	5.0	25304.2	12652.1	67787.0
				Total Storage=	67787.0

Porosity	
Media=	0.2
Gravel=	0.4

Effective Depth of Underground storage to the bottom orifice elevation

Bottom Surface				
Orifice				
Elevation	0.5	ft	6.00000	inches
Effiective Depth	0.5151	ft	6.18152	inches

Basin 6 Stage Discharge Table

Bottom Orifice Diameter	1	Inches		**Bottom Slot Opening**			Emergency Weir				
Number of Orifices	0		Invert Elev.	0	ft	Invert Elev.	0.8	ft		1.5	1.3
Cg-Bottom	0.62		B (width)	1	ft	L (Length)	12	ft		10	15.6
Middle Orifice Diameter	1	Inches	h (Height)	0.083	ft						
Number of Orifices	0		Cw	3.1							
Cg-Middle	0.62			**Top Slot**							
invert elev	0	ft	Invert Elev.		ft						
			B (width)		ft						
			h (Height)		ft						

h (ft)	H/D-Bttm	H/D-Middle	Qbttm-orif	Qbttm-weir	Qtotal - Low	Qmid-orif	Qmid-weir	Qtot-mid	Qslot-low	Qslot-top	Qemer	h (ft)	Total Q
ft	-	-	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	ft	cfs
0	0.0	0.0	0.00000		0.00000	0.00000		0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
0.1	1.2	1.2	0.00000		0.00000	0.00000		0.00000	0.09988	0.00000	0.00000	0.10000	0.09988
0.2	2.4	2.4	0.00000		0.00000	0.00000		0.00000	0.16441	0.00000	0.00000	0.20000	0.16441
0.3	3.6	3.6	0.00000		0.00000	0.00000		0.00000	0.20996	0.00000	0.00000	0.30000	0.20996
0.4	4.8	4.8	0.00000		0.00000	0.00000		0.00000	0.24726	0.00000	0.00000	0.40000	0.24726
0.5	6.0	6.0	0.00000		0.00000	0.00000		0.00000	0.27963	0.00000	0.00000	0.50000	0.27963
0.6	7.2	7.2	0.00000		0.00000	0.00000		0.00000	0.30862	0.00000	0.00000	0.60000	0.30862
0.7	8.4	8.4	0.00000		0.00000	0.00000		0.00000	0.33511	0.00000	0.00000	0.70000	0.33511
0.8	9.6	9.6	0.00000		0.00000	0.00000		0.00000	0.35966	0.00000	0.00000	0.80000	0.35966
0.9	10.8	10.8	0.00000		0.00000	0.00000		0.00000	0.38263	0.00000	1.17637	0.90000	1.55900
1	12.0	12.0	0.00000		0.00000	0.00000		0.00000	0.40430	0.00000	3.32727	1.00000	3.73157
1.1	13.2	13.2	0.00000		0.00000	0.00000		0.00000	0.42487	0.00000	6.11258	1.10000	6.53746
1.2	14.4	14.4	0.00000		0.00000	0.00000		0.00000	0.44449	0.00000	9.41094	1.20000	9.85543
1.3	15.6	15.6	0.00000		0.00000	0.00000		0.00000	0.46328	0.00000	13.15219	1.30000	13.61546
1.4	16.8	16.8	0.00000		0.00000	0.00000		0.00000	0.48133	0.00000	17.28900	1.40000	17.77033
1.5	18.0	18.0	0.00000		0.00000	0.00000		0.00000	0.49873	0.00000	21.78663	1.50000	22.28536
1.6	19.2	19.2	0.00000		0.00000	0.00000		0.00000	0.51554	0.00000	26.61815	1.60000	27.13370
1.7	20.4	20.4	0.00000		0.00000	0.00000		0.00000	0.53183	0.00000	31.76192	1.70000	32.29374
1.8	21.6	21.6	0.00000		0.00000	0.00000		0.00000	0.54763	0.00000	37.20000	1.80000	37.74763
1.9	22.8	22.8	0.00000		0.00000	0.00000		0.00000	0.56298	0.00000	42.91726	1.90000	43.48024
2	24.0	24.0	0.00000		0.00000	0.00000		0.00000	0.57793	0.00000	48.90067	2.00000	49.47860

Post Development Detention Basin Stage Storage Discharge Input

Storage Unit Basin_6

Name	Basin_6
X-Coordinate	-713.380
Y-Coordinate	4303.731
Description	
Tag	
Inflows	NO
Treatment	NO
Invert El.	485
Max. Depth	0
Initial Depth	0
Ponded Area	0
Evap. Factor	0
Seepage Loss	NO
Storage Curve	TABULAR
Functional Curve	
Coefficient	1000
Exponent	0
Constant	0
Tabular Curve	
Curve Name	Basin_6

Storage Curve Editor

Curve Name: Basin_6

Description: Surface Storage Only Above Lowest Outlet

	Depth (ft)	Area (ft2)
1	0	21525.1
2	.5	22768.9
3	1	24028.6
4	1.5	25304.2
5		
6		
7		
8		
9		
10		
11		

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Rating Curve Editor

Curve Name: Outlet6

Description:

	Head (ft)	Outflow (CFS)
1	0.00000	0.00000
2	0.10000	0.09988
3	0.20000	0.16441
4	0.30000	0.20996
5	0.40000	0.24726
6	0.50000	0.27963
7	0.60000	0.30862
8	0.70000	0.33511
9	0.80000	0.35966
10	0.90000	1.55900
11	1.00000	3.73157
12	1.10000	6.53746
13	1.20000	9.85543
14	1.30000	13.61546
15	1.40000	17.77033
16	1.50000	22.28536
17	1.60000	27.13370
18	1.70000	32.29374
19	1.80000	37.74763
20	1.90000	43.48024
21	2.00000	49.47860
22	2.10000	55.73138

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BASIN 7

BASIN 7 STAGE STORAGE						
Section (Type)	Elevation (F)	Stage (F)	Surface Area (SF)	Incremental Volume (CF)	Total Volume (CF)	
	-3.0	0.0	17017.1	0.0	2268.9	DS
Gravel	-2.5	0.5	17017.1	3403.4	5672.4	
	-2.0	1.0	17017.1	3403.4	9075.8	
	-1.5	1.5	17017.1	3403.4	12479.2	
Media	-1.0	2.0	17017.1	1701.7	14180.9	
	-0.5	2.5	17017.1	1701.7	15882.6	
	0.0	3.0	17017.1	1701.7	17584.3	
Trapezoidial Basin	0.5	3.5	18144.2	9072.1	26656.4	
	1.0	4.0	19295.3	9647.7	36304.1	
	1.5	4.5	20470.7	10235.4	46539.4	
	2.0	5.0	21670.1	10835.1	57374.5	
	2.5	5.5	0.0	0.0	57374.5	
	3.0	6.0	0.0	0.0	57374.5	
	3.5	6.5	0.0	0.0	57374.5	
	4.0	7.0	0.0	0.0	57374.5	
	4.5	7.5	0.0	0.0	57374.5	
	5.0	8.0	0.0	0.0	57374.5	
				Total Storage=	57374.5	

Porosity	
Media=	0.2
Gravel=	0.4

Effective Depth of Underground storage to the bottom orifice elevation

Bottom Surface Orifice		
Elevation	0.5 ft	6.00000 inches
Effiective Depth	0.5166 ft	6.19870 inches

Basin 7 Stage Discharge Table

Bottom Orifice Diameter	1	Inches			Bottom Slot Opening			Emergency Weir			
Number of Orifices	0			Invert Elev.	0	ft		Invert Elev.	1.5	ft	
Cg-Bottom	0.62			B (width)	1	ft		L (Length)	12	ft	
Middle Orifice Diameter	1	Inches		h (Height)	0.083	ft					
Number of Orifices	0			Cw	3.1						
Cg-Middle	0.62				Top Slot						
invert elev	0	ft		Invert Elev.		ft					
				B (width)		ft					
				h (Height)		ft					

h (ft)	H/D-Bttm	H/D-Middle	Qbttm-orif	Qbttm-weir	Qtotal - Low	Qmid-orif	Qmid-weir	Qtot-mid	Qslot-low	Qslot-top	Qemer	h (ft)	Total Q
ft	-	-	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	ft	cfs
0	0.0	0.0	0.00000		0.00000	0.00000		0.00000	0.00000	0.00000	0.00000	**0**	0.00000
0.1	1.2	1.2	0.00000		0.00000	0.00000		0.00000	0.09988	0.00000	0.00000	**0.1**	0.09988
0.2	2.4	2.4	0.00000		0.00000	0.00000		0.00000	0.16441	0.00000	0.00000	**0.2**	0.16441
0.3	3.6	3.6	0.00000		0.00000	0.00000		0.00000	0.20996	0.00000	0.00000	**0.3**	0.20996
0.4	4.8	4.8	0.00000		0.00000	0.00000		0.00000	0.24726	0.00000	0.00000	**0.4**	0.24726
0.5	6.0	6.0	0.00000		0.00000	0.00000		0.00000	0.27963	0.00000	0.00000	**0.5**	0.27963
0.6	7.2	7.2	0.00000		0.00000	0.00000		0.00000	0.30862	0.00000	0.00000	**0.6**	0.30862
0.7	8.4	8.4	0.00000		0.00000	0.00000		0.00000	0.33511	0.00000	0.00000	**0.7**	0.33511
0.8	9.6	9.6	0.00000		0.00000	0.00000		0.00000	0.35966	0.00000	0.00000	**0.8**	0.35966
0.9	10.8	10.8	0.00000		0.00000	0.00000		0.00000	0.38263	0.00000	0.00000	**0.9**	0.38263
1	12.0	12.0	0.00000		0.00000	0.00000		0.00000	0.40430	0.00000	0.00000	**1**	0.40430
1.1	13.2	13.2	0.00000		0.00000	0.00000		0.00000	0.42487	0.00000	0.00000	**1.1**	0.42487
1.2	14.4	14.4	0.00000		0.00000	0.00000		0.00000	0.44449	0.00000	0.00000	**1.2**	0.44449
1.3	15.6	15.6	0.00000		0.00000	0.00000		0.00000	0.46328	0.00000	0.00000	**1.3**	0.46328
1.4	16.8	16.8	0.00000		0.00000	0.00000		0.00000	0.48133	0.00000	0.00000	**1.4**	0.48133
1.5	18.0	18.0	0.00000		0.00000	0.00000		0.00000	0.49873	0.00000	0.00000	**1.5**	0.49873
1.6	19.2	19.2	0.00000		0.00000	0.00000		0.00000	0.51554	0.00000	1.17637	**1.6**	1.69191
1.7	20.4	20.4	0.00000		0.00000	0.00000		0.00000	0.53183	0.00000	3.32727	**1.7**	3.85910
1.8	21.6	21.6	0.00000		0.00000	0.00000		0.00000	0.54763	0.00000	6.11258	**1.8**	6.66021
1.9	22.8	22.8	0.00000		0.00000	0.00000		0.00000	0.56298	0.00000	9.41094	**1.9**	9.97392
2	24.0	24.0	0.00000		0.00000	0.00000		0.00000	0.57793	0.00000	13.15219	**2**	13.73012
2.1	25.2	25.2	0.00000		0.00000	0.00000		0.00000	0.59250	0.00000	17.28900	**2.1**	17.88150
2.2	26.4	26.4	0.00000		0.00000	0.00000		0.00000	0.60672	0.00000	21.78663	**2.2**	22.39335
2.3	27.6	27.6	0.00000		0.00000	0.00000		0.00000	0.62062	0.00000	26.61815	**2.3**	27.23877
2.4	28.8	28.8	0.00000		0.00000	0.00000		0.00000	0.63421	0.00000	31.76192	**2.4**	32.39612
2.5	30.0	30.0	0.00000		0.00000	0.00000		0.00000	0.64751	0.00000	37.20000	**2.5**	37.84751

Post Development Detention Basin Stage Storage Discharge Input

Storage Unit Basin_7

Property	Value
Name	Basin_7
X-Coordinate	-1546.983
Y-Coordinate	5809.773
Description	
Tag	
Inflows	NO
Treatment	NO
Invert El.	482
Max. Depth	0
Initial Depth	0
Ponded Area	0
Evap. Factor	0
Seepage Loss	NO
Storage Curve	TABULAR
Functional Curve	
Coefficient	1000
Exponent	0
Constant	0
Tabular Curve	
Curve Name	Basin_7

Storage Curve Editor

Curve Name: Basin_7

Description:

	Depth (ft)	Area (ft2)
1	0	18144.2
2	0.5	19295.3
3	1	20470.7
4	1.5	21670.1
5		
6		
7		
8		
9		
10		
11		

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Rating Curve Editor

Curve Name: Outlet_7

Description:

	Head (ft)	Outflow (CFS)
1	0	0.00000
2	0.1	0.09988
3	0.2	0.16441
4	0.3	0.20996
5	0.4	0.24726
6	0.5	0.27963
7	0.6	0.30862
8	0.7	0.33511
9	0.8	0.35966
10	0.9	0.38263
11	1	0.40430
12	1.1	0.42487
13	1.2	0.44449
14	1.3	0.46328
15	1.4	0.48133
16	1.5	0.49873
17	1.6	1.49585
18	1.7	3.30455
19	1.8	5.64145
20	1.9	8.40543
21	2	11.53808
22	2.1	15.00000

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ATTACHMENT 3
STRUCTURAL BMP MAINTENANCE INFORMATION

This is the cover sheet for Attachment 3.

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Project Name: **Sunroad Otay**

Indicate which Items are Included:

Attachment Sequence	Contents	Checklist
Attachment 3a	Structural BMP Maintenance Thresholds and Actions (Required)	☒ Included See Structural BMP Maintenance Information Checklist.
Attachment 3b	Maintenance Agreement (Form DS-3247) (when applicable)	○ Included ◉ Not Applicable

Project Name: **Sunroad Otay**

Use this checklist to ensure the required information has been included in the Structural BMP Maintenance Information Attachment:

Preliminary Design / Planning / CEQA level submittal:

- Attachment 3a must identify:
  - ☐ Typical maintenance indicators and actions for proposed structural BMP(s) based on Section 7.7 of the BMP Design Manual
- Attachment 3b is not required for preliminary design / planning / CEQA level submittal.

Final Design level submittal:

Attachment 3a must identify:

☒ Specific maintenance indicators and actions for proposed structural BMP(s). This shall be based on Section 7.7 of the BMP Design Manual and enhanced to reflect actual proposed components of the structural BMP(s)
☒ How to access the structural BMP(s) to inspect and perform maintenance
☒ Features that are provided to facilitate inspection (e.g., observation ports, cleanouts, silt posts, or other features that allow the inspector to view necessary components of the structural BMP and compare to maintenance thresholds)
☐ Manufacturer and part number for proprietary parts of structural BMP(s) when applicable
☒ Maintenance thresholds specific to the structural BMP(s), with a location-specific frame of reference (e.g., level of accumulated materials that triggers removal of the materials, to be identified based on viewing marks on silt posts or measured with a survey rod with respect to a fixed benchmark within the BMP)
☐ When applicable, frequency of bioretention soil media replacement
☒ Recommended equipment to perform maintenance
☒ When applicable, necessary special training or certification requirements for inspection and maintenance personnel such as confined space entry or hazardous waste management

Attachment 3b: For private entity operation and maintenance, Attachment 3b must include a Storm Water Management and Discharge Control Maintenance Agreement (Form DS-3247). The following information must be included in the exhibits attached to the maintenance agreement:

☐ Vicinity map
☐ Site design BMPs for which DCV reduction is claimed for meeting the pollutant control obligations.
☐ BMP and HMP location and dimensions
☐ BMP and HMP specifications/cross section/model
☐ Maintenance recommendations and frequency
☐ LID features such as (permeable paver and LS location, dim, SF).

THE CITY OF SAN DIEGO

RECORDING REQUESTED BY:

THE CITY OF SAN DIEGO

AND WHEN RECORDED MAIL TO:

Click or tap here to enter text.

Click or tap here to enter text.

Click or tap here to enter text.

(THIS SPACE IS FOR THE RECORDER'S USE ONLY)

STORM WATER MANAGEMENT AND DISCHARGE CONTROL MAINTENANCE AGREEMENT

APPROVAL NUMBER:	ASSESSOR'S PARCEL NUMBER:	PROJECT NUMBER:
Click or tap here to enter text.	646-290-04, 08, 17, 18, 19, 24, 25, 26, 27, 29, 31	538140

This agreement is made by and between the City of San Diego, a municipal corporation [City] and
Craig Bachman

the owner or duly authorized representative of the owner [Property Owner] of property located at:
Otay Mesa Road at Piper Ranch Road, San Diego, CA 92154

(PROPERTY ADDRESS)

and more particularly described as: Lots 4 and 8 of Sunroad Otay Park I, in the the City of San Diego, County of San San Diego, State of California, according to Map thereof No. 14023, filed in the Office of the County Recorder of San Diego August 25, 2000. Parcel 1 through 8, inclusive, or Parcel Map No. 18959, in the City of San Diego, County of San Diego, State of California, according to map thereof filed in the office of the County Recorder of San Diego County, May 9, 2002. Parcels 1 and 2 of Parcel map 18483, in the City of San Diego, County of San Diego, State of California, according to map thereof filed in the office of the County Recorder of San Diego County on June 1, 2000.

Property Owner is required pursuant to the City of San Diego Municipal Code, Chapter 4, Article 3, Division 3, Chapter 14, Article 2, Division 2, and the Land Development Manual, Storm Water Standards to enter into a Storm Water Management and Discharge Control Maintenance Agreement [Maintenance Agreement] for the installation and maintenance of Permanent Storm Water Best Management Practices [Permanent Storm Water BMP's] prior to the issuance of construction permits. The Maintenance Agreement is intended to ensure the establishment and maintenance of Permanent Storm Water BMP's onsite, as described in the attached exhibit(s), the project's Storm Water Quality Management Plan [SWQMP] and Grading and/or Improvement Plan Drawing No(s), or Building Plan Project No(s): Click or tap here to enter text.

Property Owner wishes to obtain a building or engineering permit according to the Grading and/or Improvement Plan Drawing No(s) or Building Plan Project No(s): Click or tap here to enter text.

Continued on Page 2

NOW, THEREFORE, the parties agree as follows:

1. Property Owner shall have prepared, or if qualified, shall prepare an Operation and Maintenance Procedure [OMP] for Permanent Storm Water BMP's, satisfactory to the City, according to the attached exhibit(s), consistent with the Grading and/or Improvement Plan Drawing No(s), or Building Plan Project No(s):538140.

2. Property Owner shall install, maintain and repair or replace all Permanent Storm Water BMP's within their property, according to the OMP guidelines as described in the attached exhibit(s), the project's WQTR and Grading and/or Improvement Plan Drawing No(s), or Building Plan Project No(s)538140.

3. Property Owner shall maintain operation and maintenance records for at least five (5) years. These records shall be made available to the City for inspection upon request at any time.

This Maintenance Agreement shall commence upon execution of this document by all parties named hereon, and shall run with the land.

Executed by the City of San Diego and by Property Owner in San Diego, California.

See Attached Exhibits(s):DMA Exhibit

(Owner Signature)

Craig Bachman

(Print Name and Title)

Sunroad Otay Partners, LP

(Company/Organization Name)

Click or tap to enter a date.

(Date)

THE CITY OF SAN DIEGO

APPROVED:

(City Control engineer Signature

(Print Name)

(Date)

NOTE: ALL SIGNATURES MUST INCLUDE NOTARY ACKNOWLEDMENTS PER CIVIL CODE SEC. 1180 ET.SEQ

Table 7-2. Maintenance Indicators and Actions for Vegetated BMPs

Typical Maintenance Indicator(s) for Vegetated BMPs	Maintenance Actions
Accumulation of sediment, litter, or debris	Remove and properly dispose of accumulated materials, without damage to the vegetation.
Poor vegetation establishment	Re-seed, re-plant, or re-establish vegetation per original plans.
Overgrown vegetation	Mow or trim as appropriate, but not less than the design height of the vegetation per original plans when applicable (e.g. a vegetated swale may require a minimum vegetation height).
Erosion due to concentrated irrigation flow	Repair/re-seed/re-plant eroded areas and adjust the irrigation system.
Erosion due to concentrated storm water runoff flow	Repair/re-seed/re-plant eroded areas, and make appropriate corrective measures such as adding erosion control blankets, adding stone at flow entry points, or minor re-grading to restore proper drainage according to the original plan. If the issue is not corrected by restoring the BMP to the original plan and grade, the City Engineer shall be contacted prior to any additional repairs or reconstruction.
Standing water in vegetated swales	Make appropriate corrective measures such as adjusting irrigation system, removing obstructions of debris or invasive vegetation, loosening or replacing top soil to allow for better infiltration, or minor re-grading for proper drainage. If the issue is not corrected by restoring the BMP to the original plan and grade, the City Engineer shall be contacted prior to any additional repairs or reconstruction.
Standing water in bioretention, biofiltration with partial retention, or biofiltration areas, or flow-through planter boxes for longer than 96 hours following a storm event*	Make appropriate corrective measures such as adjusting irrigation system, removing obstructions of debris or invasive vegetation, clearing underdrains (where applicable), or repairing/replacing clogged or compacted soils.
Obstructed inlet or outlet structure	Clear obstructions.
Damage to structural components such as weirs, inlet or outlet structures	Repair or replace as applicable.
*These BMPs typically include a surface ponding layer as part of their function which may take 96 hours to drain following a storm event.	

E.12. PR-1 Biofiltration with Partial Retention

Location: 805 and Bonita Road, Chula Vista, CA.

MS4 Permit Category

NA

Manual Category

Partial Retention

Applicable Performance Standard

Pollutant Control
Flow Control

Primary Benefits

Volume Reduction
Treatment
Peak Flow Attenuation

Description

Biofiltration with partial retention (partial infiltration and biofiltration) facilities are vegetated surface water systems that filter water through vegetation, and soil or engineered media prior to infiltrating into native soils, discharge via underdrain, or overflow to the downstream conveyance system. Where feasible, these BMPs have an elevated underdrain discharge point that creates storage capacity in the aggregate storage layer. Biofiltration with partial retention facilities are commonly incorporated into the site within parking lot landscaping, along roadsides, and in open spaces. They can be constructed in ground or partially aboveground, such as planter boxes with open bottoms to allow infiltration. Treatment is achieved through filtration, sedimentation, sorption, infiltration, biochemical processes and plant uptake.

Typical biofiltration with partial retention components include:

- Inflow distribution mechanisms (e.g, perimeter flow spreader or filter strips)
- Energy dissipation mechanism for concentrated inflows (e.g., splash blocks or riprap)
- Shallow surface ponding for captured flows
- Side Slope and basin bottom vegetation selected based on climate and ponding depth
- Non-floating mulch layer
- Media layer (planting mix or engineered media) capable of supporting vegetation growth
- Filter course layer (aka choking layer) consisting of aggregate to prevent the migration of fines into uncompacted native soils or the optional aggregate storage layer
- Aggregate storage layer with underdrain(s)
- Uncompacted native soils at the bottom of the facility
- Overflow structure

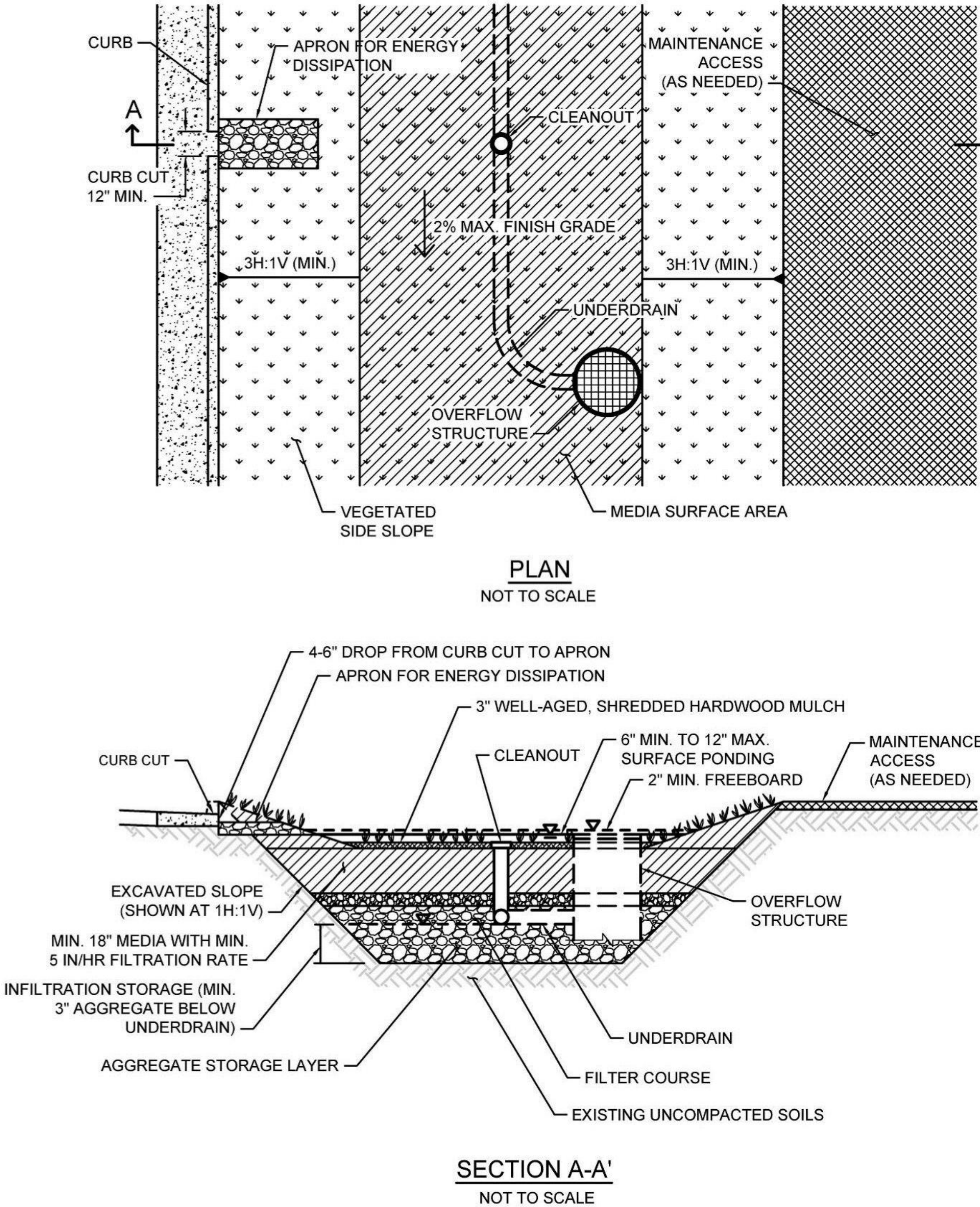


Figure E.12-E.12-1: Typical plan and Section view of a Biofiltration with Partial Retention BMP

Design Adaptations for Project Goals

Partial infiltration BMP with biofiltration treatment for storm water pollutant control. Biofiltration with partial retention can be designed so that a portion of the DCV is infiltrated by providing infiltration storage below the underdrain invert. The infiltration storage depth should be determined by the volume that can be reliably infiltrated within drawdown time limitations. Water discharged through the underdrain is considered biofiltration treatment. Storage provided above the underdrain within surface ponding, media, and aggregate storage is included in the biofiltration treatment volume.

Integrated storm water flow control and pollutant control configuration. The system can be designed to provide flow rate and duration control by primarily providing increased surface ponding and/or having a deeper aggregate storage layer. This will allow for significant detention storage, which can be controlled via inclusion of an orifice in an outlet structure at the downstream end of the underdrain.

Design Criteria and Considerations

Biofiltration with partial retention must meet the following design criteria and considerations. Deviations from the below criteria may be approved at the discretion of the City Engineer if it is determined to be appropriate:

	Siting and Design	Intent/Rationale
☐	Placement observes geotechnical recommendations regarding potential hazards (e.g., slope stability, landslides, liquefaction zones) and setbacks (e.g., slopes, foundations, utilities).	Must not negatively impact existing site geotechnical concerns.
☐	Selection and design of basin is based on infiltration feasibility criteria and appropriate design infiltration rate (See Appendix C and D).	Must operate as a partial infiltration design and must be supported by drainage area and in-situ infiltration rate feasibility findings.
☐	Contributing tributary area shall be ≤ 5 acres (≤ 1 acre preferred).	Bigger BMPs require additional design features for proper performance. Contributing tributary area greater than 5 acres may be allowed at the discretion of the City Engineer if the following conditions are met: 1) incorporate design features (e.g. flow spreaders) to minimizing short circuiting of flows in the BMP and 2) incorporate additional design features requested by the City Engineer for proper performance of the regional BMP.
☐	Finish grade of the facility is ≤ 2%.	Flatter surfaces reduce erosion and channelization within the facility.
Surface Ponding		
☐	Surface ponding is limited to a 24-hour drawdown time.	Surface ponding limited to 24 hours for plant health. Surface ponding drawdown time greater than 24-hours but less than 96 hours may be allowed at the discretion of the City Engineer if certified by a landscape architect or agronomist.

City of San Diego
TRANSPORTATION & STORM WATER

	Siting and Design	Intent/Rationale
☐	Surface ponding depth is ≥ 6 and ≤ 12 inches.	Surface ponding capacity lowers subsurface storage requirements. Deep surface ponding raises safety concerns. Surface ponding depth greater than 12 inches (for additional pollutant control or surface outlet structures or flow-control orifices) may be allowed at the discretion of the City Engineer if the following conditions are met: 1) surface ponding depth drawdown time is less than 24 hours; and 2) safety issues and fencing requirements are considered (typically ponding greater than 18" will require a fence and/or flatter side slopes) and 3) potential for elevated clogging risk is considered.
☐	A minimum of 2 inches of freeboard is provided.	Freeboard provides room for head over overflow structures and minimizes risk of uncontrolled surface discharge.
☐	Side slopes are stabilized with vegetation and are = 3H:1V or shallower.	Gentler side slopes are safer, less prone to erosion, able to establish vegetation more quickly and easier to maintain.
Vegetation		
☐	Plantings are suitable for the climate and expected ponding depth. A plant list to aid in selection can be found in Appendix E.20	Plants suited to the climate and ponding depth are more likely to survive.
☐	An irrigation system with a connection to water supply should be provided as needed.	Seasonal irrigation might be needed to keep plants healthy.
Mulch (Mandatory)		
☐	A minimum of 3 inches of well-aged, shredded hardwood mulch that has been stockpiled or stored for at least 12 months is provided. Mulch must be non-floating to avoid clogging of overflow structure.	Mulch will suppress weeds and maintain moisture for plant growth. Aging mulch kills pathogens and weed seeds and allows the beneficial microbes to multiply.
Media Layer		

	Siting and Design	Intent/Rationale
☐	Media maintains a minimum filtration rate of 5 in/hr over lifetime of facility. Additional Criteria for media hydraulic conductivity described in the bioretention soil media model specification (Appendix F.4)	A filtration rate of at least 5 inches per hour allows soil to drain between events, and allows flows to relatively quickly enter the aggregate storage layer, thereby minimizing bypass. The initial rate should be higher than long term target rate to account for clogging over time. However an excessively high initial rate can have a negative impact on treatment performance, therefore an upper limit is needed.
☐	Media is a minimum 18 inches deep, meeting the following media specifications: Model bioretention soil media specification provided in Appendix F.4 or County of San Diego Low Impact Development Handbook: Appendix G - Bioretention Soil Specification (June 2014, unless superseded by more recent edition). Alternatively, for proprietary designs and custom media mixes not meeting the media specifications, the media meets the pollutant treatment performance criteria in Section F.1.	A deep media layer provides additional filtration and supports plants with deeper roots. Standard specifications shall be followed. For non-standard or proprietary designs, compliance with Appendix F.1 ensures that adequate treatment performance will be provided.
☐	Media surface area is 3% of contributing area times adjusted runoff factor or greater. Unless demonstrated that the BMP surface area can be smaller than 3%.	Greater surface area to tributary area ratios: a) maximizes volume retention as required by the MS4 Permit and b) decrease loading rates per square foot and therefore increase longevity. Adjusted runoff factor is to account for site design BMPs implemented upstream of the BMP (such as rain barrels, impervious area dispersion, etc.). Refer to Appendix B.2 guidance. Use Worksheet B.5-1 Line 26 to estimate the minimum surface area required per this criteria.
☐	Where receiving waters are impaired or have a TMDL for nutrients, the system is designed with nutrient sensitive media design (see fact sheet BF-2).	Potential for pollutant export is partly a function of media composition; media design must minimize potential for export of nutrients, particularly where receiving waters are impaired for nutrients.
Filter Course Layer		

	Siting and Design	Intent/Rationale
☐	A filter course is used to prevent migration of fines through layers of the facility. Filter fabric is not used.	Migration of media can cause clogging of the aggregate storage layer void spaces or subgrade and can result in poor water quality performance for turbidity and suspended solids. Filter fabric is more likely to clog.
☐	Filter course is washed and free of fines.	Washing aggregate will help eliminate fines that could clog the facility
☐	To reduce clogging potential, a two-layer filter course (aka choking stone system) is used consisting of one 3" layer of clean and washed ASTM 33 Fine Aggregate Sand overlying a 3" layer of ASTM No 8 Stone (Appendix F.5)	This specification has been developed to maintain permeability while limiting the migration of media material into the stone reservoir and underdrain system.
Aggregate Storage Layer		
☐	ASTM #57 open graded stone is used for the storage layer and a two layer filter course (detailed above) is used above this layer	This layer provides additional storage capacity. ASTM #8 stone provides an acceptable choking/bridging interface with the particles in ASTM #57 stone.
☐	Maximum aggregate storage layer depth below the underdrain invert is determined based on the infiltration storage volume that will infiltrate within a 36-hour drawdown time.	A maximum drawdown time is needed for vector control and to facilitate providing storm water storage for the next storm event.
Inflow, Underdrain, and Outflow Structures		
☐	Inflow, underdrains and outflow structures are accessible for inspection and maintenance.	Maintenance will prevent clogging and ensure proper operation of the flow control structures.
☐	Inflow velocities are limited to 3 ft/s or less or use energy dissipation methods. (e.g., riprap, level spreader) for concentrated inflows.	High inflow velocities can cause erosion, scour and/or channeling.
☐	Curb cut inlets are at least 12 inches wide, have a 4-6 inch reveal (drop) and an apron and energy dissipation as needed.	Inlets must not restrict flow and apron prevents blockage from vegetation as it grows in. Energy dissipation prevents erosion.
☐	Underdrain outlet elevation should be a minimum of 3 inches above the bottom elevation of the aggregate storage layer.	A minimal separation from subgrade or the liner lessens the risk of fines entering the underdrain and can improve hydraulic performance by allowing perforations to remain unblocked.
☐	Minimum underdrain diameter is 8 inches.	Smaller diameter underdrains are prone to clogging.

	Siting and Design	Intent/Rationale
☐	Underdrains should be affixed with an upturned elbow to an elevation at least 9 to 12 inches above the invert of the underdrain.	An upturned elbow reduces velocity in the underdrain pipe and can help reduce mobilization of sediments from the underdrain and media bed.
☐	Underdrains are made of slotted, PVC pipe conforming to ASTM D 3034 or equivalent or corrugated, HDPE pipe conforming to AASHTO 252M or equivalent.	Slotted underdrains provide greater intake capacity, clog resistant drainage, and reduced entrance velocity into the pipe, thereby reducing the chances of solids migration.
☐	An underdrain cleanout with a minimum 8-inch diameter and lockable cap is placed every 50 feet as required based on underdrain length.	Properly spaced cleanouts will facilitate underdrain maintenance.
☐	Overflow is safely conveyed to a downstream storm drain system or discharge point. Size overflow structure to pass 100-year peak flow for on-line infiltration basins and water quality peak flow for off-line basins.	Planning for overflow lessens the risk of property damage due to flooding.

Conceptual Design and Sizing Approach for Storm Water Pollutant Control Only

To design biofiltration with partial retention and an underdrain for storm water pollutant control only (no flow control required), the following steps should be taken:

1. Verify that siting and design criteria have been met, including placement requirements, contributing tributary area, maximum side and finish grade slopes, and the recommended media surface area tributary ratio.
2. Calculate the DCV per Appendix B based on expected site design runoff for tributary areas.
3. Generalized sizing procedure is presented in Appendix B.5. The surface ponding should be verified to have a maximum 24-hour drawdown time. Surface ponding drawdown time greater than 24-hours but less than 96 hours may be allowed at the discretion of the City Engineer if certified by a landscape architect or agronomist.

Conceptual Design and Sizing Approach when Storm Water Flow Control is Applicable

Control of flow rates and/or durations will typically require significant surface ponding and/or aggregate storage volumes, and therefore the following steps should be taken prior to determination of storm water pollutant control design. Pre-development and allowable post-project flow rates and durations should be determined as discussed in Chapter 6 of the manual.

1. Verify that siting and design criteria have been met, including placement requirements, contributing tributary area, maximum side and finish grade slopes, and the recommended media surface area tributary ratio.
2. Iteratively determine the facility footprint area, surface ponding and/or aggregate storage layer depth required to provide detention and/or infiltration storage to reduce flow rates and durations to allowable limits. Flow rates and durations can be controlled from detention

storage by altering outlet structure orifice size(s) and/or water control levels. Multi-level orifices can be used within an outlet structure to control the full range of flows.

3. If biofiltration with partial retention cannot fully provide the flow rate and duration control required by this manual, an upstream or downstream structure with significant storage volume such as an underground vault can be used to provide remaining controls.
4. After biofiltration with partial retention has been designed to meet flow control requirements, calculations must be completed to verify if storm water pollutant control requirements to treat the DCV have been met.

Storm Drain Signage SD-13

Design Objectives

- Maximize Infiltration
- Provide Retention
- Slow Runoff
- Minimize Impervious Land Coverage
- ☑ Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

Description

Waste materials dumped into storm drain inlets can have severe impacts on receiving and ground waters. Posting notices regarding discharge prohibitions at storm drain inlets can prevent waste dumping. Storm drain signs and stencils are highly visible source controls that are typically placed directly adjacent to storm drain inlets.

Approach

The stencil or affixed sign contains a brief statement that prohibits dumping of improper materials into the urban runoff conveyance system. Storm drain messages have become a popular method of alerting the public about the effects of and the prohibitions against waste disposal.

Suitable Applications

Stencils and signs alert the public to the destination of pollutants discharged to the storm drain. Signs are appropriate in residential, commercial, and industrial areas, as well as any other area where contributions or dumping to storm drains is likely.

Design Considerations

Storm drain message markers or placards are recommended at all storm drain inlets within the boundary of a development project. The marker should be placed in clear sight facing toward anyone approaching the inlet from either side. All storm drain inlet locations should be identified on the development site map.

Designing New Installations

The following methods should be considered for inclusion in the project design and show on project plans:

- Provide stenciling or labeling of all storm drain inlets and catch basins, constructed or modified, within the project area with prohibitive language. Examples include "NO DUMPING

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

– DRAINS TO OCEAN" and/or other graphical icons to discourage illegal dumping.

- Post signs with prohibitive language and/or graphical icons, which prohibit illegal dumping at public access points along channels and creeks within the project area.

Note - Some local agencies have approved specific signage and/or storm drain message placards for use. Consult local agency stormwater staff to determine specific requirements for placard types and methods of application.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. If the project meets the definition of "redevelopment", then the requirements stated under " designing new installations" above should be included in all project design plans.

Additional Information

Maintenance Considerations

- Legibility of markers and signs should be maintained. If required by the agency with jurisdiction over the project, the owner/operator or homeowner's association should enter into a maintenance agreement with the agency or record a deed restriction upon the property title to maintain the legibility of placards or signs.

Placement

- Signage on top of curbs tends to weather and fade.

- Signage on face of curbs tends to be worn by contact with vehicle tires and sweeper brooms.

Supplemental Information

Examples

- Most MS4 programs have storm drain signage programs. Some MS4 programs will provide stencils, or arrange for volunteers to stencil storm drains as part of their outreach program.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

PESTICIDES: SAFE AND EFFECTIVE USE IN THE HOME AND LANDSCAPE

Integrated Pest Management for Home Gardeners and Landscape Professionals

Pesticides are designed to be toxic to the pests they target—whether they are insects, cause plant disease, or are weeds or other unwanted home and garden invaders. When used properly, pesticides can protect your plants or home from damage. However, when the label instructions are not followed correctly, plant injury may occur, pests may not be controlled, health may be impaired, and pesticides may contribute to soil, air, or water pollution.

Before you purchase and use a pesticide, learn all you can about the material, how to use it, and how to properly dispose of the empty containers. Also, carefully consider whether or not a pesticide is necessary and if a nonchemical solution might be just as effective.

DEFINITION OF A PESTICIDE

A pesticide is any material (natural, organic, or synthetic) used to control, prevent, kill, suppress, or repel pests. "Pesticide" is a broad term that includes insecticides (insect killers), herbicides (weed or plant killers), fungicides (fungus killers), rodenticides (rodent killers), growth regulators, and other materials like miticides, which are used for mite control, or products that kill snails and slugs (molluscicides).

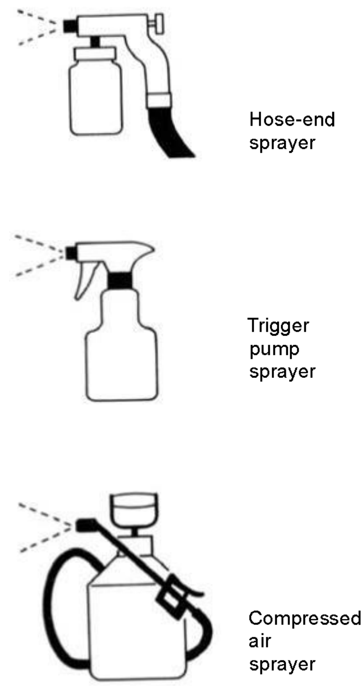
DECIDING TO USE A PESTICIDE

Before using any pesticide, be sure you need it. Verify that the organism you seek to control is really causing lasting damage, and research alternative management methods. Keep in mind that most pests cannot be entirely eliminated—even with pesticides. Some questions to ask before choosing to use a pesticide include:

Is a pest really the cause of your problem? More often than most people imagine, pesticide products are applied unnecessarily because the cause of damage has been misidentified. Damage can also be the result of other factors such as incorrect irrigation, poor drainage, herbicide toxicity, or physical damage.

How many pests are there and will a pesticide spray be justified? A few caterpillars on a plant might not be a problem that requires any pesticide action on your part, especially if natural enemies of the caterpillars are present. However, a very high population causing severe leaf loss or damage to edible fruits or nuts may mean you would want to control the pest. Be sure to base decisions on presence of pests—not damage levels—and on your knowledge of the pest's life cycle. For instance, often by the time a tree is defoliated (stripped of leaves), pests are gone and sprays will be of no use. In the case of foliar diseases, many fungicides must be applied preventatively before symptoms are noticeable.

Can you change the conditions which have caused the pest to become a problem? Prevention is always the best way to manage a pest problem. Will the conditions change due to the weather or other environmental factors? Is the problem due to gardening practices that can be changed? Each specific pest organism has optimum environmental conditions for causing damage. For instance, powdery mildew in many plants is favored by shade and conditions that favor off-season growth. Sometimes providing plants with a sunny location, opening up canopies to provide air circulation, and avoiding excessive fertilizing will keep the disease from becoming serious. Overhead sprinkling may also reduce powdery mildew problems on some plants.



Common types of home garden pesticide application equipment.

Other than a pesticide, what else might work? There are many ways to manage pests other than pesticides including:

- *Cultural control* (using the right pruning, fertilizing or watering regime, or selecting pest-resistant varieties or species)
- *Physical control* (for example, using mulches to keep weeds from growing, or solarization for soilborne pathogens or weed seeds)
- *Mechanical control* (hoeing weeds, spraying leaves forcefully with water to remove insects, or using traps or creating barriers to exclude pests)

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April 2006

- *Biological control* (using beneficial organisms such as insects that eat or parasitize other insects)

- *Replant* (in extreme cases, where a plant requires regular pesticide treatment, consider replanting with a more pest-resistant species or variety)

If you decide to use a pesticide, use it in an integrated pest management (IPM) program that includes use of non-chemical methods. In almost all cases, a combination of measures will provide the most satisfactory and long-term pest control.

CHOOSING THE RIGHT PESTICIDE

The first step in choosing a pesticide is to accurately identify the organism (e.g., the specific insect, weed, or plant disease) that is causing the problem. If the pest is misidentified, you will not be able to choose an effective pesticide or other management strategy. If you aren't confident that you can do this using your own experience, get help from your University of California Cooperative Extension office or other reliable source. Use the plant problem-solving tables in the back of University of California Agriculture and Natural Resources publications, *Pests of the Garden and Small Farm* and *Pests of Landscape Trees and Shrubs* to identify major pests on most common garden plants.

If a pesticide is needed, select one that is effective against your pest and also poses the least risks to human health and the environment. A good source of information for identifying effective, least-toxic methods and pesticides for use against specific pests is the University of California (UC) *Pest Notes* series available at UC Cooperative Extension offices or on the UC Statewide IPM Program Website (www.ipm.ucdavis.edu). When shopping for a pesticide, it is important to consult the label to be sure the target pest and site is listed. However, don't use a label as your primary source for selecting the best control product. In addition to pests that are effectively controlled, pesticide labels often picture or list pests against which the product is only marginally effective. Getting information from University publications, UC Cooperative Extension offices, or other knowledgeable experts is a better strategy.

Before purchasing a pesticide, also check the label to be sure it is appropriate to use on your plants or treatment site. For instance:

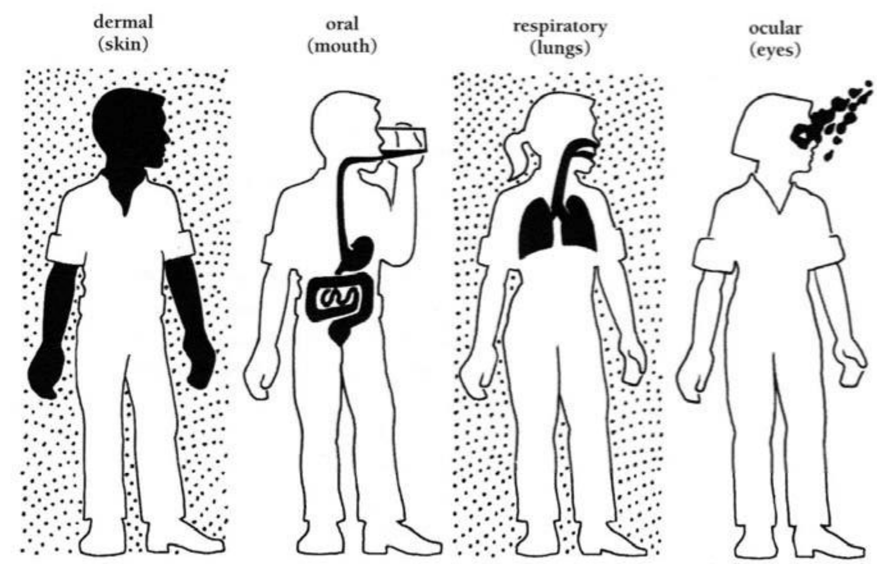
- Be sure the particular type of plant or site you plan to treat is listed on the label.
- Do not use pesticides labeled for use on ornamental plants on plants that will be eaten.
- Never use pesticides labeled for "outdoor use only" indoors.
- Pesticides can seriously damage some plants; read the label to be sure treated plants won't be injured.

Finally, when choosing pesticides, remember that most pesticides (even the more toxic ones) only control certain stages of the pest. Many insecticides kill only the larval (e.g., caterpillars) stage, not the eggs or pupae. Other insecticides target only adults. Many fungicides are preventive treatments and will not eliminate infections that have already started, although they may slow their spread. Likewise, some herbicides (preemergence herbicides) kill germinating weeds but not established ones, while others (postemergence herbicides) are effective against actively growing weeds.

LEAST TOXIC ALTERNATIVES

Choose the least toxic pesticide that will solve your problem. Least-toxic alternatives are usually suggested in the UC IPM *Pest Notes*. Examples of least-toxic insecticides include insecticidal petroleum or plant-based oils, soaps, and the microbial insecticide *Bacillus thuringiensis.*

Pesticides are used because they kill or control the target pest. "Selective" pesticides kill only a few closely related organisms. Others are broader spectrum, killing a range of pests but also nontarget organisms. Most pesticides are not without some negative impacts on the environment. For instance, some insecticides with low toxicity to people may have high toxicity to beneficial insects like parasitic wasps or other desirable organisms like honey bees, earthworms, or aquatic invertebrates. Most herbicides selectively kill some weeds, but



The most common ways for pesticide exposure to occur are through the skin (dermal), through the mouth (oral), through the lungs (respiratory), and through the eyes (ocular).

can also kill desirable garden plants if not used properly. Pesticide persistence—or how long it remains toxic in the environment—is also a factor in the safety of pesticides. Pesticides that break down rapidly usually have less negative impact on the environment, but are more difficult to use. Because they don't leave toxic residues that will kill pests arriving hours or days after the application, they must be applied precisely when the vulnerable stage of the pest is present.

The signal words Danger, Warning, or Caution on a pesticide label indicate the immediate toxicity of a single exposure of a product to humans. Over the years, these words have been the consumer's primary guide to relative safety of products. However, signal words do not give an indication of potential for causing chronic problems (e.g., cancer, reproductive problems or other long-term health effects). They also do not reflect potential hazards for wildlife, beneficial insects and many other nontarget organisms. However, most home and garden products are relatively safe and unlikely to cause injury to people if label directions are carefully followed. Precautionary statements on labels give additional information on harmful effects or additional safeguards that should be taken. For more information on hazards of specific pesticides, review the Material Safety Data Sheets (MSDS) available from the pesticide manufacturer or online see the National Pesticide Information Center: http://npic.orst.edu/gen.htm or telephone 800-858-7378.

PESTICIDE APPLICATION EQUIPMENT

Read the pesticide label carefully and be sure that you have the proper equipment for applying it safely. You will need protective clothing to protect yourself from exposure even when applying the safest pesticides. Minimally, protective gear should include rubber gloves, eye protection, a long-sleeved shirt, long pants, and closed shoes. Avoid using cotton gloves or lightweight dust masks that may absorb the spray and result in prolonged contact with your skin. Read the pesticide label carefully for additional protective requirements.

Required equipment varies according to your application site, your choice of pesticide, and your willingness to work with more complicated application devices. For many home and garden pesticide applications, the best choice is to purchase a ready-to-use product in a trigger pump type of sprayer. Ready-to-use products eliminate the need to dilute and mix pesticides or purchase special equipment and are excellent for spot treatments on small plants and shrubs. At the other end of the spectrum are compressed air sprayers, which require careful maintenance and operation as well as precise mixing of chemicals.

If you mix your own pesticides, keep a set of measuring spoons or cups for use *only* with pesticides. It is a good idea to write "PESTICIDE ONLY" on them to distinguish them from your kitchen utensils, and keep them well away from food preparation areas. A locked storage cabinet in a garden shed, garage, or well-ventilated utility area is the best place to store pesticides and equipment you use to mix or apply pesticides. If you are spraying for weed control, keep a sprayer specifically for that purpose and label it "WEEDS ONLY." Otherwise, herbicide residue in the sprayer may injure plants if the same sprayer is used for applying another type of pesticide or fertilizer.

Take a shower as soon after application as possible. Wash clothing separately from other laundry. Never smoke, drink, eat, or use the bathroom after pesticide application without washing first.

Measuring and Diluting Pesticide Concentrates

Properly measuring concentrated formulations of pesticides is essential for their effective and safe use. The application rate for most insecticides and fungicides is given on the label in ounces per gallon of water used in the spray applicator. It is essential that you follow these procedures properly and

Always Read the Pesticide Label.

Important information regarding the pesticide can be found on the product's label. The label is a legal document required for every pesticide registered in the United States. The U.S. Environmental Protection Agency must approve the label. Always keep the product in the original package. Some of the information that is contained on the label includes:

✓ Trade name or brand name
✓ Active ingredients and their percentage by weight
✓ Types of plants or sites where pesticide may be used
✓ Pests targeted
✓ How much to use
✓ How and when to apply
✓ Required protective clothing and equipment
✓ Signal word defining short-term toxicity to people (DANGER, WARNING, or CAUTION)
✓ Precautionary statements defining hazards to people, domestic animals, or the environment
✓ Emergency and first aid measures to take if someone has been exposed
✓ How to properly store and dispose of the pesticide and empty containers

Active Ingredient
Glyphosphate, isopropylamine salt........2.0%
Other Ingredients.................................98.0%

KEEP OUT OF REACH OF CHILDREN

CAUTION

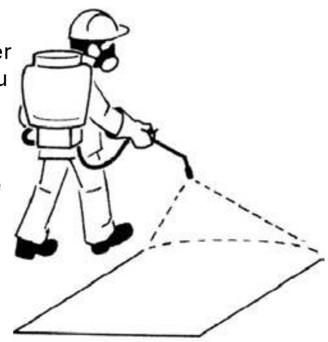
See back panel for additional precautionary statements.

NET CONTENTS 32 FL OZ

(1QT) 946mL

Sidebar 1. How to Dilute an Herbicide.

For most herbicides, the application rate is stated in ounces per 100 square feet or 1000 square feet, so you need to know how large an area you are treating in order to determine the amount of product to use. Suppose you are trying to kill weeds in your lawn and the herbicide label states "use 2 oz. per 1000 square feet." After measuring, you find your lawn is only 600 square feet. Therefore, you would use (600 square feet/1000 square feet) x 2 oz. = 0.6 x 2 oz. = 1.2 oz. of herbicide to treat the entire lawn.



You also must calculate how much water you need to add to your sprayer. Insecticide and fungicide labels and many herbicide labels tell you how much water to add to dilute your spray. If a certain volume of water is not listed, you can determine how much you need by spraying a small area with the sprayer and a known quantity of clean water. Then divide by the fraction of the area where you plan to apply the herbicide. For example, if you found out that one quart of water covered 100 square feet, you can assume you will need 6 quarts to cover 600 square feet. Mix your 1.2 oz of herbicide in 6 quarts of water.

dilute and apply materials as required. For herbicides and some uses of insecticides and fungicides (such as applications on lawns), the label will indicate the amount of pesticide to use for a given area. In these cases, you'll need to measure the area you are treating to calculate how much to mix up. See Sidebar 1. How to Dilute an Herbicide.

Remember, if the label specifies a dilution rate, you need to follow the label directions precisely. Before mixing up your pesticide, test out your sprayer with water to assure you will cover the recommended area with the recommended amount of diluted spray. If not, you will need to adjust your application rate accordingly by walking or spraying slower or faster.

Insecticide or fungicide directions for fruit or ornamental trees often don't specify areas in square feet to be treated. They often say something such as "wet plants to dripping point, thoroughly cover both sides of leaves". For these applications or for spot treatments, it is also a good idea to test out your sprayer with water to see how much spray you need to cover a fruit or ornamental tree or other area. That way you'll know how much product to mix up.

Never use more than what the directions recommend. The pest will not be controlled any faster and you will be wasting the pesticide, your time, and money while potentially causing plant injury and contaminating the environment with excess chemicals. Mix up only as much as you need immediately; don't store leftover pesticide solutions. They may be susceptible to quality changes at high or very low temperatures or by settling out.

Minimizing Environmental Contamination

Use spot treatments where the pest is most prevalent; avoid widespread applications of the pesticide throughout your garden or home. For spot treatments, mix the pesticide according to label instructions, and apply the mixture only to the affected area. Bait stations for ants, wick or shielded applicators for some herbicides, and tree trunk treatments for certain insects are other ways of limiting environmental exposure.

Be sure pesticides are properly applied to the target plant or site and can't move onto other plants or areas. Pesticides can easily move off target with wind. Do not spray during windy conditions when pesticides can be carried into areas where they aren't needed or wanted. Be sure the application does not run off or blow into drains, creeks, or other water bodies so you can prevent contamination of water supplies. Avoid applying chemicals just before irrigation or rainy weather, unless labels specify post-application irrigation. Also avoid applying pesticides to hard surfaces such as sidewalks, driveways, and foundations, because they can easily be washed off and go into storm drains.

Follow the guidelines for protecting environmental quality and keeping pesticides out of our waterways.

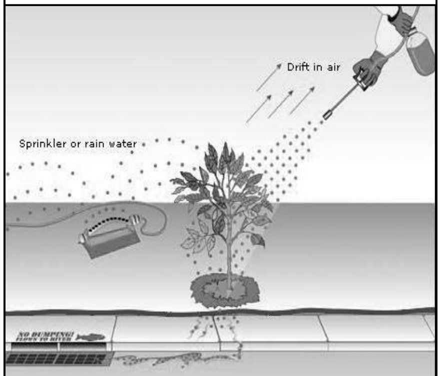
Disposing of Leftover Pesticides

Try to purchase only as much pesticide as you will use in the immediate future. This will eliminate the need to store the unused products. If you can't use up your pesticides in a timely manner, share them with a friend or neighbor who can use them, but always keep these materials in their original containers. Do not use an old soda bottle or anything that could be mistaken for a drink container. People have been poisoned and killed by inadvertently drinking from these containers. Don't dilute more pesticide than you can use right away. Diluted pesticide needs to be applied according to label directions to plants or sites listed on the label and at label rates until the spray tank is empty. Excess diluted pesticide should be disposed of at a household hazardous waste facility.

Do not dump excess, unwanted, or old material down the drain, onto the soil, or into open waterways, gutters, storm drains or sewers, or in the trash. The only legal way to dispose of pesticides is to take them to your local household hazardous waste disposal facility. In California, call the California Environmental Hotline 1-800-253-2687, to find the hazardous waste disposal site closest to you or check on-line at www.earth911.org.

Empty containers of concentrated home use pesticides in the possession of a homeowner on his/her property may

Keep Pesticides Out of Our Waterways by Following These Guidelines.



Pesticides applied in the garden can move off target by drifting in the air or washing off into storm drains or creeks.

✓ Be aware of weather patterns and do not apply pesticides just prior to rainfall or during windy conditions.

✓ Avoid applying pesticides to hard surfaces such as sidewalks or driveways, where they can easily be washed off.

✓ Check pesticide labels for warnings regarding use near bodies of water such as streams, rivers, and lakes.

✓ Never dispose of pesticides in storm drains, sinks, or toilets.

✓ Under no circumstances should pest control equipment be cleaned in a location where rinse water could flow into gutters, storm drains, or open waterways.

✓ Never apply more than the rate listed on a pesticide label.

✓ Be aware that some pesticides are more easily carried in surface runoff than others and therefore have a greater potential to move off site during irrigation or storms. The leaching and runoff risks of specific pesticides can be obtained from the UC IPM Website WaterTox database, www.ipm.ucdavis.edu/TOX/simplewatertox.html

be disposed of in the trash without rinsing. Empty containers of ready-to-use products may also be disposed of in the trash. Professionals who use concentrated liuquid pesticides must rinse the container three times before disposal. The best time to rinse is when you are using up the last remaining pesticide in the container. Add the remaining pesticide to the sprayer. Add water to the empty pesticide container, put the cap on, swirl the water around the container, and transfer the liquid to the spray tank. Repeat two times. If necessary, add more water to the spray tank to reach the correct concentration. This way, you will have rinsed the bottle three times and used the rinse water to make the pesticide application.

Don't pour unused rinse liquid down any drain or sewer or in the trash. Unused rinse liquid is considered hazardous waste and must be disposed of properly at a hazardous waste facility or as suggested above.

Indoor Versus Outdoor Pesticides

Use only pesticides specifically labeled for indoor use inside the house. Many outdoor pesticides are designed to break down into less toxic substances with ventilation and in the daylight and the rain. Without these conditions the pesticides may linger and cause toxic conditions for humans or pets.

Hiring a Pest Control Company

If you do not have the time or ability to research your pest problem and safely apply the appropriate material to control it, you may want to hire a pest control service to do the job for you. See the *Pest Note: Hiring a Pest Control Company* for information on how to select a contractor.

Licensed pesticide operators also have access to some products not available in retail stores. Many pest problems, such as termites or management of problems on large trees, require special pesticides or equipment and technical training for most effective management. Although professional services may be expensive, the investment may be worth it to solve a serious problem.

SUGGESTED READING

Flint, M. L. *Pests of the Garden and Small Farm.* 1998. Oakland: Univ. Calif. Div. Agric. Nat. Res. Publ. 3332.

Dreistadt, S. H. *Pests of Landscape Trees and Shrubs.* 2004. Oakland: Univ. Calif. Div. Agric. Nat. Res. Publ. 3359.

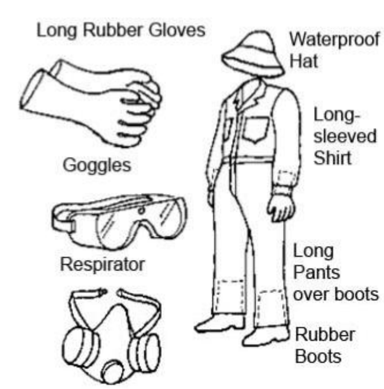
O'Connor-Marer, P. J. *Safe and Effective Use of Pesticides.* 2000. Oakland: Univ. Calif. Div. Agric. Nat. Res. Publ. 3324.

Pittenger, D. R., ed. *California Master Gardener Handbook.* 2002. Oakland:

Use Pesticides Safely.

- Be sure plant and site is on the label.
- Be sure pest is on the label.
- Follow label directions for mixing.
- Follow label directions about wearing protective clothing.
- Check label for other precautions.

Protective Clothing and Equipment.



Univ. Calif. Div. Agric. Nat. Res. Publ. 3382.

Wilen, C.A., et al. 2006. *Pest Note: Hiring a Pest Control Company.* Oakland: Univ. Calif. Div. Agric. Nat. Res. Publ. 74125. Also available online, www.ipm.ucdavis.edu.

Online: Check out more Pest Notes at www.ipm.ucdavis.edu. ❖

For more information contact the University of California Cooperative Extension or agricultural commissioner's office in your county. See your telephone directory for addresses and phone numbers.

AUTHORS: C. A. Wilen, UC Statewide IPM Program, San Diego Co.; D. L. Haver, UC Cooperative Extension, Orange Co.; M. L. Flint, UC Statewide IPM Program, Davis; P. M. Geisel, UC Cooperative Extension, Fresno Co.; and C. L. Unruh, UC Cooperative Extension, Fresno Co.

COORDINATION & PRODUCTION: P. N. Galin
ILLUSTRATIONS: Keep Pesticides Out of Waterway illustration by C. Rusconi. All other illustrations by D. Kidd.

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This Pest Note is available on the World Wide Web (www.ipm.ucdavis.edu)

This publication has been anonymously peer reviewed for technical accuracy by University of California scientists and other qualified professionals. This review process was managed by the ANR Associate Editor for Pest Management.

To simplify information, trade names of products have been used. No endorsement of named products is intended, nor is criticism implied of similar products that are not mentioned.

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WARNING ON THE USE OF CHEMICALS

Pesticides are poisonous. Always read and carefully follow all precautions and safety recommendations given on the container label. Store all chemicals in the original labeled containers in a locked cabinet or shed, away from food or feeds, and out of the reach of children, unauthorized persons, pets, and livestock.

Confine chemicals to the property being treated. Avoid drift onto neighboring properties, especially gardens containing fruits or vegetables ready to be picked.

Do not place containers containing pesticide in the trash or pour pesticides down sink or toilet. Either use the pesticide according to the label or take unwanted pesticides to a Household Hazardous Waste Collection site. Contact your county agricultural commissioner for additional information on safe container disposal and for the location of the Household Hazardous Waste Collection site nearest you. Dispose of empty containers by following label directions. Never reuse or burn the containers or dispose of them in such a manner that they may contaminate water supplies or natural waterways.

PRIVATE TREATMENT CONTROL BMP
OPERATION AND MAINTENANCE VERIFICATION FORM
BIORETENTION FACILITIES, VEGETATED SWALES & HIGHER RATE BIOFILTERS

1. Transcribe the following information from your notification letter and make corrections as necessary:

Permit No.: ______________________

BMP Location: ______________________

Responsible Party: ______________________

Phone Number: ( ) ______________ **Email:** ______________

Responsible Party Address: ______________________

Number Street Name & Suffix City/Zip

☐ *Check here for Address or phone number change*

2. Using the Table below, please describe the inspections and maintenance activities that have been conducted during the fiscal year (July 1 – June 30), and date(s) maintenance was performed. Under "Results of Inspection," indicate whether maintenance was required based on each inspection, and if so, what type of maintenance. If maintenance was required, provide the date maintenance was conducted and a description of the maintenance. ***REFER TO THE BACK OF THIS SHEET FOR MORE INFORMATION DESCRIBING TYPICAL MAINTENANCE INDICATORS AND MAINTENANCE ACTIVITIES.*** *If no maintenance was required based on the inspection results, state "no maintenance required."*

What To Look For?	Date Inspected	Results of Inspection: Work needed? (Yes/No)	Date Maintenance Completed and Description of Maintenance Conducted
Accumulation of Sediment, Litter, Grease Standing Water Erosion Overgrown Vegetation Poor Vegetation Establishment Structural Damage			

3. Attach copies of available supporting documents (photographs, copies of maintenance contracts, and/or maintenance records).

4. Sign the bottom of the form and return to:

County of San Diego Watershed Protection Program
Treatment Control BMP Tracking
5201 Ruffin Road, Suite P, MS 0326
San Diego, CA 92123 ***OR***
Email: Watersheds@sdcounty.ca.gov

____

Signature of Responsible Party **Print Name** **Date**

PRIVATE TREATMENT CONTROL BMP
OPERATION AND MAINTENANCE VERIFICATION FORM

BIORETENTION FACILITIES, VEGETATED SWALES & HIGHER RATE BIOFILTERS-SIDE 2

This guide sheet provides general indicators for maintenance only and for a wide array of treatment control BMPs. Your developer prepared maintenance plans specifically for your treatment control BMP as an appendix to the Stormwater Management Plan. <u>Also, if you have a manufactured structure, please refer to the manufacturer's maintenance instructions.</u>

Biofilters include the following :
☐ Vegetated Filter Strip/Swale ☐ Bioswale ☐ Bioretention Facility ☐ Planter Boxes
☐ Manufactered Higher-Flow-Rate Biofilters, such as Tree-Pit-Style Units.
Routine maintenance is needed to ensure that flow is unobstructed, that erosion is prevented, and that soils are held together by plant roots and are biologically active. Typical maintenance consists of the following:

Bioretention BMPs Inspection and Maintenance Checklist	
Typical Maintenance Indicators	**Typical Maintenance Actions**
Accumulation of sediment (over 2 inches deep or covers vegetation), litter, or debris	Remove and properly dispose of accumulated materials, without damage to the vegetation. Confirm that soil is not clogging and that the area drains after a storm event. Till or replace soil as necessary.
Poor vegetation establishment	Ensure vegetation is healthy and dense enough to provide filtering and to protect soils from erosion. Replenish mulch as necessary (if less than 3 inches deep), remove fallen leaves and debris, prune large shrubs or trees, and mow turf areas.
Overgrown vegetation—woody vegetation not part of design is present and grass excessively tall (greater than 10 inches)	Mow or trim as appropriate, but not less than the design height of the vegetation (typically 4-6 inches for grass). Confirm that irrigation is adequate and not excessive and that sprays do not directly enter overflow grates. Replace dead plants and remove noxious and invasive weeds.
Erosion due to concentrated irrigation flow	Repair/re-seed eroded areas and adjust the irrigation.
Erosion due to concentrated stormwater runoff flow	Repair/re-seed eroded areas and make appropriate corrective measures such as adding erosion control blankets, adding stone at flow entry points, or re-grading where necessary.Remove obstructions and sediment accumulations so water disperses.
Standing water (BMP not draining) . If mosquito larvae are present and persistent, contact the San Diego County Vector Control Program at (858) 694-2888. Mosquito larvicides should be applied only when absolutely necessary and then only by a licensed individual or contractor.	Where there is an underdrain, such as in planter boxes and manufactured biofilters, check the underdrain piping to make sure it is intact and unobstructed. Abate any potential vectors by filling holes in the ground in and around the biofilter facility and by insuring that there are no areas where water stands longer than 96 hours following a storm .
Obstructed inlet or outlet structure	Clear obstructions.
Damage to structural components such as weirs, inlet, or outlet structures	Repair or replace as applicable.
Before the wet season and after rain events: remove sediment and debris from screens and overflow drains and downspouts; ensure pumps are functioning, where applicable; check integrity of mosquito screens; and; check that covers are properly seated and locked.	Where cisterns are part of the system
For manufactured high-flow-rate biofilters, see manufacturer's maintenance guidelines	

PRIVATE TREATMENT CONTROL BMP
OPERATION AND MAINTENANCE VERIFICATION FORM

DETENTION BASINS

1. Transcribe the following information from your notification letter and make corrections as necessary:

Permit No.: ______________________

BMP Location: ______________________

Responsible Party: ______________________

Phone Number: ( ) ______________ **Email:** ______________

Responsible Party Address: ______________________

Number Street Name & Suffix City/Zip

☐ *Check here for Address Change*

2. Using the Table below, please describe the inspections and maintenance activities that have been conducted during the fiscal year (July 1 – June 30), and date(s) maintenance was performed. Under "Results of Inspection," indicate whether maintenance was required based on each inspection, and if so, what type of maintenance. If maintenance was required, provide the date maintenance was conducted and a description of the maintenance. ***REFER TO THE BACK OF THIS SHEET FOR MORE INFORMATION DESCRIBING TYPICAL MAINTENANCE INDICATORS AND MAINTENANCE ACTIVITIES.*** *If no maintenance was required based on the inspection results, state "no maintenance required."*

What To Look For?	Date Inspected	Results of Inspection: Work needed? (Yes/No)	Date Maintenance Completed and Description of Maintenance Conducted
Poor Vegetation Establishment Overgrown Vegetation Erosion Gopher Holes Accumulation of Sediment & Litter Standing Water Obstructed Inlet/Outlet Structural Damage			

3. Attach copies of available supporting documents (photographs, copies of maintenance contracts, and/or maintenance records).

4. Sign the bottom of the form and return to: *County of San Diego Watershed Protection Program*
Treatment Control BMP Tracking
5201 Ruffin Road, Suite P, MS 0326
San Diego, CA 92123 ***OR***

*Email:*Watersheds@sdcounty.ca.gov

____

Signature of Responsible Party **Print Name** **Date**

PRIVATE TREATMENT CONTROL BMP
OPERATION AND MAINTENANCE VERIFICATION FORM
DETENTION – SIDE 2

These larger-scale facilities remove pollutants by detaining runoff in a settling pool long enough for some of the particulates to settle to the bottom. The following list of typical maintenance indicators and maintenance activities for detention basins is included for your reference. **These are general indicators for maintenance only. Your developer prepared maintenance plans as an appendix to the Stormwater Management Plan specifically for your treatment control BMP. <u>Also, if you have a manufactured structure, please refer to the manufacturer's maintenance instructions.</u>**

Detention BMPs Inspection and Maintenance Checklist	
Typical Maintenance Indicators	**Typical Maintenance Actions**
Poor vegetation establishment	Re-seed, re-establish vegetation.
Overgrown vegetation and invasive plants, or presence of woody plants or vegetation over 12 inches in height	Mow or trim as appropriate and remove invasive plants.
Erosion due to concentrated irrigation flow	Repair/re-seed eroded areas and adjust the irrigation system.
Erosion due to concentrated stormwater runoff flow	Repair/re-seed eroded areas and make appropriate corrective measures such as adding erosion control blankets, adding stone at flow entry points, or re-grading where necessary.
Gopher holes	Repair/re-seed holes and make appropriate corrective measures to prevent rodent activity.
Accumulation of sediment (generally 10% of design capacity), litter, or debris	Remove and properly dispose of accumulated materials, without damage to the vegetation. Dredge accumulated sediment. This may be required every five to 15 years, and more frequently if there are excess sources of sediment (as may occur on newly constructed sites where soils are not yet stabilized). Dredging is usually a major project requiring mechanized equipment. The work will include an initial survey of depths and elevations; sediment sampling and testing; removal, transport, and disposal of accumulated sediment, and reestablishment of original design grades and sections. Permits may be required.
Standing water (BMP not draining) If mosquito larvae are present and persistent, contact the San Diego County Vector Control Program at (858) 694-2888. Mosquito larvicides should be applied only when absolutely necessary and then only by a licensed individual or contractor.	Abate any potential vectors by filling holes in the ground in and around the pond and by insuring that there are no areas where water stands longer than 96 hours following a storm.
Obstructed inlet or outlet structure	Clear obstructions.
Damage to structural components such as weirs, inlet, or outlet structures	Remove any debris or sediment that could plug the outlets. Identify and correct any sources of sediment and debris. Check rocks or other armoring and replace as necessary.
Where cisterns or other manufactured detention systems are used	Before the wet season and after rain events: Remove sediment and debris from screens and overflow drains and downspouts/outflows; ensure pumps are functioning, where applicable; check integrity of mosquito screens where applicable; and check that covers are properly seated and locked. **See manufacturer's recommendations**.

PRIVATE TREATMENT CONTROL BMP
OPERATION AND MAINTENANCE VERIFICATION FORM
MEDIA FILTERS & HIGHER RATE MEDIA FILTERS

1. Transcribe the following information from your notification letter and make corrections as necessary:

Permit No.: ______________________

BMP Location: ______________________

Responsible Party: ______________________

Phone Number: (   ) ______________ **Email:** ______________

Responsible Party Address: ______________________

Number   Street Name & Suffix   City/Zip

☐ *Check here for Address Change*

2. Using the Table below, please describe the inspections and maintenance activities that have been conducted during the fiscal year (July 1 – June 30), and date(s) maintenance was performed. Under "Results of Inspection," indicate whether maintenance was required based on each inspection, and if so, what type of maintenance. If maintenance was required, provide the date maintenance was conducted and a description of the maintenance. ***REFER TO THE BACK OF THIS SHEET FOR MORE INFORMATION DESCRIBING TYPICAL MAINTENANCE INDICATORS AND MAINTENANCE ACTIVITIES.*** *If no maintenance was required based on the inspection results, state "no maintenance required."*

What To Look For?	Date Inspected	Results of Inspection: Work needed? (Yes/No)	Date Maintenance Completed and Description of Maintenance Conducted
Accumulation of Sediment, Litter, Grease Clogged Filter Media Standing Water Insect Breeding Structural Damage			

3. Attach copies of available supporting documents (photographs, copies of maintenance contracts, and/or maintenance records).

4. Sign the bottom of the form and return to:

County of San Diego Watershed Protection Program
Treatment Control BMP Tracking
5201 Ruffin Road, Suite P, MS 0326
San Diego, CA 92123 ***OR***
*Email:*Watersheds@sdcounty.ca.gov

____

Signature of Responsible Party   **Print Name**   **Date**

PRIVATE TREATMENT CONTROL BMP
OPERATION AND MAINTENANCE VERIFICATION FORM

MEDIA FILTERS & HIGHER RATE MEDIA FILTERS– SIDE 2

The following list of typical maintenance indicators and maintenance activities for filtration BMPs is provided for your reference. **These are general indicators for maintenance only. Your developer prepared maintenance plans specifically for your treatment control BMP as an appendix to the Stormwater Management Plan. Also, if you have a manufactured structure, please refer to the manufacturer's maintenance instructions. If you have not been supplied the manufacturer's instructions by the developer or previous owner, these can frequently be found on the internet or by contacting the manufacturer. The specific make and model of treatment control BMP can be found on the structure.**

This category of treatment control BMPs includes the following:

Austin Sand Filters   Delaware Sand Filter   Multi-Chambered Treatment Trains (MCTT)   Vault-based filters

Filtration BMPs Inspection and Maintenance Checklist	
Typical Maintenance Indicators	**Typical Maintenance Actions**
Accumulation of sediment, litter, or debris	Remove and properly dispose of accumulated materials.
Accumulation of floating oil and grease	Remove and properly dispose of oil and grease.
Clogged filter media	Remove and properly dispose of filter media, and replace with fresh media.
Damage to components of the filtration system	Repair or replace as applicable.
For offline systems No accumulation of sediment, oil or grease in collection chambers after significant rainfall Damaged or obstructed flow diversion components	Inspect flow diversion devices for damage and obstructions. Remove obstructions. Repair damage.
Mosquito larvae present in designs where permanent pools exist (e.g., Delaware filter & MCTT)	If larvae are present and persistent, contact the San Diego County Vector Control Program at (858) 694-2888. Mosquito larvicides should be applied only when absolutely necessary and then only by a licensed individual or contractor. For MCTT and Vault-based filters, exclude vectors by sealing them out, for example, by using tight-fitting aluminum covers.
Dry designs, such as the Austin sand filter have standing water (longer than 96 hours after rainfall) and/or mosquito larve are present.	Media filters may be clogged. Remove vegetative growth and debris. If clogged with a crust, remove and properly dispose of filter media and replace with fresh media.

Maintenance of filtration BMPs involves handling of potentially hazardous material (oil and/or oil sorbent material), which requires special disposal. Additionally, maintenance may involve entry into the filtration BMP underground. Therefore the maintenance operator must be trained in handling and disposal of hazardous waste, and must also be certified for confined space entry if the maintenance will require entry into the filtration BMP. Therefore it is recommended that private BMP owners obtain a maintenance contract with a qualified contractor to provide inspection and maintenance. There are several storm drain cleaning service providers who are able to inspect and/or maintain filtration BMPs. Contact the manufacturer of the filtration system to find qualified service providers.

PRIVATE TREATMENT CONTROL BMP
OPERATION AND MAINTENANCE VERIFICATION FORM
DRAIN INSERTS &TRASH RACKS

1. Transcribe the following information from your notification letter and make corrections as necessary:

Permit No.: ______________________________

BMP Location: ______________________________

Responsible Party: ______________________________

Phone Number: ( ) ______________ **Email:** ______________

Responsible Party Address: ______________________________

Number Street Name & Suffix City/Zip

☐ *Check here for Address Change*

2. Using the Table below, please describe the inspections and maintenance activities that have been conducted during the fiscal year (July 1 – June 30), and date(s) maintenance was performed. Under "Results of Inspection," indicate whether maintenance was required based on each inspection, and if so, what type of maintenance. If maintenance was required, provide the date maintenance was conducted and a description of the maintenance. ***REFER TO THE BACK OF THIS SHEET FOR MORE INFORMATION DESCRIBING TYPICAL MAINTENANCE INDICATORS AND MAINTENANCE ACTIVITIES.*** *If no maintenance was required based on the inspection results, state "no maintenance required."*

What To Look For?	Date Inspected	Results of Inspection: Work Needed? (Yes/No)	Date Maintenance Completed and Description of Maintenance Conducted
Accumulation of Sediment, Litter, Grease Clogged Filter Media Structural Damage			

3. Attach copies of available supporting documents (photographs, copies of maintenance contracts, and/or maintenance records).

4. Sign the bottom of the form and return to: *County of San Diego Watershed Protection Program*
Treatment Control BMP Tracking
5201 Ruffin Road, Suite P, MS 0326
San Diego, CA 92123 ***OR***
*Email:*Watersheds@sdcounty.ca.gov

Signature of Responsible Party **Print Name** **Date**

PRIVATE TREATMENT CONTROL BMP
OPERATION AND MAINTENANCE VERIFICATION FORM

TRASH RACKS & DRAINAGE INSERTS – SIDE 2

The following list of typical maintenance indicators and maintenance activities for drainage inserts is provided for your reference. **These are general indicators for maintenance only. These types of treatment control BMPs are proprietary so the best guidance is from the manufacturer's instructions. <u>Please refer to the manufacturer's maintenance instructions.</u> If you have not been supplied the manufacturer's instructions by the developer or previous owner, these can frequently be found on the internet or by contacting the manufacturer. The specific make and model of treatment control BMP can be found on the structure.**

Drainage Insert BMPs Inspection and Maintenance Checklist	
Typical Maintenance Indicators	**Typical Maintenance Actions**
Accumulation of sediment, litter, or debris	Remove and properly dispose of accumulated materials at least once prior to the rainy season and as required to ensure sediment litter and debris is not released to the stormwater conveyance.
Spent or clogged sorbent material or media pack, where applicable	Remove and properly dispose of sorbent material or media pack, and replace with fresh material. These materials/media are potentially hazardous and must be handled by a properly trained contractor.
Damage to components of the drainage insert	Repair or replace as applicable.

Maintenance of trash racks and drainage inserts involves handling of potentially hazardous material (oil sorbent material), which requires special disposal. Additionally, maintenance may involve entry into the storm drain inlet underground. Therefore the maintenance operator must be trained in handling and disposal of hazardous waste, and must also be certified for confined space entry if the maintenance will require entry into the storm drain inlet. Therefore it is recommended that private BMP owners obtain a maintenance contract with a qualified contractor to provide inspection and maintenance. There are several storm drain cleaning service providers who are able to inspect and/or maintain drainage inserts. Contact the manufacturer of the drainage insert to find qualified service providers.

ATTACHMENT 4
COPY OF PLAN SHEETS SHOWING PERMANENT STORM WATER BMPS

This is the cover sheet for Attachment 4.

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Project Name: Sunroad Otay

Use this checklist to ensure the required information has been included on the plans:

The plans must identify:

☒ Structural BMP(s) with ID numbers matching Form I-6 Summary of PDP Structural BMPs
☒ The grading and drainage design shown on the plans must be consistent with the delineation of DMAs shown on the DMA exhibit
☒ Details and specifications for construction of structural BMP(s)
☐ Signage indicating the location and boundary of structural BMP(s) as required by the City Engineer
☐ How to access the structural BMP(s) to inspect and perform maintenance
☒ Features that are provided to facilitate inspection (e.g., observation ports, cleanouts, silt posts, or other features that allow the inspector to view necessary components of the structural BMP and compare to maintenance thresholds)
☐ Manufacturer and part number for proprietary parts of structural BMP(s) when applicable
☐ Maintenance thresholds specific to the structural BMP(s), with a location-specific frame of reference (e.g., level of accumulated materials that triggers removal of the materials, to be identified based on viewing marks on silt posts or measured with a survey rod with respect to a fixed benchmark within the BMP)
☐ Recommended equipment to perform maintenance
☐ When applicable, necessary special training or certification requirements for inspection and maintenance personnel such as confined space entry or hazardous waste management
☒ Include landscaping plan sheets showing vegetation requirements for vegetated structural BMP(s)
☒ All BMPs must be fully dimensioned on the plans
☐ When propritery BMPs are used, site specific cross section with outflow, inflow and model number shall be provided. Broucher photocopies are not allowed.

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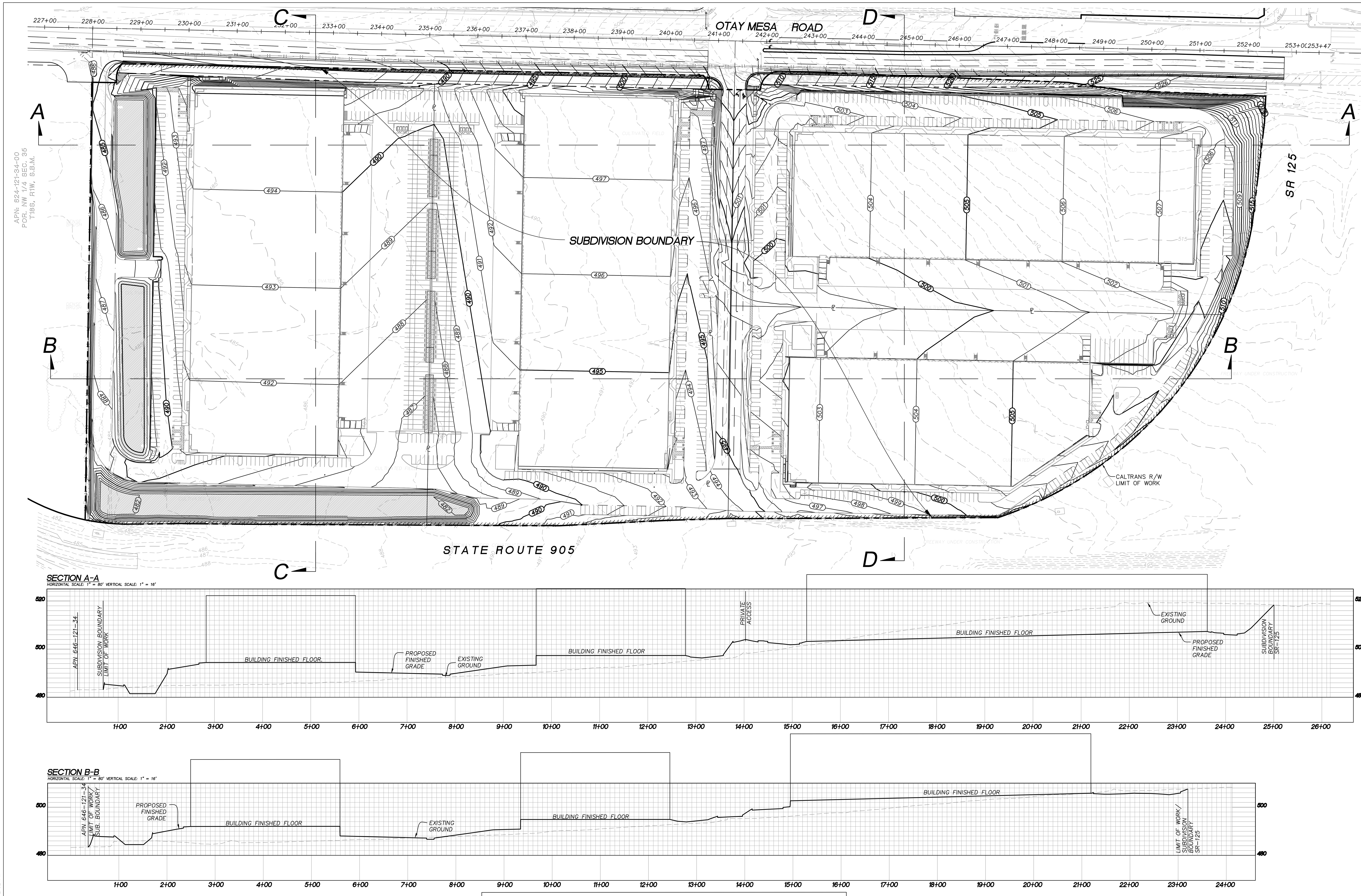

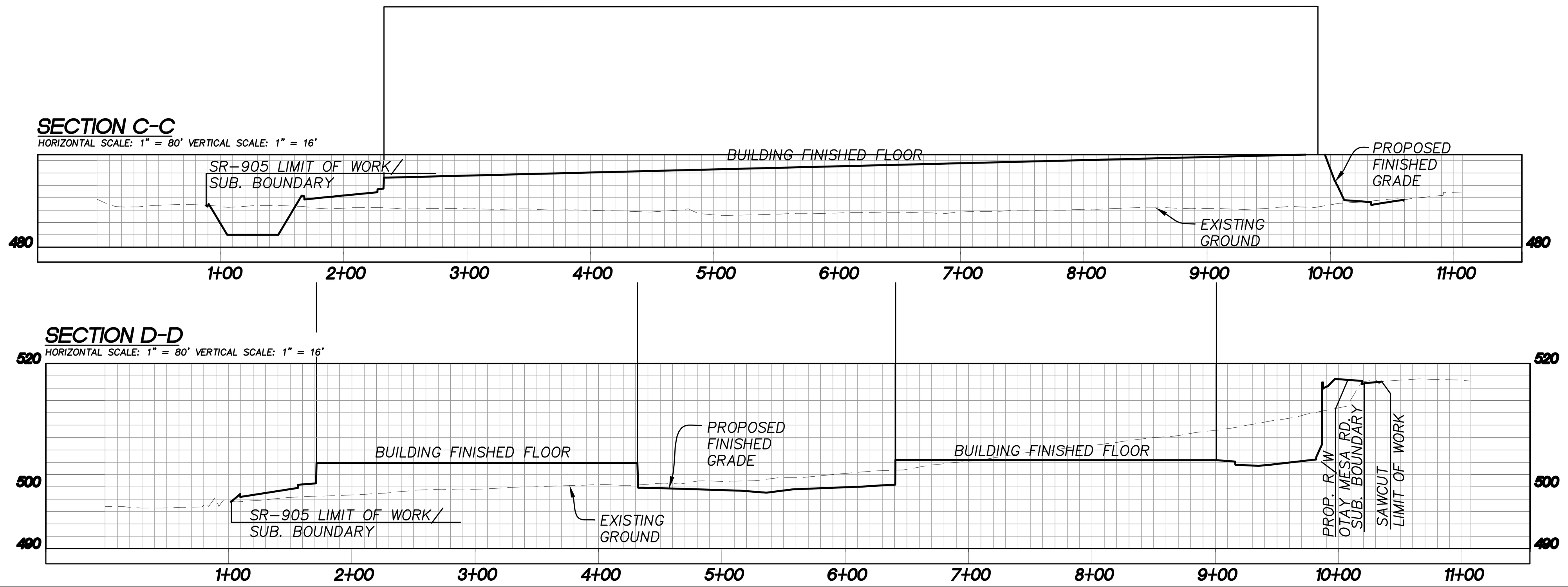

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Kimley»Horn
401 B Street · Suite 600 · San Diego, Ca. · 92101
Tel: (619) 234-9411

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PREPARED BY:
NAME: KIMLEY HORN AND ASSOCIATES, INC.
ADDRESS: 401 B STREET, SUITE 600 SAN DIEGO, CA 92101
PHONE #: (619) 234-9411

PROJECT ADDRESS:
OTAY MESA ROAD @ PIPER RANCH RD
SAN DIEGO, CALIFORNIA
92154

PROJECT NAME:
SUNROAD OTAY

SHEET TITLE:
SITE SECTIONS

REVISION 14.
REVISION 13.
REVISION 12.
REVISION 11.
REVISION 10.
REVISION 9.
REVISION 8.
REVISION 7.
REVISION 6.
REVISION 5.
REVISION 4.
REVISION 3. 10/9/2017
REVISION 2. 7/6/2017
REVISION 1. 4/11/2017

SUBMITTAL DATE: 2/17/2017

SHEET 4 OF 8

PDP No.
NDP No.
SDP No.
SV No.
VTM No.
CCS83: 1784-6341

SUNROAD OTAY

OTAY MESA ROAD @ PIPER RANCH ROAD
SAN DIEGO, CALIFORNIA

REVISIONS

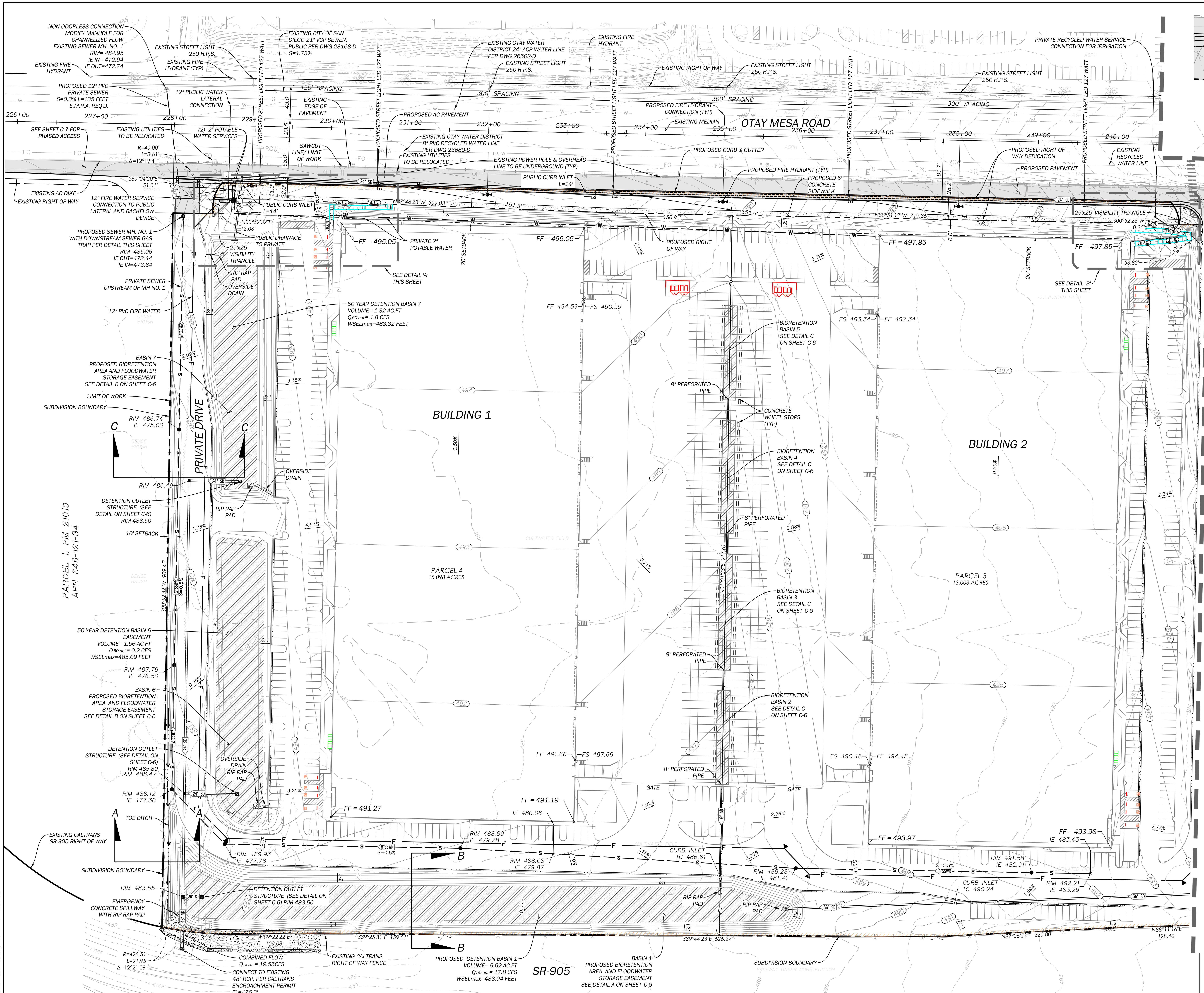
Scale

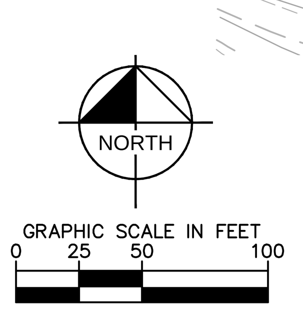
Project No. --

SITE SECTIONS

Sheet

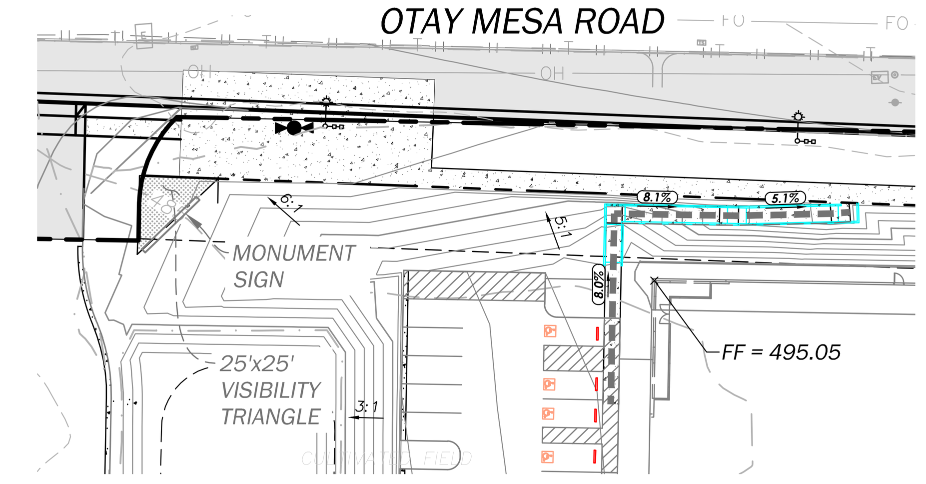
C-4





Kimley»Horn

401 B Street · Suite 600 · San Diego, Ca. · 92101
Tel: (619) 234-9411



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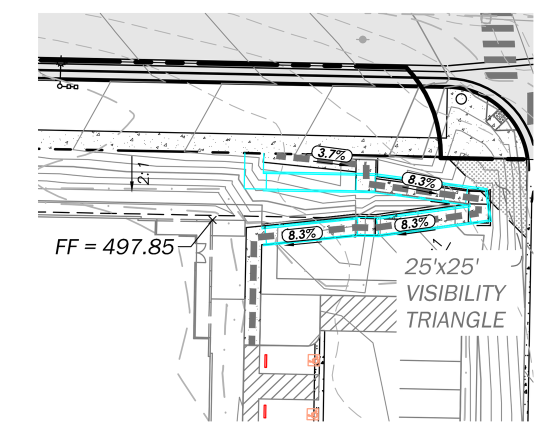

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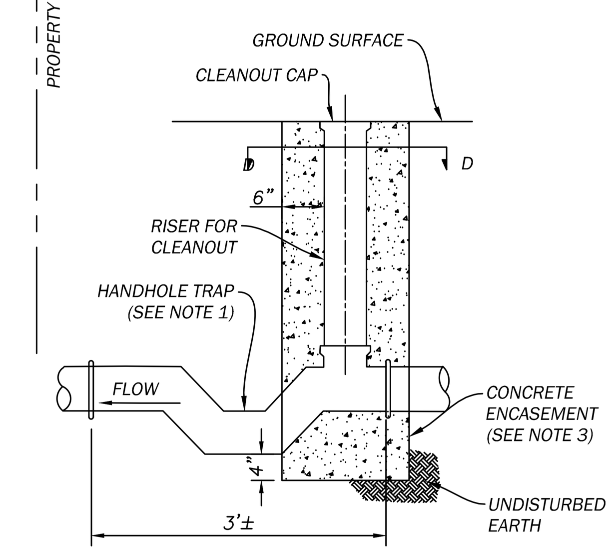
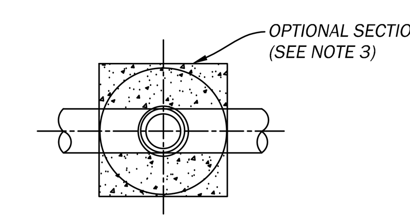


SEWER GAS TRAP DETAIL
N.T.S

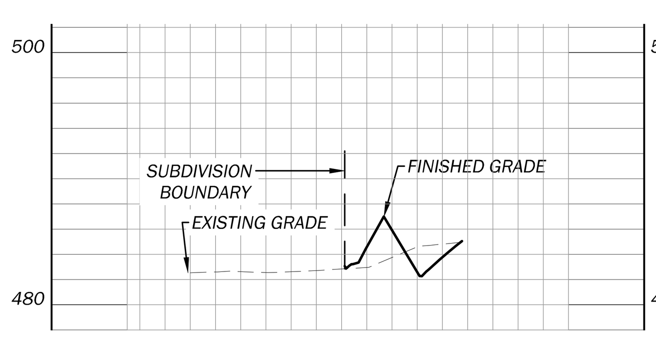


SEWER GAS TRAP SECTION D-D
N.T.S

NOTES:

1. HANDHOLE TRAP MAY BE FABRICATED OR MITERED SECTION AS SHOWN HEREON, OR OF A SINGLE UNIT WITH CURVED SEGMENTS.
2. PLAN END PIPE MAY BE USED IN LIEU OF BELL (SOCKET) AND SPIGOT FITTED PIPE PROVIDED APPROVED COUPLINGS ARE USED.
3. THE CONCRETE ENCASEMENT AROUND THE RISED ABOVE THE TOP OF THE HOUSE CONNECTION TEE MAY BE CIRCULAR OR RECTANGULAR IN CROSS SECTION. FROM THE BOTTOM OF THE ENCASEMENT TO THE TOP OF THE HOUSE CONNECTION TEE, THE ENCASEMENT SHALL BE RECTANGULAR IN CROSS SECTION. ENCASEMENT SHALL BE CLASS 420C-2000 CONCRETE.
4. THE RISER SHALL BE SEALED WITH A CAP AND 1 INCH THICK TYPE "F" MORTAR AROUND THE CIRCUMFERENCE OF THE CAP.
5. THE HANDHOLE TRAP SHALL BE BEDDED IN THE SAME MANNER AS THE HOUSE CONNECTION SEWER.

NOTE:
ALL STORM DRAIN, SEWER, AND WATER WITHIN PROPERTY BOUNDARIES ARE PRIVATE. PUBLIC UTILITIES ARE INDIVIDUALLY IDENTIFIED ON PLAN AS NOTED.



SECTION A-A
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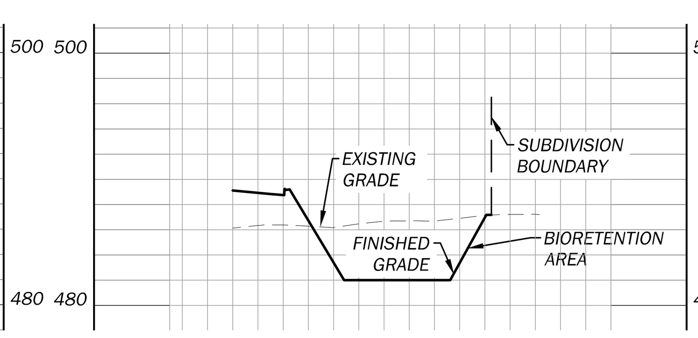

SECTION B-B
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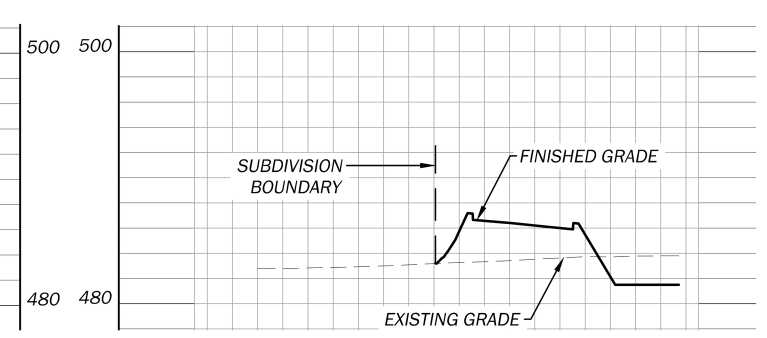

SECTION C-C
N.T.S

PREPARED BY:
NAME: KIMLEY HORN AND ASSOCIATES, INC.
ADDRESS: 401 B STREET, SUITE 600 SAN DIEGO, CA 92101
PHONE #: (619) 234-9411

PROJECT ADDRESS:
OTAY MESA ROAD @ PIPER RANCH RD
SAN DIEGO, CALIFORNIA
92154

PROJECT NAME:
SUNROAD OTAY

SHEET TITLE:
GRADING AND DRAINAGE

REVISION 14. ____
REVISION 13. ____
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REVISION 11. ____
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REVISION 9. ____
REVISION 8. ____
REVISION 7. ____
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REVISION 5. ____
REVISION 4. ____
REVISION 3. 10/9/2017
REVISION 2. 7/6/2017
REVISION 1. 4/11/2017

SUBMITTAL DATE: 2/17/2017

SHEET 5 OF 8

PDP No. ____
NDP No. ____
SDP No. ____
SV No. ____
VTM No. ____
CC583: 1784-6341

SUNROAD OTAY

OTAY MESA ROAD @ PIPER RANCH ROAD
SAN DIEGO, CALIFORNIA

REVISIONS

Scale
Project No. --

GRADING AND DRAINAGE

Sheet
C-5

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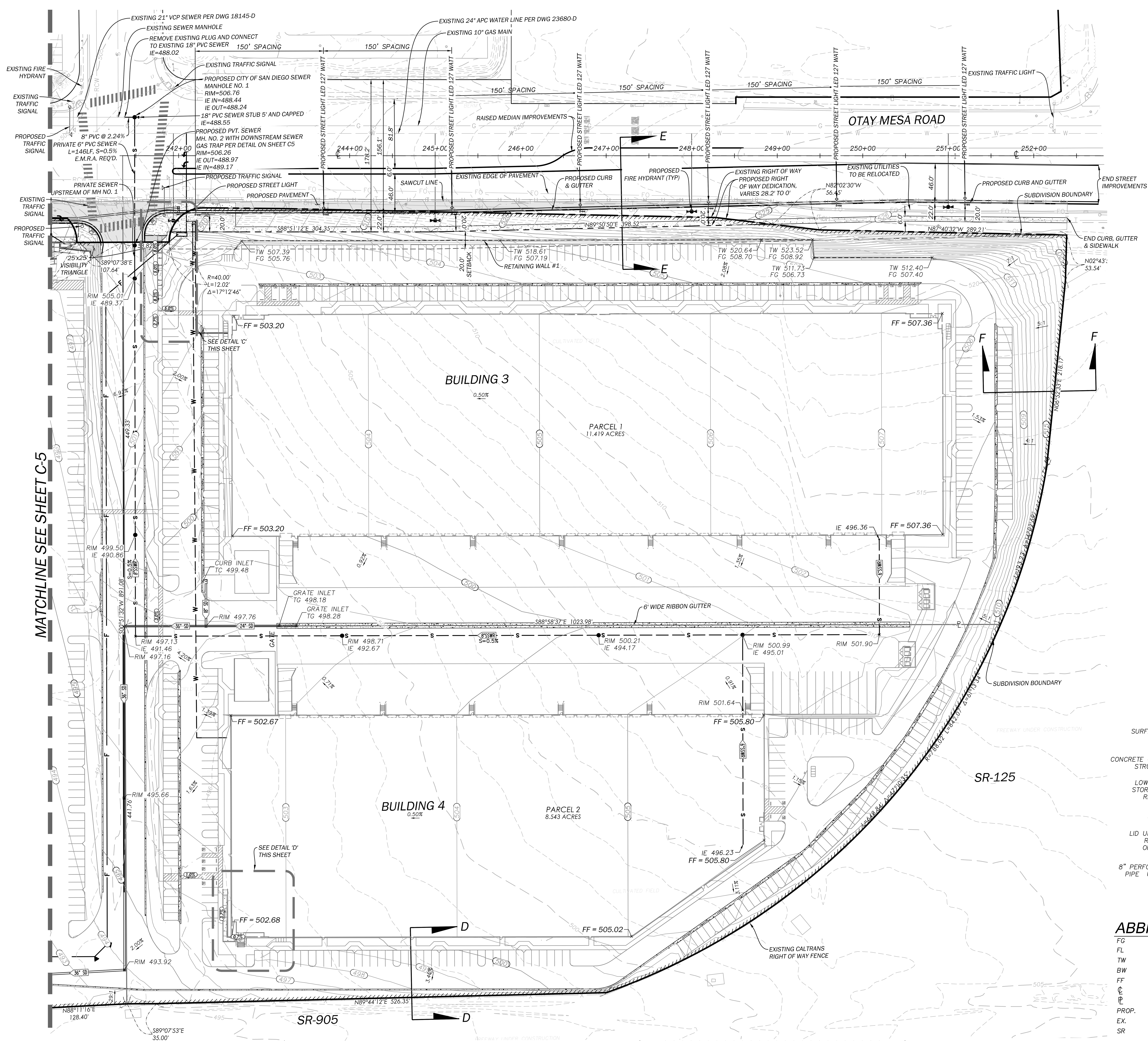
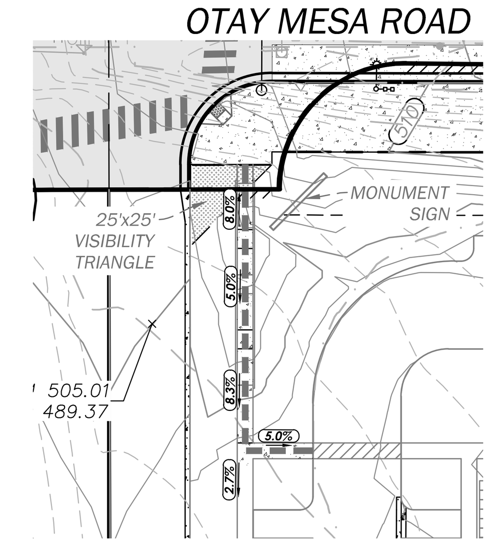
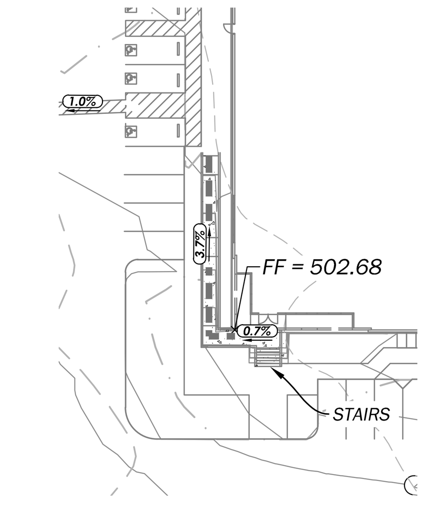




ACCESSIBILITY DETAIL 'C'
N.T.S



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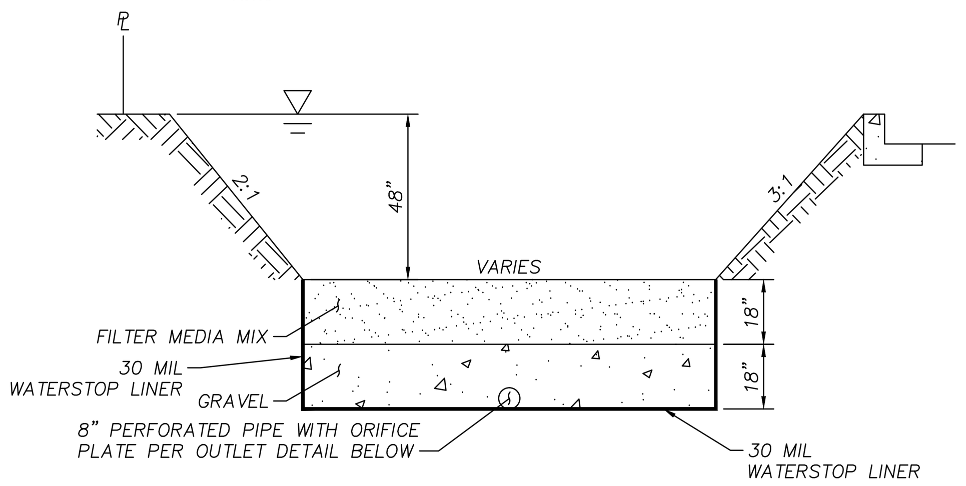
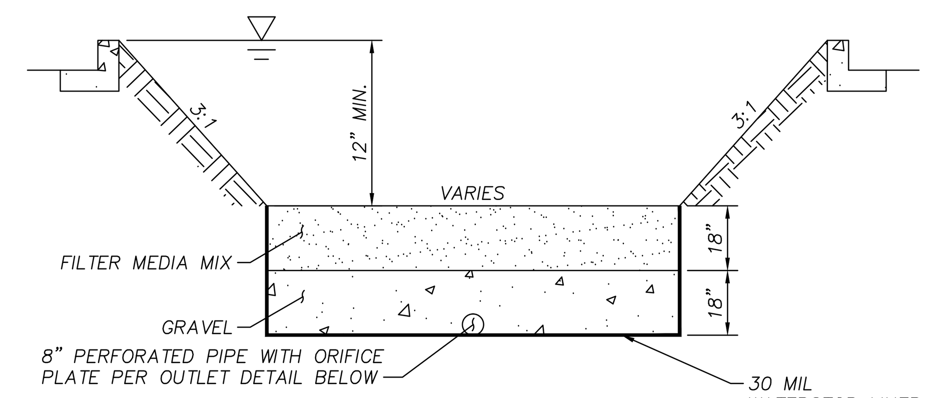
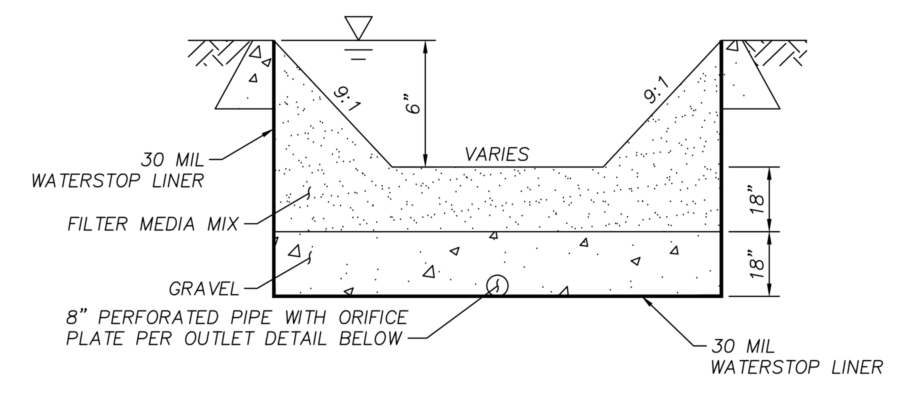


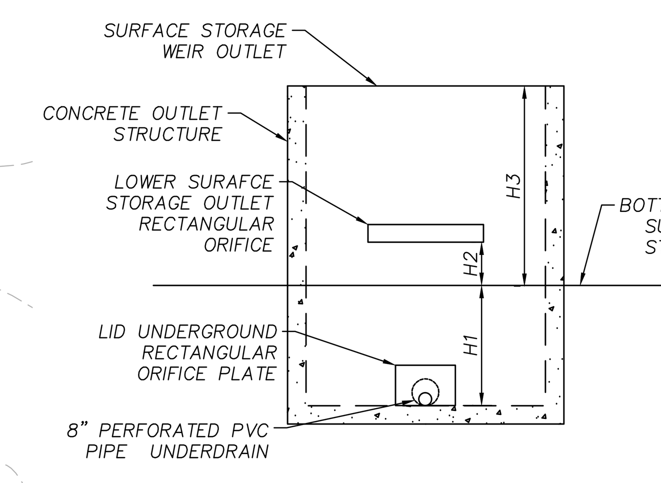
BIOFILTRATION CROSS SECTION A
NTS



BIOFILTRATION CROSS SECTION B
NTS



BIOFILTRATION CROSS SECTION C
NTS



TYPICAL OUTLET STRUCTURE DETAIL
NTS

BASIN ID	LID ORIFICE PLATE		LOWER SURFACE RECTANGULAR ORIFICE			SURFACE STORAGE WEIR OUTLET	
	H1	DIAMETER	H2	LENGTH	HEIGHT	H3	LENGTH
	INCHES	INCHES	INCHES	INCHES	INCHES	FT	FT
1	36	2.5	6	48	6	3.3	18
2	36	1.5	N/A	N/A	N/A	0.5	10
3	36	1.5	N/A	N/A	N/A	0.5	10
4	36	1.75	N/A	N/A	N/A	0.5	10
5	36	1.75	N/A	N/A	N/A	0.5	10
6	36	2	6	12	1	1.3	12
7	36	2	6	12	1	2	12

BASIN SPECIFIC OUTLET TABLE

NOTE:
ALL STORM DRAIN, SEWER, AND WATER WITHIN PROPERTY BOUNDARIES ARE PRIVATE. PUBLIC UTILITIES ARE INDIVIDUALLY IDENTIFIED ON PLAN AS NOTED.

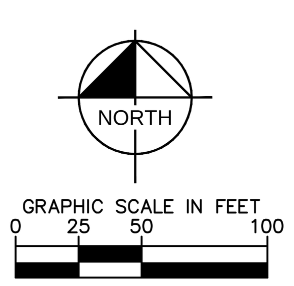
ABBREVIATIONS

FG	FINISHED GRADE
FL	FLOW LINE
TW	TOP OF WALL
BW	BOTTOM OF WALL
FF	FINISHED FLOOR
℄	CENTER LINE
ℙ	PROPERTY LINE
PROP.	PROPOSED
EX.	EXISTING
SR	STATE ROUTE

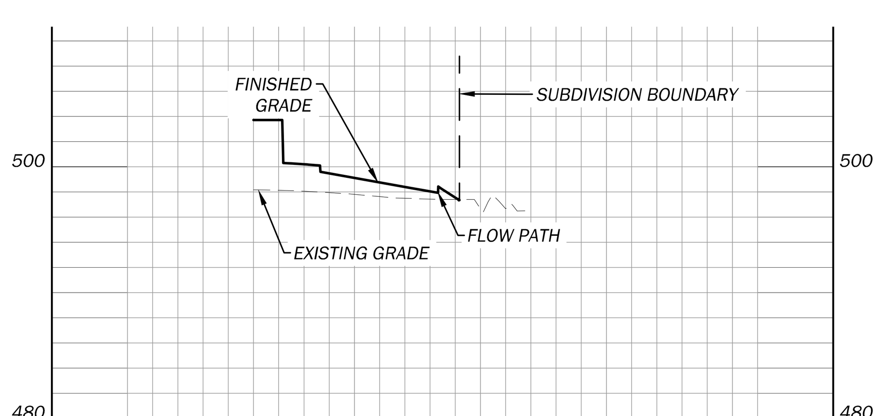
RETAINING WALL DATA

RW	MAX HEIGHT	LENGTH	MATERIAL
RW #1	15.00 Ft	840.00 Ft	CONCRETE

NOTE: WALLS ARE ON PRIVATE PROPERTY AND NOT VISIBLE FROM PUBLIC RIGHT OF WAY.



Kimley»Horn
401 B Street · Suite 600 · San Diego, Ca. · 92101
Tel: (619) 234-9411



SECTION D-D
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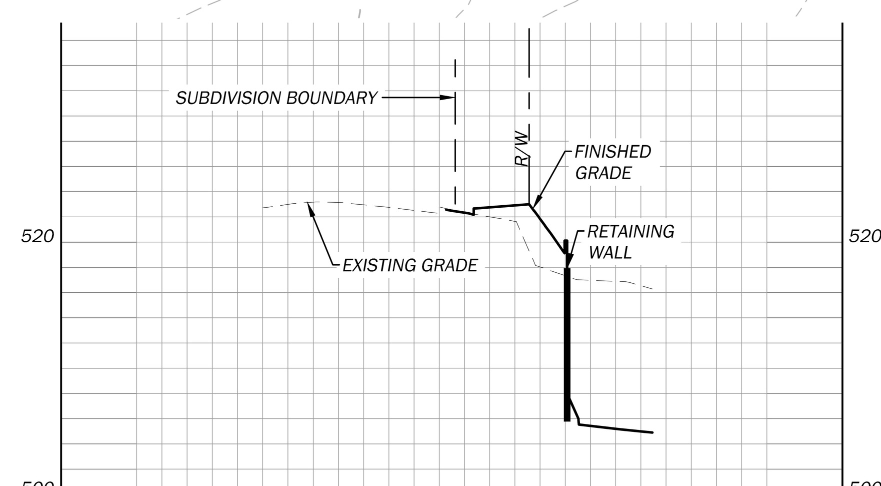
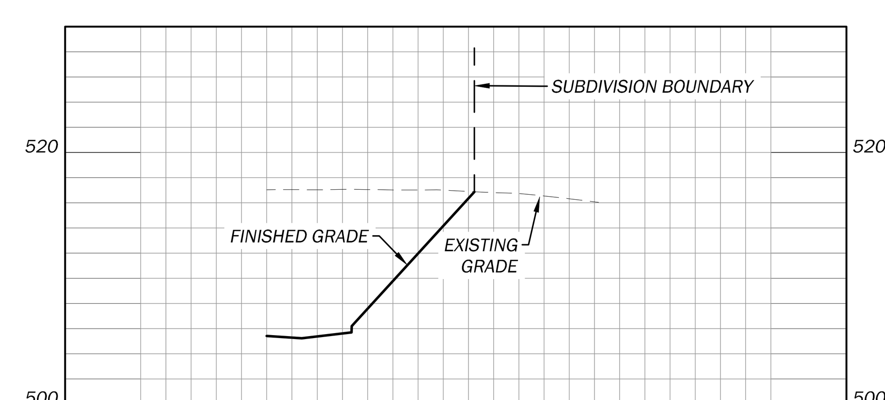


SECTION E-E
N.T.S



SECTION F-F
N.T.S

PREPARED BY:
NAME: KIMLEY HORN AND ASSOCIATES, INC.
ADDRESS: 401 B STREET, SUITE 600
SAN DIEGO, CA 92101
PHONE # (619) 234-9411

PROJECT ADDRESS:
OTAY MESA ROAD @ PIPER RANCH RD
SAN DIEGO, CALIFORNIA
92154

PROJECT NAME:
SUNROAD OTAY

SHEET TITLE:
GRADING AND DRAINAGE

REVISION 14.
REVISION 13.
REVISION 12.
REVISION 11.
REVISION 10.
REVISION 9.
REVISION 8.
REVISION 7.
REVISION 6.
REVISION 5.
REVISION 4.
REVISION 3. 10/9/2017
REVISION 2. 7/5/2017
REVISION 1. 4/11/2017

SUBMITTAL DATE: 2/17/2017

SHEET 6 OF 8

PDP No.
NDP No.
SDP No.
SV No.
VTM No.
CCS83: 1784-6341

SUNROAD OTAY
OTAY MESA ROAD @ PIPER RANCH ROAD
SAN DIEGO, CALIFORNIA

REVISIONS

Scale
Project No. --

GRADING AND DRAINAGE

Sheet
C-6

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ATTACHMENT 5
DRAINAGE REPORT

Attach project's drainage report. Refer to Drainage Design Manual to determine the reporting requirements.

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ATTACHMENT 6
GEOTECHNICAL AND GROUNDWATER INVESTIGATION REPORT

Attach project's geotechnical and groundwater investigation report. Refer to Appendix C.4 to determine the reporting requirements.

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GEOCON
INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS

Project No. 07740-42-02
April 17, 2017

Commerce Construction Corporation, L.P.
13191 Crossroads Parkway North, 6th Floor
City of Industry, California 91746

Attention: Mr. Ali Zare

Subject: STORM WATER MANAGEMENT INVESTIGATION
SUNROAD OTAY 50
OTAY MESA ROAD
SAN DIEGO, CALIFORNIA

References:
1. *Update Geotechnical Investigation [for] Sunroad Otay 50, Otay Mesa Road, San Diego, California,* prepared by Geocon Incorporated, dated March 31, 2017 (Project No. 07740-42-02)
2. *Preliminary Grading Plan for Sunroad Otay 50,* prepared by Kimley-Horn and Associates, plot date February 15, 2017.

Dear Mr. Zare:

In accordance with your request and our proposal LG-17014, dated January 10, 2017, we have prepared this report to provide recommendations regarding storm water management for the subject project. We performed three, constant-head, hydraulic-conductivity tests at the locations shown on the Geologic Map, Figure 1. The locations were selected in areas being proposed to receive bioretention basins to obtain general information regarding infiltration characteristics of the site subsoils.

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). 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, properties downstream could 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 1 presents the descriptions of the hydrologic soil groups. In addition, the USDA website also provides an estimated saturated hydraulic conductivity for the existing soil.

TABLE 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 underlain by 2 units identified as Diablo Clay (DaC) and Salinas Clay (ScA). These units are classified as hydrologic soil group D and C, respectively. Table 2 presents the information from the USDA website for the subject property.

TABLE 2
USDA WEB SOIL SURVEY – HYDROLOGIC SOIL GROUP

Map Unit Name	Percent Slopes	Map Unit Symbol	Approximate Percentage of Property	Hydrologic Soil Group
Diablo Clay	2 to 9	DaC	22.0	D
Salinas Clay	0 to 2	ScA	78.0	C

In-Situ Testing

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 three, in place, constant head, hydraulic conductivity tests using a Soilmoisture Equipment Corp Aardvark Permeameter at the approximate locations shown on the attached Geologic Map, Figure 1. We advance a hand auger borehole at each location to a depth of approximately 4 feet. The borehole was approximately 4 to 5 inches in diameter. Table 3 presents the results of the infiltration tests. The field sheets are also attached. Grain size tests were performed on three representative soil samples. Laboratory tests are attached. 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 0.0005 and 0.008 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 is equivalent to the saturated hydraulic conductivity rate.

TABLE 3
FIELD PERMEAMETER INFILTRATION TEST RESULTS

Test No.	Geologic Unit	Test Depth (feet)	Infiltration Rate (inch/hour)	Infiltration Rate [1] (inch/hour)
A-1	Qvop	3.9	0.001	0.0005
A-2	Qvop	4.1	0.015	0.008
A-3	Qvop	4.3	0.004	0.002

[1] Using a factor of safety of 2 for Worksheet C.4-1.

STORM WATER MANAGEMENT CONCLUSIONS

The Geologic Map, Figure 1, depicts the existing property, proposed development, the locations of the field excavations and in-situ infiltration test locations.

Soil Types

Compacted Fill – Compacted fill will be placed above competent Very Old Paralic Deposits for proper structural support of the proposed buildings and associated improvements. The proposed storm water BMP’s will be founded in compacted fill placed above Very Old Paralic Deposits. The compacted fill will be comprised of sandy clay and clayey sand with gravel and cobble. Proposed fill 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. 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 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 vertical 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 Very Old Paralic Deposits below the proposed compacted fill is expected between 2 to 4 feet below bottom of proposed grades at the detention basins after grading is performed. Considering the proximity of proposed access driveway adjacent to detention basin Nos. 1 and 2 and the proximity of Interstate 905 Right of Way at detention basin No. 3, full infiltration should be considered geotechnically infeasible.

- *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 infiltration should be considered geotechnically infeasible for detention basin Nos. 1, 2 and 3.

- *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 full or partial infiltration for detention basins Nos. 1, 2, and 3 should be considered unfeasible.

Infiltration Rates

The results of the factored infiltration rates obtained within the compacted fill ranged between 0.0005 and 0.008 inches per hour. Therefore, based on the results of the infiltration testing, full and partial infiltration is infeasible.

Groundwater Elevations

Groundwater was not encountered during our field exploration. Groundwater is expected at depths in excess of 100 feet below existing grades. Groundwater is not expected to be a geotechnical constraint.

Soil or Groundwater Contamination

Based on review of the Geotracker website, no existing contaminated soils are known to exist on the site. We are unaware of contaminated soil or groundwater on the property. Therefore, infiltration associated with this risk is considered feasible.

New or Existing Utilities

Existing utilities are present within right of ways adjacent to the existing Otay Mesa Road and Interstate 905 Right of Way. 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 and light industrial developments exist to the north of the property. Otay Mesa Road is located immediately to north property boundary. 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 with a very gentle descending slope from the northeast toward the southwest.

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 4 describes the suitability assessment input parameters related to the geotechnical engineering aspects for the factor of safety determination.

TABLE 4
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 4, Table 5 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 5
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.

STORM WATER MANAGEMENT CONCLUSIONS AND RECOMMENDATIONS

Our results indicate that, in general, the soils on the subject site have very low infiltration characteristics. Some interbedded permeable sandy layers may occur within the proposed compacted fill, which, in our opinion, will result in a high probability for lateral water migration. Considering the low infiltration rates obtained, we are of the opinion that full or partial infiltration is unfeasible. Our evaluation included the soil and geologic conditions, settlement and expansion potential of the underlying soil, slope stability and utility considerations.

Side and bottom liners should be installed for detention basins Nos. 1, 2 and 3,

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.

Should you have any questions regarding the letter, or if we may be of further service, please contact the undersigned at your convenience.

Very truly yours,

GEOCON INCORPORATED

Raul R. Garcia
GE 2842

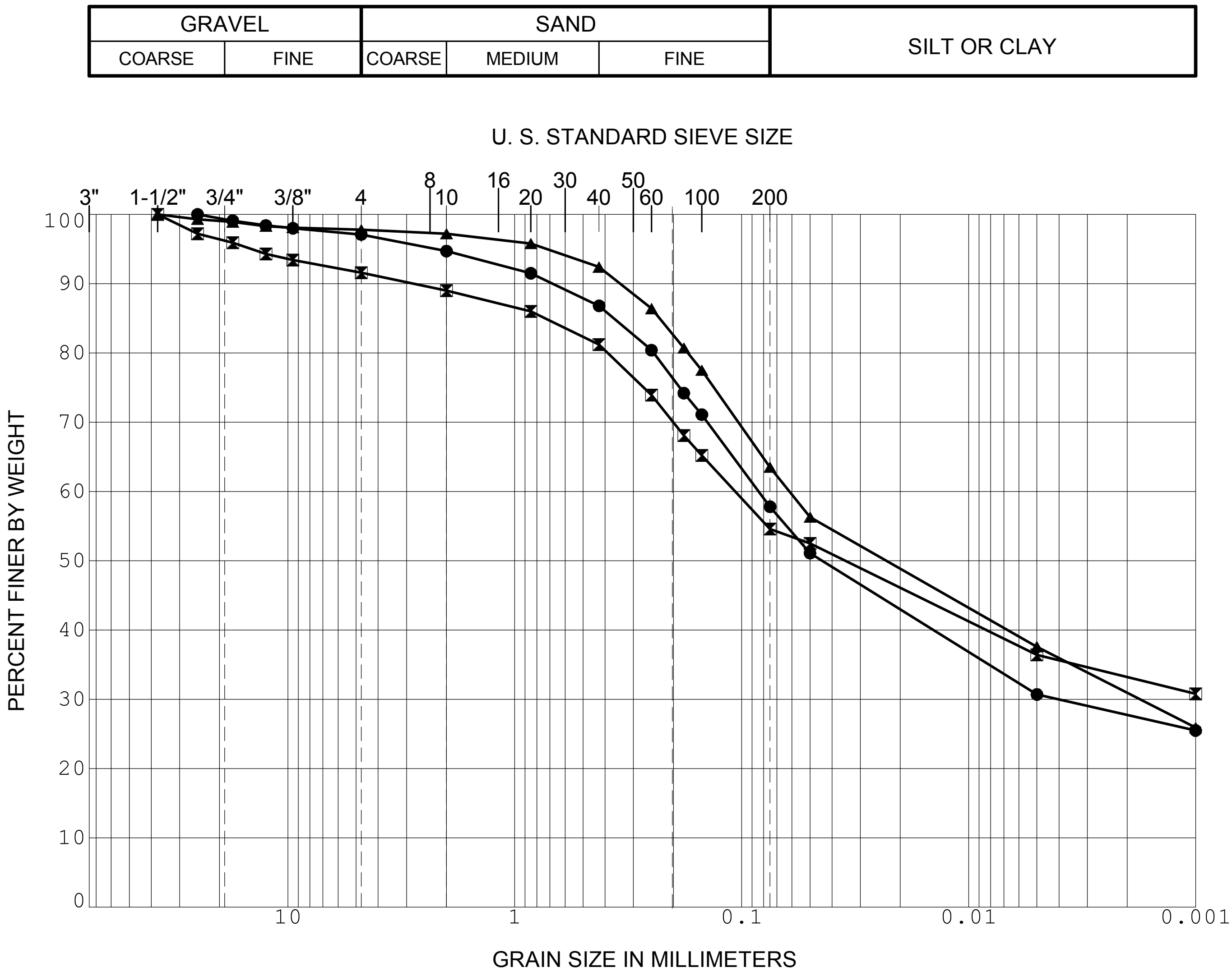
RRG:dmc

Attachments: Figure 1
Worksheet C.4-1
Aardvark Data
Grain Size Analysis

(e-mail) Addressee

Plotted:04/17/2017 8:50AM | By:ALVIN LADRILLONO | File Location:Y:\PROJECTS\07740-42-02 Sunroad Otay\SHEETS\07740-42-02 UpdatedGeoMap.dwg

PROJECT NO. 07740-42-02



	SAMPLE	DEPTH (ft)	CLASSIFICATION	NAT WC	LL	PL	PI
●	A-1	0.0	(CL) Sandy, lean CLAY				
⧗	A-2	0.0	(CL) Sandy, lean CLAY				
▲	A-3	0.0	(ML) Sandy SILT				

GRADATION CURVE

OTAY SUNROAD

SAN DIEGO COUNTY, CALIFORNIA

07740-42-02 GRADATION CURVES.GPJ

Figure B-1

GEOCON

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: This form applies for biofiltration basin Nos. 1, 2 and 3. We performed 3 infiltration tests using a Soil Moisture Corp Aardvark Constant Head Permeameter. The unfactored (FS-1) test results indicate infiltration rates ranging between 0.001 inches/hour and 0.015 inches/hour. After applying a feasibility factor of safety of 2.0, the infiltration rates reduce to 0.0005 to 0.008 inches/hour, which is below the minimum threshold value of 0.5 inches/hour. Based on the USDA Wets Soil Survey website, 100 percent of the site consists of a unit that possesses a Hydrologic Soil Group D.			
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: The site will be underlain by compacted fill and very stiff to very dense, clay and sand of the Very Old Paralic Deposits. Infiltration into compacted fill could cause settlement and adverse distress to improvements and structures. There is a high potential for lateral water migration, which could impact existing improvements as a result of soil settlement in the fill and/or volume change of the clays within the fill soils and of the Very Old Paralic Deposits, which could impact existing improvements as a result of soil settlement in the fill or volume change (expansion) of the clay and may cause water to perch and travel laterally to Otay Mesa Road and Interstate 905 Right of Way and adjacent properties and utility lines. Expansion index tests indicate that the native soils have a high expansion potential. Therefore, there is a high potential for heaving on existing and proposed sidewalks and associated improvements. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			

<table>
<tr><th colspan="4">Worksheet C.4-1 Page 2 of 4</th></tr>
<tr><td>Criteria</td><td>Screening Question</td><td>Yes</td><td>No</td></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>X</td><td></td></tr>
<tr><td colspan="4">Provide basis:

Based on our experience and review of www.water.ca.gov website, groundwater is expected to be deeper than 100 feet; therefore, the risk of impacting the groundwater as a result of storm water infiltration is very low.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.</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:

From a geotechnical perspective, due to the very low permeability of the underlying soils, we do not expect a significant change in any stream flow or seasonality of stream flow or increased risk of contaminated groundwater to adversely impact any stream flows. 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.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.</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>Full Infiltration Not Feasible</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:

The unfactored infiltration rates are 0.001, 0.015 and 0.004 inches per hour.
Based on the geotechnical study and infiltration test results, the soil conditions at the site does not allow for full or partial infiltration.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.

Criteria	Screening Question	Yes	No
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:

Based on our study and information presented in the update geotechnical report dated March 31, 2017, the site will have variable soil conditions consisting of compacted fills and Very Old Paralic Deposits. Infiltration into compacted fill can cause heaving and/or settlement and distress to infrastructure within the Interstate 905 Right of Way and Otay Mesa Road and associated improvements. As the test results indicate, infiltration rates are very low across the site, there is a high probability that infiltration, even in inappreciable amounts, will migrate laterally to compacted fills, adjacent utility lines and could cause distress to existing and proposed site improvements. To reduce the potential for lateral water migration, side and bottom liners should be installed in proposed detention basins.

Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.

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: Based on our experience and review of www.water.ca.gov website, groundwater is expected to be deeper than 100 feet; therefore, the risk of impacting the groundwater as a result of storm water infiltration is very low. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
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: Researching downstream water rights is beyond the scope of our geotechnical services. In this regard, we are not aware of any downstream water rights that would be adversely impacted by storm water BMP's at the site. The volume of storm water to percolate into the ground is expected to be very low. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
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 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

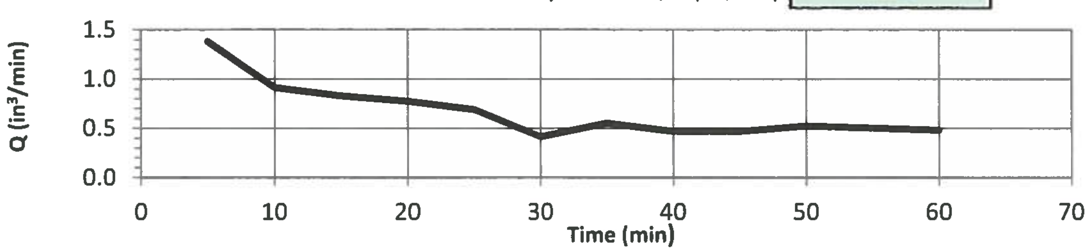
Aardvark Permeameter Data Analysis

Project Name:	Sunroad Otay 50		Date:	2/6/2017
Project Number:	07740-42-02		By:	JML
Test Number:	A-1			

Borehole Diameter, d (in.):	4.50		Ref. EL (feet, MSL):	0.0
Borehole Depth, **H** (in):	47.00		Bottom EL (feet, MSL):	-3.9
Distance Between Reservoir & Top of Borehole (in.)	29.00			
Estimated Depth to Water Table, **S** (feet):	50.00			
Height APM Raised from Bottom (in.):	1.00			
Pressure Reducer Used:	No			

Distance Between Resevoir and APM Float, **D** (in.):	67.75
Head Height Calculated, **h** (in.):	4.73
Head Height Measured, **h** (in.):	4.50
Distance Between Constant Head and Water Table, **L** (in.):	557.50

Reading	Time Elapsed (min)	Water Weight Consummed (lbs)	Water Volume Consummed (in^3)	Q (in^3/min)
1	0.00	0.000	0.00	0.00
2	2.00	0.005	0.14	0.069
3	2.00	0.000	0.00	0.000
4	2.00	0.010	0.28	0.138
5	2.00	0.005	0.14	0.069
6	2.00	0.010	0.28	0.138
7	5.00	0.010	0.28	0.055
8	10.00	0.010	0.28	0.028
9	5.00	0.005	0.14	0.028
			Steady Flow Rate, Q (in^3/min):	0.028



Soil Matric Flux Potential, Φ_m

Φ_m= 0.001 in^2/min

Field-Saturated Hydraulic Conductivity (Infiltration Rate)

K_{sat} = 2.00E-05 in/min   0.001 in/hr

GEOCON

Aardvark Permeameter Data Analysis

Project Name: Sunroad Otay 50 Date: 2/6/2017

Project Number: 07740-42-02 By: JML

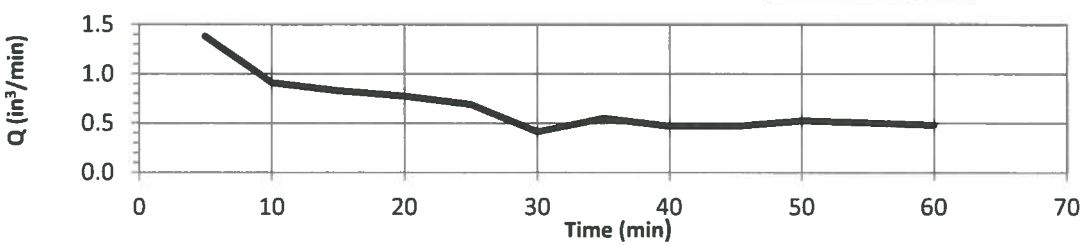
Test Number: A-2 Ref. EL (feet, MSL): 0.0

Bottom EL (feet, MSL): -4.1

Borehole Diameter, d (in.):	4.50
Borehole Depth, **H** (in):	49.00
Distance Between Reservoir & Top of Borehole (in.)	28.00
Estimated Depth to Water Table, **S** (feet):	50.00
Height APM Raised from Bottom (in.):	1.00
Pressure Reducer Used:	No

Distance Between Resevoir and APM Float, **D** (in.):	68.75
Head Height Calculated, **h** (in.):	4.73
Head Height Measured, **h** (in.):	4.50
Distance Between Constant Head and Water Table, **L** (in.):	555.50

Reading	Time Elapsed (min)	Water Weight Consummed (lbs)	Water Volume Consummed (in^3)	Q (in^3/min)
1	0.00	0.000	0.00	0.00
2	2.00	0.160	4.43	2.215
3	2.00	0.110	3.05	1.523
4	2.00	0.105	2.91	1.454
5	2.00	0.090	2.49	1.246
6	2.00	0.090	2.49	1.246
7	2.00	0.085	2.35	1.177
8	1.00	0.050	1.38	1.385
9	1.00	0.045	1.25	1.246
10	1.00	0.030	0.83	0.831
11	1.00	0.035	0.97	0.969
12	1.00	0.035	0.97	0.969
13	1.00	0.035	0.97	0.969
14	2.00	0.060	1.66	0.831
15	2.00	0.055	1.52	0.762
16	2.00	0.060	1.66	0.831
17	1.00	0.025	0.69	0.692
18	1.00	0.030	0.83	0.831
19	2.00	0.060	1.66	0.831
20	2.00	0.060	1.66	0.831
21	10.00	0.290	8.03	0.803
			Steady Flow Rate, Q (in^3/min):	0.803



Soil Matric Flux Potential, Φ_m

Φ_m= 0.024 in^2/min

Field-Saturated Hydraulic Conductivity (Infiltration Rate)

K_{sat} = 2.45E-04 in/min 0.015 in/hr

GEOCON

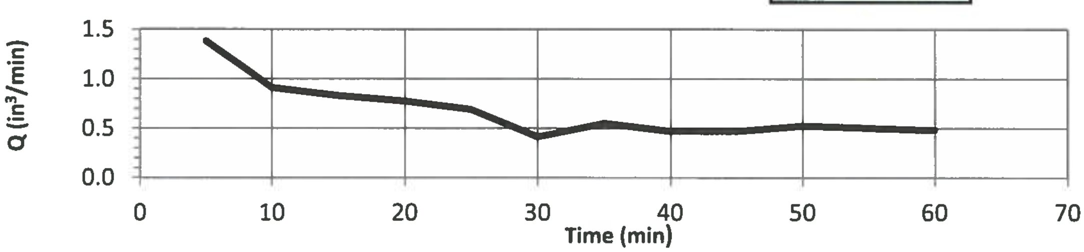
Aardvark Permeameter Data Analysis

Project Name:	Sunroad Otay 50	Date:	2/6/2017
Project Number:	07740-42-02	By:	JML
Test Number:	A-3	Ref. EL (feet, MSL):	0.0
		Bottom EL (feet, MSL):	-4.3

Borehole Diameter, d (in.):	4.50
Borehole Depth, **H** (in):	52.00
Distance Between Reservoir & Top of Borehole (in.)	29.00
Estimated Depth to Water Table, **S** (feet):	50.00
Height APM Raised from Bottom (in.):	1.00
Pressure Reducer Used:	No

Distance Between Resevoir and APM Float, **D** (in.):	72.75
Head Height Calculated, **h** (in.):	4.74
Head Height Measured, **h** (in.):	4.50
Distance Between Constant Head and Water Table, **L** (in.):	552.50

Reading	Time Elapsed (min)	Water Weight Consummed (lbs)	Water Volume Consummed (in^3)	Q (in^3/min)
1	0.00	0.000	0.00	0.00
2	2.00	0.030	0.83	0.415
3	2.00	0.030	0.83	0.415
4	2.00	0.005	0.14	0.069
5	2.00	0.025	0.69	0.346
6	2.00	0.020	0.55	0.277
7	5.00	0.030	0.83	0.166
8	10.00	0.085	2.35	0.235
9	10.00	0.070	1.94	0.194
			Steady Flow Rate, Q (in^3/min):	0.194



Soil Matric Flux Potential, Φ_m

Φ_m= 0.006 in^2/min

Field-Saturated Hydraulic Conductivity (Infiltration Rate)

K_{sat} = 5.90E-05 in/min 0.004 in/hr

UPDATE
GEOTECHNICAL INVESTIGATION

SUNROAD OTAY 80
OTAY MESA ROAD AND
AVENIDA COSTA AZUL
SAN DIEGO, CALIFORNIA

GEOCON
INCORPORATED

GEOTECHNICAL
ENVIRONMENTAL
MATERIALS

PREPARED FOR

SUNROAD ENTERPRISES
SAN DIEGO, CALIFORNIA

OCTOBER 10, 2006
PROJECT NO. 07740-22-01

GEOCON
INCORPORATED
GEOTECHNICAL ■ ENVIRONMENTAL ■ MATERIALS

Project No. 07740-22-01
October 10, 2006

Sunroad Enterprises
4445 Eastgate Mall, Suite 400
San Diego, California 92121

Attention: Mr. Tom Story

Subject: SUNROAD OTAY 80
OTAY MESA ROAD AND AVENIDA COSTA AZUL
SAN DIEGO, CALIFORNIA
UPDATE GEOTECHNICAL INVESTIGATION

Gentlemen:

In accordance with your authorization of our proposal (LG-06372), dated September 26, 2006, we have prepared this update geotechnical investigation for the subject project. The accompanying report discusses soil and geologic conditions at the site and provides recommendations relative to the geotechnical engineering aspects for developing the project as presently proposed.

Provided that the recommendations of the report are followed, the site is considered suitable for construction of the planned development.

Should you have questions regarding this update report, or if we may be of further service, please contact the undersigned at your convenience.

Very truly yours,

GEOCON INCORPORATED

Raul R. Garcia
RCE 42132

REGISTERED PROFESSIONAL ENGINEER
RAUL R. GARCIA
No. 42132
Exp. 03/31/08
CIVIL
STATE OF CALIFORNIA

Nathan A. Ash
CEG 2288

PROFESSIONAL GEOLOGIST
NATHAN A. ASH
NO. 2288
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

Joseph J. Vettel
GE 2401

REGISTERED PROFESSIONAL ENGINEER
JOSEPH J. VETTEL
No. 2401
EXP. 09/30/08
GEOTECHNICAL
STATE OF CALIFORNIA

RRG:NAA:JJV:anh

(2) Addressee
(1/del) MW Steele
Attention: Ms. Christine Babla
(5/del) Kimley Horn & Associates
Attention: Mr. Brian Repsher

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UPDATE GEOTECHNICAL INVESTIGATION

1. PURPOSE AND SCOPE

This report summarizes the findings of our update geotechnical investigation of the proposed new Sunroad Otay 80 project located south of Otay Mesa Road and east of proposed Avenida Costa Azul in the Otay Mesa area of San Diego, California (See Vicinity Map, Figure 1). The purpose of this study was to update previous geotechnical investigations performed by Geocon Incorporated, to evaluate whether the conclusions and recommendations presented in the referenced reports are relevant to the existing conditions, and to provide further recommendations for site development.

The scope of the study included a review of the following geotechnical reports previously prepared for the industrial subdivision and the current project plans:

1. *Soil and Geologic Investigation for San Diego Mesa Center, Tract 86-1006, San Diego, California,* prepared by Geocon Incorporated, dated October 19, 1989 (Project No. D-4435-J01).

2. *Soil and Geologic Investigation for Otay Mesa III Limited, San Diego, California,* dated April 26, 1989 revised October 13, 1989 (Project No. D-4341-J01).

3. *Grading Plans for Sunroad Otay 80,* prepared by Kimley Horn and Associates Incorporated.

The scope of this update geotechnical investigation also included a review of readily available (in-house) published geologic literature pertinent to the property. Reports and published literature reviewed for this investigation are summarized in the *List of References* at the end of this report.

The purpose of the referenced geotechnical investigations was to evaluate the surface and subsurface soil and geologic conditions at the site and, based on the conditions encountered, provide recommendations relative to the geotechnical engineering aspects of proposed site development. Previous subsurface exploration included 4 borings and 16 trenches used to determine the thickness of surficial soil (topsoil, undocumented fill, etc.), collect samples for laboratory testing, and to roughly delineate the near-surface geologic units. Details of the previous field investigation and the boring and trench logs are presented in Appendix A.

Laboratory testing was performed in 1989 during our previous investigations on selected representative samples secured during the subsurface investigation. The purpose of the laboratory testing was to evaluate pertinent physical and chemical soil properties for engineering analysis to assist in providing recommendations for site grading and development. Details of the laboratory testing and a summary of the test results are presented in Appendix B.

The Geologic Map, Figure 2 (map pocket) depicts the configuration of the property, proposed grading, existing topography and geology, and the approximate locations of exploratory excavations. The proposed grading is based on the referenced grading plans prepared by Kimley Horn and Associates.

Conclusions and recommendations presented herein are based on an analysis of the data obtained from our recent geologic reconnaissance, and our review of our previous studies, previous laboratory testing, and our experience with similar soil and geologic conditions.

2. SITE AND PROJECT DESCRIPTION

The site consists of approximately 80 acres of undeveloped land located south of Otay Mesa Road and Piper Ranch Road, and east of proposed Avenida Costa Azul in the Otay Mesa area of San Diego, California. Specifically, the site is a semi-rectangular parcel extending approximately 1,000 feet to the south from Otay Mesa Road and approximately 2,500 feet to the east from proposed Avenida Costa Azul. The project limits are presented on the Geologic Map, Figure 2.

Topographically, the site is relatively level with a natural southwesterly drainage gradient. Elevations vary from approximately 520 feet Mean Sea Level (MSL) in the northeastern corner to approximately 485 feet MSL at the southwest corner. Vegetation typically consists of native weeds and grasses.

Based on our review of the site grading plans and our conversations with you, we understand that proposed improvements will consist of an industrial park containing 24 sheet-graded pads with associated city streets, and utilities. We expect that the sheet-graded lots will receive one- and two-story structure buildings supported on conventional continuous and isolated spread footings. Grading to construct the sheet-graded pads is expected to be relatively minor consisting of cuts and fills of less than 10 feet. Two detention basins are planned during rough grading, one in the central portion and one along the southern margin of the site. Surface drainage will be directed towards the two detention basins.

3. SOIL AND GEOLOGIC CONDITIONS

Two surficial soil deposits and two geologic formations exist at the site. Surficial soil consists of undocumented fill and topsoil. Geologic units include Quaternary-age Terrace Deposits and Tertiary-age Otay Formation. Descriptions of the surficial soil and formational units are provided in order of increasing age. The expected subsurface relationship between the geologic units is presented on the Geologic Cross-Section A-A', Figure 3.

3.1 Undocumented Fill (Qudf)

Undocumented fill exists at isolated locations in the southern portion of the site (see Trenches T-4A and T-9A). Fill thickness was a maximum of 6 feet and consisted of loose silty sand and gravelly sand. The undocumented fill is unsuitable for support of settlement sensitive structures and/or improvements and will require complete removal and recompaction.

3.2 Topsoil (unmapped)

Topsoil exists throughout the site with thicknesses of approximately 2 to 3 feet. The topsoil, as exposed in exploratory borings and trenches, consists of soft, dry to damp sandy clay and loose, dry, clayey sand. The topsoil is also unsuitable for support of settlement sensitive structures and/or improvements and will require complete removal and recompaction.

3.3 Terrace Deposits (Qt)

Terrace Deposits underlie the topsoil and undocumented fill over the majority of the site. Terrace Deposit materials consist of two relatively distinct layers; an upper, highly expansive clay layer over a lower granular layer. The upper clay layer consists of approximately 6 to 15 feet of soft to hard sandy clay. The clay layer is generally thicker in the northern and western portions of the site. The lower granular layer consists of dense silty sand, sandy gravel and clayey sand. Results of our previous laboratory testing indicate that the lower granular soils have a "low" expansion potential and therefore should provide excellent capping material. Cobble content increases with depth within the sandier portions. The Terrace Deposits should provide adequate foundation support in their present condition or as compacted fill. Highly expansive Terrace Deposits, if exposed at finish grade, will require special foundation design criteria, as discussed in subsequent sections.

3.4 Otay Formation (To)

Formational materials of the Otay Formation exist in the eastern corner of the site. This formation consists of very dense, moist to very moist, fine- to medium-grained silty sandstone to sandy siltstone. The Otay Formation exhibits "low" to "medium" expansion characteristics and should provide suitable capping material for the proposed building pad. The Otay Formation is suitable for the support of compacted fill and structural loads.

4. GROUNDWATER

Perched groundwater was encountered at depths of 36 feet in Boring B-2A and at 16, 23½, and 36 feet in Boring B-2B. Groundwater or seepage was not encountered in the other exploratory excavations conducted on the property. As the perched condition is relatively deep with respect to planned grading and improvements, groundwater should not adversely impact the proposed development.

5. GEOLOGIC STRUCTURE

Bedding within the Terrace Deposits ranges from massive to well-developed and bedding attitudes are typically horizontal. The Otay Formation is massive and generally dips slightly (0 to 4 degrees) both to the north and south. Geologic structure is not expected to present a constraint to the proposed project.

6. GEOLOGIC HAZARDS

6.1 Geologic Hazard Category

Review of the City of San Diego *Seismic Safety Study, Geologic Hazards and Faults*, 1995 Edition indicates the site is designated in Zone 53, *Level or Sloping Terrain, unfavorable geologic structure, low to moderate risk.* Proposed development of the site will result in a fairly level pad and the surrounding area has little topographic relief, therefore the geologic risk at the site is considered to be low.

6.2 Faulting and Seismicity

No faults are known to exist at the site or in the immediate vicinity and none were encountered during our previous investigation. The main trace of the La Nación Fault zone lies approximately 1.5 miles to the west of the site. The La Nación Fault zone has been the subject of discussion within the geologic community regarding is recency of activity. To date, no evidence for movement along the fault zone within Holocene time (11,000 years before present) has been demonstrated. Currently, the California Division of Mines and Geology has classified the La Nación Fault zone as *potentially active*, meaning the fault has undergone movement within Pleistocene time (1 to 2 million years before present) but not within Holocene time. As the La Nación Fault is approximately 1.5 miles from the site no adverse geologic impact exists to this due to this fault.

The nearest active fault in the Rose Canyon Fault Zone located approximately 11 miles west of the site. Portions of the Rose Canyon Fault Zone have been included in an Alquist-Priolo Earthquake Fault Zone. This site is not located in any such zone. The results of the seismicity analyses indicate that the Rose Canyon Fault is the dominant source of potential ground motion at the site. Earthquakes on the Rose Canyon Fault having a maximum magnitude of 7.2 are considered to be representative of the potential for seismic ground shaking within the property. The "maximum magnitude" is defined as the maximum earthquake that appears capable of occurring under the presently known tectonic framework (California Division of Mines and Geology Notes, Number 43). The estimated maximum ground acceleration expected at the site was calculated to be approximately 0.26g, using the Sadigh, *et al.* (1997), attenuation relationship. The earthquake events and site accelerations for the faults within a 50-mile radius of the site considered most likely to subject the site to ground shaking are presented on Table 6.2.

TABLE 6.2
DETERMINISTIC SITE PARAMETERS FOR SELECTED ACTIVE FAULTS

Fault Name	Distance From Site (miles)	Maximum Magnitude Event	
		Magnitude	Peak Site Acceleration (g)
Rose Canyon	11	7.2	0.26
Coronado Bank	18	7.6	0.20
Elsinore (Julian)	42	7.1	0.05
Elsinore (Coyote Mountain)	44	6.8	0.04
Earthquake Valley	46	6.5	0.03
Newport Inglewood (offshore)	49	7.1	0.04

The site could be subject to moderate to severe ground shaking in the event of an earthquake along any of the faults listed in Table 6.1 or other faults in the southern California/northern Baja California region. However, we do not consider the site to possess any greater seismic risk than that of the surrounding developments. While listing of peak accelerations is useful for comparison of potential effects of fault activity in a region, other considerations are important in seismic design, including the frequency and duration of motion and the soil conditions underlying the site. We recommend that seismic design of the structures be performed in accordance with Uniform Building Code (UBC) guidelines which are currently adopted by the City of San Diego.

6.3 Liquefaction

Liquefaction is limited to those soils that are in a relatively loose, unconsolidated condition located below the groundwater table that are subjected to ground accelerations generated from earthquakes. Due to the dense nature of the Terrace Deposits and Otay Formation underlying the site and the lack of a permanent near surface water table, the liquefaction potential is considered to be very low.

6.4 Landslides

Landslides or unstable slope conditions on or adjacent to the site have not been mapped in the Seismic Safety Study or published geologic literature, and were not observed during our geologic reconnaissance. Landslides are not considered a geologic hazard to development of the site as proposed.

6.5 Tsunamis and Seiches

The site is not located near the ocean or any other large bodies of water, so there is no risk of tsunamis or seiches affecting the site

7. CONCLUSIONS AND RECOMMENDATIONS

7.1 General

7.1.1 Based on our geologic reconnaissance, the site is in a similar condition to that encountered during our previous geotechnical investigations. It is the opinion of Geocon Incorporated that the conclusions and recommendations presented in this update report and in the previous geotechnical investigations are valid for the proposed site development.

7.1.2 No soil or geologic conditions were observed that would preclude development of the property as planned provided the recommendations of this report are followed.

7.1.3 Undocumented fill and topsoil underlie the majority of the site to depths up to 6 feet, but are generally less than 3 feet thick. Highly expansive clays comprise the upper portions of the Terrace Deposits, extending to depths ranging from approximately 6 to 15 feet. Granular, low-expansive Terrace Deposits underlie this clay layer. Otay Formation is exposed in the northeast corner of the site.

7.1.4 The undocumented fill, topsoil, and isolated, soft portions of the Terrace Deposits are unsuitable in their present condition for support of settlement sensitive structures and/or surface improvements. As such, removal and recompaction of these materials will be required. The majority of the Terrace Deposits and Otay Formation are suitable for the support of compacted fill and structural loads.

7.1.5 The primary geotechnical constraint to the property is the presence of highly expansive clayey soil within the near surface. To mitigate expansive soil, removal of highly expansive soil within the upper 4 feet of pad grade and replacement with low-expansive materials or lime treatment of the existing clay should be performed. Recommendations for both these options are provided herein. Foundation recommendations, pavement, and concrete slabs-on-grade will require deeper foundations and structural sections in the event that highly expansive soil remains within 4 feet of finish grade.

7.1.6 The deeper Terrace Deposits consist predominately of silty to slightly clayey sand and gravelly sand. This material has "low" expansion characteristics and would be beneficial material for use in capping of the building pad and parking areas. In order to get sufficient quantities to cap the site stockpiling and mining of the deeper Terrace Deposits may be required. Alternatively, import of low-expansive soils as capping material could be performed.

7.1.7 The proposed structures can be supported on conventional shallow foundations founded in compacted fill or formational materials.

7.1.8 Surface settlement monuments or canyon subdrains will not be necessary for the project.

7.2 Excavation Characteristics

7.2.1 The on-site materials can generally be excavated with moderate to heavy effort using conventional heavy-duty earthwork equipment. Depending upon the season when grading occurs, the grading contractor may encounter difficulties placing the on-site clays due to excessive moisture content. Mixing of clays and use of special equipment such as discs and/or sheepsfoot compactors may be required to properly place the clays as structural fill. Excavations within the sandy portions of the Terrace Deposits and the Otay Formation will require a heavy effort to efficiently excavate.

7.2.2 The on-site clays possess high expansion characteristics (Expansion Indexes varying from 93 to 127) thereby classifying them as *high* expansive soils per UBC Table 18-I-B. Ideally, mitigation of expansive materials would best be suited by placement of a 4-foot-thick, low-expansive soil cap. This would reduce the amount of expansive soil movement (swell or shrink) thereby reducing potential distress to building slabs-on-grade, concrete hardscape and pavement areas.

7.2.3 Soil samples obtained during the previous field investigations were tested to determine the amount of water-soluble sulfate for evaluation of the potential for damage to normal Portland Cement Concrete. The results of the soluble sulfate testing are presented in Appendix B. The test results indicate low sulfate contents with a corresponding *negligible* sulfate rating based on Table 19-A-4 of the 1997 Uniform Building Code (UBC). UBC guidelines should be followed in determining the type of cement to be used. The presence of water-soluble sulfate 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 or chemicals in landscape water) may affect the sulfate concentration.

7.3 Grading

7.3.1 All grading should be performed in accordance with the *Recommended Grading Specifications* contained in Appendix C. Where the recommendations of this report conflict with those of Appendix C; this section of the report takes precedence. All grading should be observed by a representative of Geocon Incorporated to verify that the recommendations of this report have been followed.

7.3.2 Prior to commencing grading, a preconstruction conference should be held at the site with the owner and/or developer, grading contractor, civil engineer, and geotechnical engineer in attendance. Special soil handling and/or the grading plans can be discussed at that time.

7.3.3 Site preparation should begin with the removal of all deleterious material and vegetation. The depth of removal should be such that material exposed in cut areas or soils to be used as fill are relatively free of organic matter. Material generated during stripping and/or site demolition should be exported from the site.

7.3.4 Compressible surficial deposits (undocumented fill/topsoil/soft, clayeyTerrace Deposits) should be completely removed and recompacted prior to placement of additional fill. The grading should be observed by a representative of Geocon Incorporated to evaluate removals of the compressible surficial deposits.

7.3.5 Import soil, if required, should consist of granular materials with a "low" expansion potential (EI less than 50). Prior to importing, representative samples of proposed borrow materials should be obtained and subjected to laboratory expansion testing to verify if the soil conforms to the recommended expansion criteria.

7.3.6 The primary geotechnical constraint to the property is the presence of highly expansive soil in the near surface. To mitigate expansive soil movement, removal of highly expansive soil and replacement with low-expansive materials or lime treatment of the existing clay should be performed. Recommendations for both these options are provided below.

7.4 Grading Option 1 – Replacement of Expansive Soils

7.4.1 One method of obtaining material for a low-expansive cap on the site is to mine the deeper on-site low-expansive Terrace Deposits. Based on trench excavations, the deeper Terrace Deposits consist of silty, gravelly sands with cobble contents up to 40 percent by weight. Alternatively, removal of the clays and replacement with imported low-expansive soil can be performed; although this option may be cost prohibitive. Typically, dependent upon location of import materials, mining of on-site soils is a better cost effective alternative. Trench excavations indicate that low-expansive materials are more readily available (shallow depths) for mining at the south and east ends of the property.

7.4.2 For the mining option, we recommend that sufficient low-expansive material be excavated to provide a minimum cap of 4 feet for building pads hardscape parking areas. Depending on the final location of pavement and the type and quantity of the traffic, the thickness of low-expansive cap in pavement and hardscape areas may be modified. Where the dock high doors are planned, the 4-foot thickness should be with respect to the lower elevations where the building footings will be placed. The project Civil Engineer should determine the size, depth, and location of excavation required to generate sufficient capping materials based on depths to low-expansive materials encountered in the exploratory excavations. The mined area should be sized so that overexcavated highly expansive materials can be placed back in the mined area and be covered with the recommended thickness of low-expansive soil.

7.4.3 Overexcavations will be required in some locations to establish the compacted mat of low-expansive materials. Where fills are planned, overexcavations should extend to 4 feet below proposed rough grades or through existing undocumented fill/topsoil, whichever is deeper. The excavation should also extend at least 5 feet beyond the building perimeter. The base of the overexcavation should expose competent Terrace Deposits or Otay Formation. For footing areas at the dock high walls, overexcavation depths should be measured from the lowest adjacent grade.

7.4.4 The exposed ground surface following removals, overexcavation or mining should be scarified, moisture conditioned and compacted. Fill soils may then be placed and compacted in layers to the design finish grade elevations. All fill should be compacted to at least 90 percent of laboratory maximum dry density as determined by ASTM D 1557-02; at or slightly above optimum moisture content. Fill areas where in-place density tests indicate moisture contents less than optimum will require additional moisture conditioning prior to placing fill.

7.4.5 Dependent upon the in situ moisture content of the clay, special equipment (i.e. discs and/or sheepsfoot compactors) may be required to place, mix, and properly compact the expansive materials. Overexcavated clays should be placed with a moisture content at least 4 percent above optimum moisture content.

7.5 Grading Option 2 – Lime-Treated Soils

7.5.1 As an alternative to replacement with low-expansive soils, lime treatment of the on-site clay can be used to mitigate expansive soil conditions. If used, lime-treated soils should be placed such that a 4-foot-thick, lime-treated soil mat is located beneath buildings, hardscape and pavement. Use of lime-treated soils in pavement areas would result in reduced structural pavement sections as compared to those required for untreated soils. Depending on the final location of pavement and the type and quantity of traffic, the thickness of lime treatment in pavement and hardscape areas may be modified.

7.5.2 Typical in-place lime-treatment operations result in treatment of the upper 12 inches of soil. As such, overexcavation and stockpiling will be required to process, lime treat, place and compact the treated soils to achieve the above recommended thicknesses. The initial excavation should extend through the undocumented fill/topsoil and at least 4 feet below proposed grades, whichever is deepest. The base of the excavation should be scarified to a depth of 12 inches, treated with a lime at a ratio of 6 percent quick lime by dry weight, moisture conditioned to 1 to 3 percent above optimum moisture content and recompacted to at least 90 percent of laboratory maximum dry density as determined by ASTM D 1557-02.

7.5.3 Excavated and stockpiled soils should then be mixed with quick lime by dry weight, uniformly moisture conditioned to 1 to 3 percent above optimum moisture content, placed in 6-to 8-inch thick layers and compacted to at least 90 percent relative compaction. Typical lime content for clays in the Otay Mesa is approximately 6 percent quick lime.

7.5.4 Application of lime, mixing, placing, and compacting should be performed in accordance with procedures contained in Section 24 of the *Caltrans Manual* and Section 301-5 of the *Standard Specifications for Public Works Construction* (Green Book).

7.5.5 The above recommended lime percentages are based on laboratory tests results conducted for nearby projects on Otay Mesa with similar soil conditions. If this alternative is selected, representative samples of the clayey materials should be obtained and subjected to laboratory testing with varying lime contents to determine the optimum percentage to achieve stabilization. For preliminary criteria, lime treatment should result in a Plasticity Index (PI) of 15 or less.

7.5.6 Due to the recommended lime content and clayey nature of the soils, difficult compaction should be expected. Lime treatment of the highly expansive clays will substantially reduce the potential for future expansion of the soils and associated distress to foundations and surface improvements.

7.6 Seismic Design Criteria

7.6.1 The following table summarizes site specific design criteria obtained from the 1997 Uniform Building Code (UBC). The values listed are for the Elsinore Fault and the Rose

Canyon Fault the nearest Type A and B faults, respectively. Consideration of both faults yielded the same parameters for the analysis.

TABLE 7.6
SEISMIC DESIGN PARAMETERS

Parameter	Value	UBC Reference
Seismic Zone Factor	0.40	Table 16-I
Soil Profile Type	S_c	Table 16-J
Seismic Coefficient, C_A	0.40	Table 16-Q
Seismic Coefficient, C_V	0.56	Table 16-R
Near Source Factor, N_A	1.0	Table 16-S
Near Source Factor, N_V	1.0	Table 16-T
Seismic Source	A & B	Table 16-U

7.7 Foundation Recommendations

7.7.1 Foundation recommendations presented herein are based on low-expansive or lime-treated soils within 4 feet of rough pad grade placed and compacted in accordance with the recommendations presented above.

7.7.2 Conventional continuous and/or isolated spread footings are suitable for support of the proposed building. Continuous footings should be at least 12 inches wide and 18 inches deep (below lowest adjacent grade). Isolated spread footings should be at least 2 feet wide and extend 18 inches below lowest adjacent grade. A typical wall/column footing dimension detail is presented in Figure 4.

7.7.3 Continuous footings should be reinforced with four No. 4 steel reinforcing bars, two placed near the top of the footing and two near the bottom. The project structural engineer should design reinforcement for spread footings.

7.7.4 Foundations proportioned as recommended may be designed for an allowable soil bearing pressure of 2,500 psf (dead plus live loads). This bearing pressure may be increased by 300 psf and 500 psf for each additional foot of foundation width and depth, respectively, up to a maximum allowable soil bearing pressure of 4,000 psf.

7.7.5 The allowable soil bearing recommendations presented above are for dead plus live loads only and may be increased by up to one third when considering transient loads such as those due to wind or seismic forces.

7.7.6 The building concrete slab will likely be subjected to heavy loading from forklift loading and storage of supplies. We recommend that the slab be designed by the structural engineer to accommodate the loading requirements. Based on soil conditions, we recommend a minimum 6-inch thick concrete slab reinforced with No. 3 steel reinforcing bars spaced 18 inches on center in both directions and placed at the slab midpoint. The slab should be underlain by at least 4 inches of clean sand and where moisture sensitive floor coverings or slab moisture would be objectionable a visqueen moisture barrier should be placed in the middle of the sand blanket. If a structural section is required beneath the slab to support forklift loading or to support cranes for lifting of tilt-up panels, Class 2 aggregate base should be used in lieu of the clean sand beneath the slab.

7.7.7 Exterior concrete flatwork not subject to vehicular traffic should be at least 4 inches thick and reinforced with 6x6-6/6 welded wire mesh. All concrete flatwork should be provided with crack control joints to reduce and/or control shrinkage cracking. Control joint spacing should be provided by the 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. Prior to placing, the subgrade should be compacted to at least 90 percent relative compaction at or slightly above optimum moisture content.

7.7.8 No special subgrade presaturation is deemed necessary prior to placing concrete; however, the exposed foundation and slab subgrade soils should be sprinkled as necessary, to maintain a moist soil condition as would be expected in any such concrete placement.

7.7.9 The recommendations of this report are intended to reduce the potential for cracking of slabs due to expansive soils (if present), differential settlement of fill or fill of varying thicknesses. However, even with the incorporation of the recommendations presented herein, foundations, stucco walls, and slabs-on-grade placed on such conditions may still exhibit some cracking due to soil movement and/or shrinkage. The occurrence of concrete shrinkage cracks is independent of the supporting soil characteristics. Their occurrence may be reduced and/or controlled by limiting the slump of the concrete, proper concrete placement and curing, and by the placement of crack-control joints at periodic intervals, in particular, where re-entrant slab corners occur.

7.8 Retaining Walls and Lateral Loads

7.8.1 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 density of 30 pounds per cubic foot (pcf). Where the backfill will be inclined at no steeper than 2.0 to 1.0, an active soil pressure of 40 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 of less than 50. Stockpiling of low-expansive soils and/or import of select material will likely be required to provide acceptable retaining wall backfill soils.

7.8.2 Unrestrained walls are those that are allowed to rotate more than 0.001H at the top of the wall. Where walls are restrained from movement at the top, an additional uniform pressure of 7H psf (where H equals the height of the retaining wall portion of the wall in feet) should be added to the above active soil pressure.

7.8.3 All 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, etc.) is not recommended where the seepage could be a nuisance or otherwise adversely impact the property adjacent to the base of the wall. A typical retaining wall drainage detail is presented in Figure 5. The above recommendations assume a properly compacted granular (Expansion Index less than 50) backfill material with no hydrostatic forces or imposed surcharge load. If conditions different than those described are anticipated, or if specific drainage details are desired, Geocon Incorporated should be contacted for additional recommendations.

7.8.4 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 3 feet below the base of the wall has an Expansion Index of less than 90. 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.

7.8.5 For resistance to lateral loads, an allowable 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 natural soils. The allowable passive pressure assumes a horizontal surface extending away from the base of the wall at least 5 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. An allowable friction coefficient of 0.4 may be used for resistance to sliding between soil and concrete. This friction coefficient may be combined with the allowable passive earth pressure when determining resistance to lateral loads.

7.9 Preliminary Pavement Recommendations

7.9.1 Pavement recommendations provided herein are based on the upper 3 feet of pavement subgrade soil consisting of low-expansive or lime-treated materials. Final pavement recommendations can be provided once subgrade elevations are achieved. Subgrade soil samples should be obtained and subjected to R-Value tests to verify these sections remain applicable or to modify them based on laboratory test results.

TABLE 7.9
PRELIMINARY PAVEMENT RECOMMENDATIONS

Location	Asphalt Concrete (Inches)	Class 2 Base (Inches)
Parking Areas	3	6
Driveways (cars)	3	8
Driveways (heavy trucks)	4	12

7.9.2 Asphalt concrete should conform to Section 203-6 of the *Standard Specifications for Public Works Construction* (Green Book). Class 2 aggregate base materials should conform to Section 26-1.02A of the *Standard Specifications of the State of California, Department of Transportation* (Caltrans).

7.9.3 Prior to placing base materials, the subgrade should be scarified, moisture conditioned and compacted to at least 95 percent relative compaction. The depth of scarification should be at least 12 inches. Base materials should be compacted to at least 95 percent relative compaction.

7.9.4 Loading aprons such as trash bin enclosures should utilize Portland cement concrete. The pavement should consist of a minimum 6-inch concrete section reinforced with No. 3 steel reinforcing bars spaced 24 inches on center in both directions placed at the slab midpoint. The concrete should extend out from the trash bin such that both the front and rear wheels of the trash truck will be located on reinforced concrete pavement when loading.

7.9.5 The performance of pavements is highly dependent upon providing positive surface drainage away from the edge of pavements. Ponding of water on or adjacent to the pavement will likely result in saturation of the subgrade materials and subsequent pavement distress.

7.10 Drainage

7.10.1 Establishing proper drainage is critical to reduce the potential for differential soil movement, erosion, and subsurface seepage. Positive measures should be taken to properly finish-grade the building pads after the structures and other improvements are in place so that the drainage water from the lots and adjacent properties are directed off the lots and to the street away from foundations and the top of the slopes. Experience has shown that even with these provisions, a shallow groundwater or subsurface water condition can develop in areas where no such water conditions existed prior to the site development; this is particularly true where a substantial increase in surface water infiltration results from an increase in landscape irrigation.

7.10.2 All underground utilities should be leak free. Utility and irrigation lines should be checked periodically for leaks for early detection of water infiltration and detected leaks should be repaired promptly. Detrimental soil movement could occur if water is allowed to infiltrate the soil for a prolonged period of time.

7.10.3 Landscaping planters adjacent to paved areas are not recommended due to the potential for surface or irrigation water to infiltrate the pavement's subgrade and base course. Drains should be installed to collect excess irrigation water and transmit it to drainage structures or impervious above-grade planter boxes be used. In addition, where landscaping is planned adjacent to the pavement, we recommend construction of a cutoff wall along the edge of the pavement that extends at least 6 inches below the bottom of the base material.

7.11 Grading and Foundation Plan Review

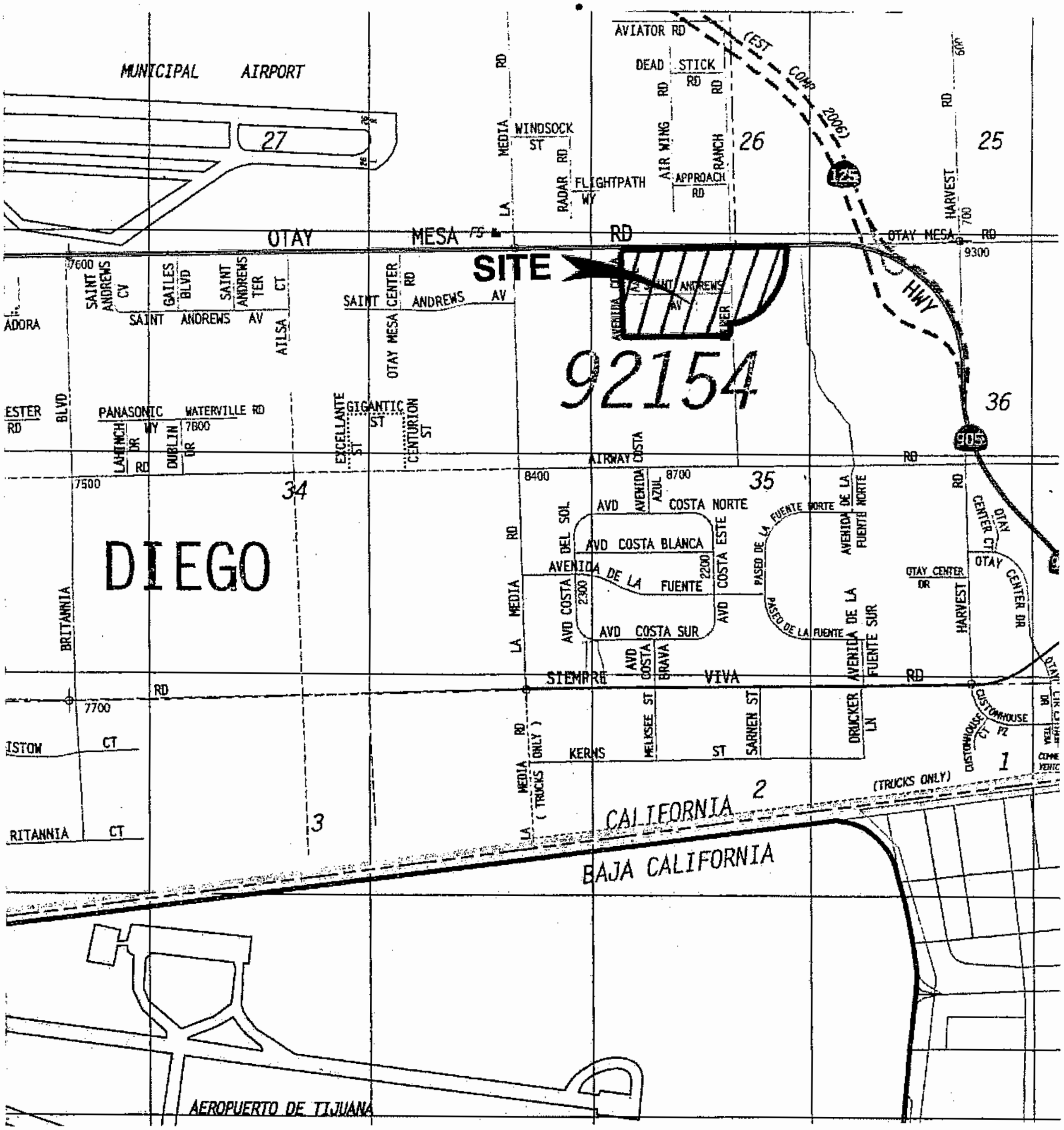
7.11.1 Geocon Incorporated should review the grading and foundation plans prior to finalization to verify their compliance with the recommendations of this report and determine the need for additional comments, recommendations, and/or analysis.

LIMITATIONS AND UNIFORMITY OF CONDITIONS

1. 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.

2. 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 the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.

3. 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.



SOURCE: 2006 THOMAS BROTHERS MAP
SAN DIEGO COUNTY, CALIFORNIA

GEOCON
INCORPORATED
GEOTECHNICAL CONSULTANTS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974
PHONE 858 558-6900 - FAX 858 558-6159

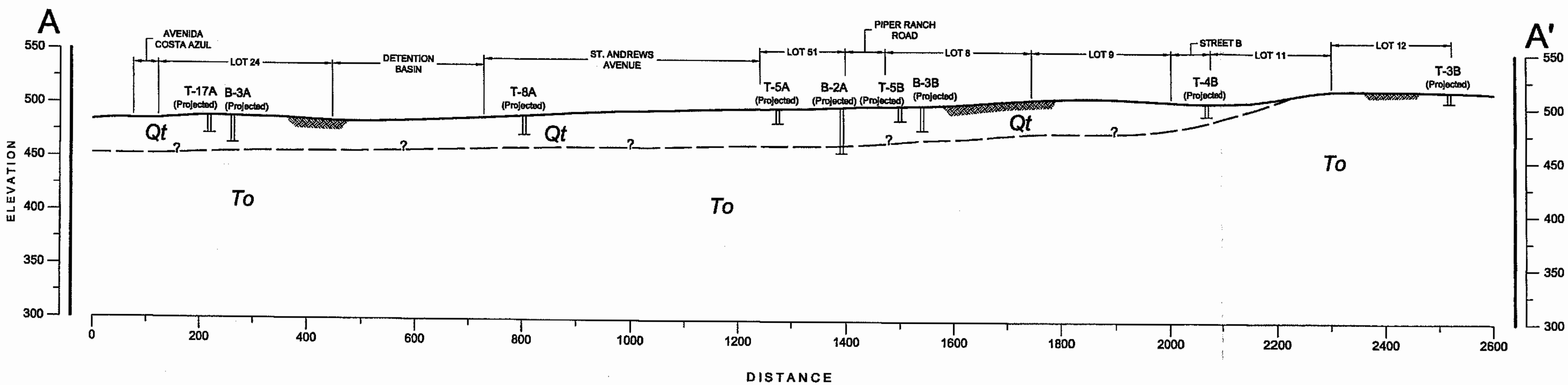
VICINITY MAP

SUNROAD OTAY 80
SAN DIEGO, CALIFORNIA

FK / RA		DSK/GTYPD	DATE	PROJECT NO. 07740 - 22 - 01	FIG. 1

Vicinity Map

SUNROAD OTAY 80
SAN DIGO, CALIFORNIA



GEOLOGIC CROSS-SECTION A-A'

SCALE
VERTICAL: 1" = 100'
HORIZONTAL: 1" = 200'

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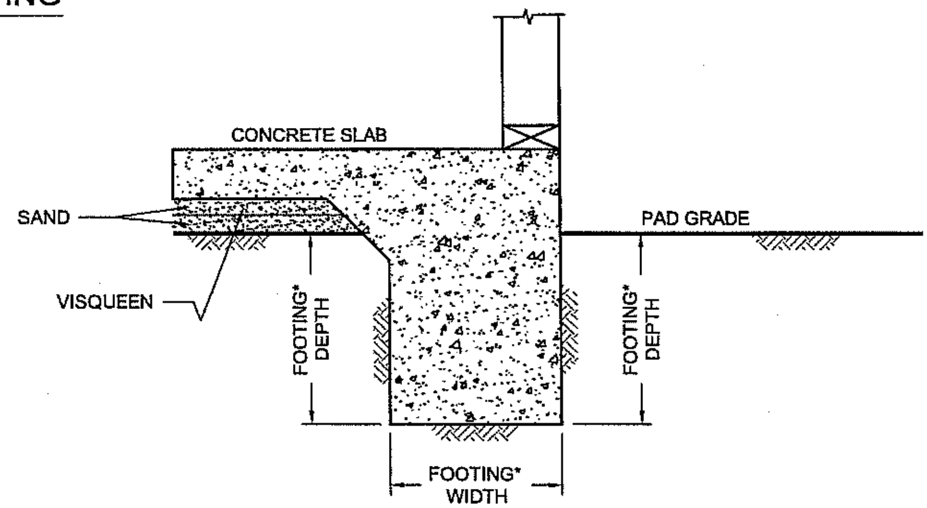
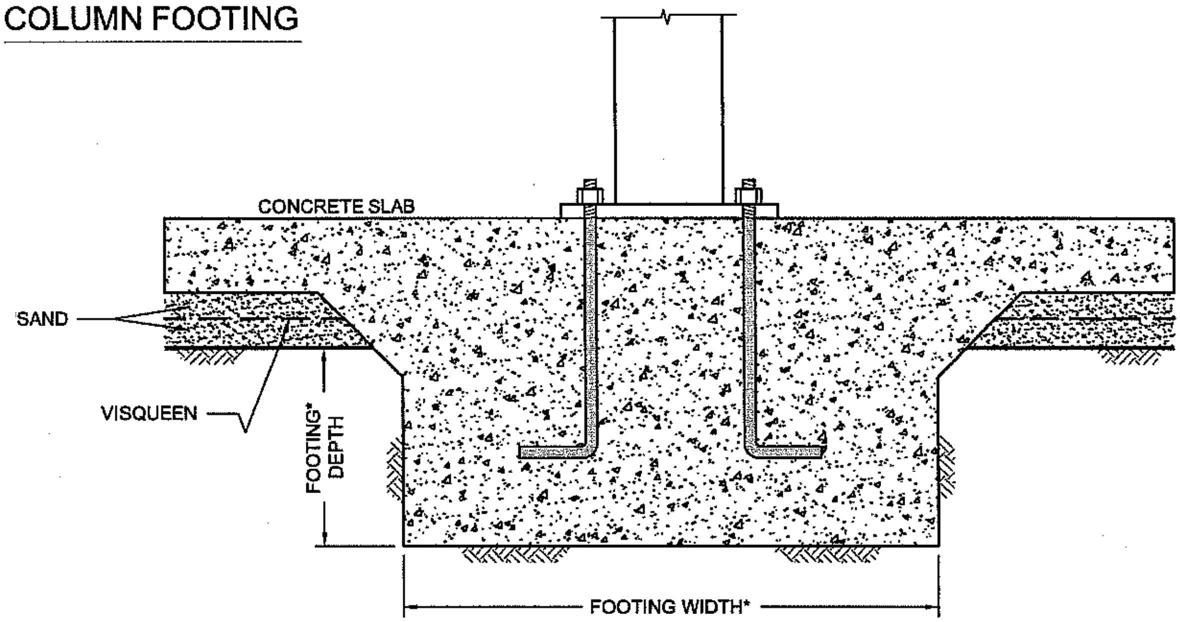
GEOTECHNICAL CONSULTANTS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974
PHONE 858 558-6900 - FAX 858 558-6159

PROJECT NO. 07740 - 22 - 01
FIGURE 3
DATE 10 - 10 - 2006

WALL FOOTING



COLUMN FOOTING



*....SEE REPORT FOR FOUNDATION WITDH AND DEPTH RECOMMENDATION

NO SCALE

WALL / COLUMN FOOTING DIMENSION DETAIL

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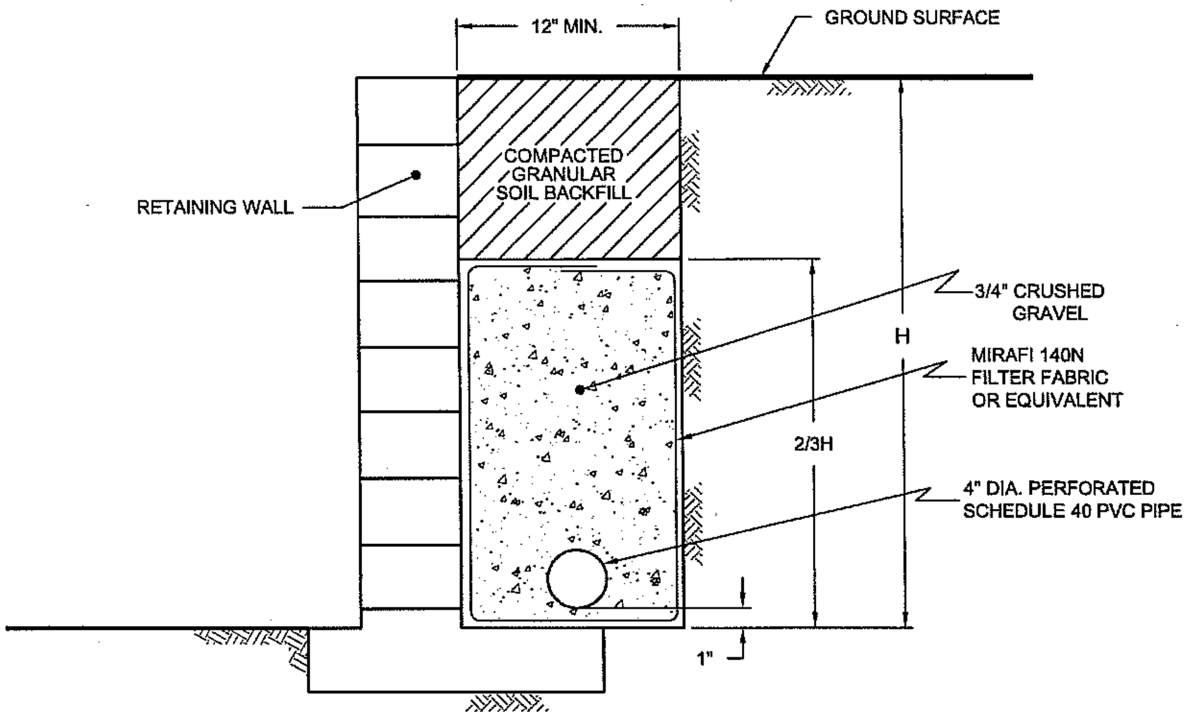
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974
PHONE 858 558-6900 - FAX 858 558-6159

SUNROAD OTAY 80
SAN DIEGO, CALIFORNIA

FK / RA		DSK/GTYPD	DATE	PROJECT NO. 07740 - 22 - 01	FIG. 4

X:/1_DETAIL/COLFOOT2/DWG.



NOTES:

1......PVC PIPE TO DRAIN AT A MINIMUM GRADIENT OF 1% AND CONNECT TO A SUITABLE OUTLET.

2......WALL DRAINAGE PANELS SUCH AS MIRADRAIN 6000 OR EQUIVALENT MAY BE USED IN LIEU OF EXTENDING GRAVEL TO TWO-THIRDS THE WALL HEIGHT.

NO SCALE

RETAINING WALL DRAINAGE DETAIL

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PHONE 858 558-6900 - FAX 858 558-6159

SUNROAD OTAY 80
SAN DIEGO, CALIFORNIA

FK / RA		DSK/GTYPD	DATE	PROJECT NO. 07740 - 22 - 01	FIG. 5

X:/R14TEMP/I_AUTOCAD PLATE TEMPLATE/I_DETAIL/RETWALL3

APPENDIX A

APPENDIX A

FIELD INVESTIGATION

The field investigation was performed between April and September, 1989 and consisted of a site reconnaissance by an engineering geologist and the excavation of 4 borings and 17 backhoe trenches. Borings extended to depths ranging from 21 to 43 feet below the existing ground surface. Trenches were excavated to depths varying from 5.5 feet to 12 feet below the existing ground surface using a John Deere 510 rubber tire backhoe equipped with a 24 inch wide bucket. Relatively undisturbed drive samples and disturbed bulk samples were obtained at selected locations within the exploratory excavations.

The soils encountered in the exploratory borings and trenches were visually examined, classified, and logged. Logs of the borings and trenches are presented on Figures A-1 through A-18. The logs depict the soil and geologic conditions encountered and the depth at which samples were obtained. The approximate location of the exploratory excavations is depicted on the Geologic Map, Figure 2 (map pocket).

File No. D-4341-J01
April 26, 1989

BORING B-2A

ELEVATION 500 MSL DATE DRILLED 3/27/89

EQUIPMENT E-100

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (U.S.C.S.)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE BLOWS/FT.	DRY DENSITY P.C.F.	MOISTURE CONTENT, %
0–2				CL	TOPSOIL Soft, moist, dark brown, fine to medium Sandy CLAY			
2–17				CL	TERRACE DEPOSITS Firm, moist, orange-brown, fine Sandy CLAY			
6	B2-1					1	92.7	26.3
10					alternating layers of reddish-brown, Clayey fine SANDSTONE, micaceous			
11	B2-2					2	101.3	22.5
16	B2-3					2		
17	B2-4						BULK	SAMP.
17–20				SM	Dense, moist, orange-brown, Silty fine SANDSTONE			
20–22				GM	Dense, moist, orange, Silty, fine to coarse Sandy GRAVEL			
22–28	B2-5			SC	Dense, moist, dark orange, Clayey, fine to coarse SANDSTONE, some gravel	4	116.6	15.
28–30				GM	Dense, moist, light gray, Silty, fine to very coarse Sandy GRAVEL			

Figure A-1 Log Test Boring B-2

Continued next pa

SAMPLE SYMBOLS
- ☐ — SAMPLING UNSUCCESSFUL
- ☒ — DISTURBED OR BAG SAMPLE
- STANDARD PENETRATION TEST
- CHUNK SAMPLE
- ■ — DRIVE SAMPLE (UNDISTURBED)
- 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.

File No. D-4341-J01
April 26, 1989

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (U.S.C.S.)	BORING B-2A CONTINUED ELEVATION ______ DATE DRILLED ______ EQUIPMENT ______ MATERIAL DESCRIPTION	PENETRATION RESISTANCE BLOWS/FT.	DRY DENSITY P.C.F.	MOISTURE CONTENT, %
30	B2-6			SM	Dense, moist, dark gray, Silty, very fine SAND, micaceous, scattered pockets of dark orange CLAYSTONE, non-continuous	5		
32								
34					well cemented SANDSTONE, 10"-12" thick			
					strong seepage			
36				ML	Hard, moist, grayish-brown, Clayey SILTSTONE, thinly laminated			
38				SM	Dense, moist, dark gray, Silty, very fine SAND, micaceous standing water			
40	B2-7					7	116.7	14.0
42					BORING TERMINATED AT 41.0 FEET			

Figure A-1 Log of Test Boring B-2 Continued

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.

File No. D-4341-J01
April 26, 1989

BORING B-3A

ELEVATION 487 MSL DATE DRILLED 3/27/89

EQUIPMENT E-100

DEPTH IN FEET	SAMPLE NO.	GROUNDWATER	SOIL CLASS (U.S.C.S.)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE BLOWS/FT.	DRY DENSITY P.C.F.	MOISTURE CONTENT, %
0–2			CL	TOPSOIL Soft, moist, dark brown, fine to medium, Sandy CLAY			
2–8			CL	TERRACE DEPOSITS Soft, wet, dark reddish-brown, fine Sandy CLAY			
5.5	B3-1				push		
8–16.5			CL	Hard, moist, dark orange, fine Sandy CLAYSTONE			
10	B3-2				3	82.3	32.
15.5	B3-3				4		
16.5–23			GC	Dense, moist, dark reddish-orange, Clayey fine Sandy GRAVEL and cobbles to 18"			
23				BORING TERMINATED AT 23.0 FEET (REFUSAL)			

Figure A-2 Log of Test Boring B-3

SAMPLE SYMBOLS

- SAMPLING UNSUCCESSFUL
- DISTURBED OR BAG SAMPLE
- STANDARD PENETRATION TEST
- CHUNK SAMPLE
- DRIVE SAMPLE (UNDISTURBED)
- 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.

File No. D-4341-J01
April 26, 1989

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (U.S.C.S.)	TRENCH T-4A ELEVATION 496 MSL DATE DRILLED 3/17/89 EQUIPMENT JD 555	PENETRATION RESISTANCE BLOWS/FT.	DRY DENSITY P.C.F.	MOISTURE CONTENT, %
					MATERIAL DESCRIPTION			
0–6				SM	FILL Loose, damp, brown, Silty, fine to medium SAND			
6–11				SM	TERRACE DEPOSITS Dense, moist, orange-yellow, Silty, fine to very coarse SAND, some gravel			
11–13					Very dense, moist, white to light gray, Silty fine to very coarse Sandy GRAVEL to and Cobbles 16"			
					TRENCH TERMINATED AT 13.0 FEET			

Figure A-3 Log of Test Trench T-4

SAMPLE SYMBOLS
- ☐ — SAMPLING UNSUCCESSFUL
- ☒ — DISTURBED OR BAG SAMPLE
- STANDARD PENETRATION TEST
- CHUNK SAMPLE
- ■ — DRIVE SAMPLE (UNDISTURBED)
- 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.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (U.S.C.S)	TRENCH T-5A ELEVATION 496 MSL DATE DRILLED 3/17/89 EQUIPMENT JD 555	PENETRATION RESISTANCE BLOWS/FT.	DRY DENSITY P.C.F.	MOISTURE CONTENT, %
0					MATERIAL DESCRIPTION			
2	T5-1			CL	TOPSOIL Soft, dry, dark brown, fine Sandy CLAY		113.5	11.4
4	T5-2			CL	TERRACE DEPOSITS Stiff, moist, light orange, fine Sandy CLAY		116.3	12.9
6								
8	T5-3			SM	Dense, moist, dark gray, Silty, very fine SAND		105.3	15.3
10								
12								
14					TRENCH TERMINATED AT 13.0 FEET			
0					TRENCH T-6A Elevation 498 MSL			
2	T6-1			CL	TOPSOIL Soft, dry, dark brown, fine Sandy CLAY		106.6	13.:
4	T6-2			SC	TERRACE DEPOSITS Dense, moist, orange-brown, Clayey fine SAND with layers of coarse sand		99.7	13.
6								
8	T6-3			CL	Stiff, moist, orange, fine Sandy CLAY		101.6	21.
10					TRENCH TERMINATED AT 9.0 FEET			

Figure A-4 Log of Test Trenches T-5 and T-6

SAMPLE SYMBOLS
- SAMPLING UNSUCCESSFUL
- DISTURBED OR BAG SAMPLE
- STANDARD PENETRATION TEST
- CHUNK SAMPLE
- DRIVE SAMPLE (UNDISTURBED)
- 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.

File No. D-4341-J01
April 26, 1989

TRENCH T-7A

ELEVATION 490 MSL DATE DRILLED 3/17/89

EQUIPMENT JD 555

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (U.S.C.S)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE BLOWS/FT.	DRY DENSITY P.C.F.	MOISTURE CONTENT, %
0								
2	T7-1			CL	TOPSOIL Soft, dry, dark brown, fine to coarse, Sandy CLAY		115.5	8.8
4–6	T7-2			CL	TERRACE DEPOSITS Firm, moist, dark gray-brown, fine Sandy CLAY		98.8	15.4
10	T7-3			CL	Stiff, moist, dark orange, fine Sandy CLAY		100.3	20.5
12					TRENCH TERMINATED AT 11.0 FEET			

Figure A-5 , Log of Test Trench T-7

SAMPLE SYMBOLS
- ☐ — SAMPLING UNSUCCESSFUL
- ☒ — DISTURBED OR BAG SAMPLE
- STANDARD PENETRATION TEST
- CHUNK SAMPLE
- DRIVE SAMPLE (UNDISTURBED)
- 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.

File No. D-4341-J01
April 26, 1989

TRENCH T-8A

ELEVATION 490 MSL DATE DRILLED 3/17/89

EQUIPMENT JD 555

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (U.S.C.S)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE BLOWS/FT.	DRY DENSITY P.C.F.	MOISTURE CONTENT, %
0								
2	T8-1			CL	TOPSOIL Soft, dry, dark brown, fine to medium, Sandy CLAY		BULK SAMPLE	
4–6	T8-2			CL-SC	TERRACE DEPOSITS Stiff, moist, dark orange-brown, fine to medium, Sandy CLAY to Clayey fine SAND		101.6	21.3
8–10	T8-3			SM	Dense, moist, light orange, Silty fine SAND, some clay		99.8	15.5
12					grades into light yellowish-gray, Silty fine SANDSTONE			
14					scattered GRAVEL			
16					TRENCH TERMINATED AT 15.5 FEET			

Figure A-6 Log of Test Trench T-8

SAMPLE SYMBOLS
- SAMPLING UNSUCCESSFUL
- DISTURBED OR BAG SAMPLE
- STANDARD PENETRATION TEST
- CHUNK SAMPLE
- DRIVE SAMPLE (UNDISTURBED)
- 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.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (U.S.C.S.)	TRENCH T-9A ELEVATION 493 MSL DATE DRILLED 3/17/89 EQUIPMENT JD 555	PENETRATION RESISTANCE BLOWS/FT.	DRY DENSITY P.C.F.	MOISTURE CONTENT, %
					MATERIAL DESCRIPTION			
0 – 5				SM	FILL Loose, damp, white to light gray, Gravelly, fine to coarse SAND			
5 – 9				SC	TERRACE DEPOSITS Dense, moist, light brown-orange, Clayey fine to very coarse SAND, some gravel			
9 – 11				SM	Dense, moist, white, Silty, fine to medium SANDSTONE			
12					TRENCH TERMINATED AT 11.0 FEET			

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (U.S.C.S.)	TRENCH T-10A Elevation 495 MSL	PENETRATION RESISTANCE BLOWS/FT.	DRY DENSITY P.C.F.	MOISTURE CONTENT, %
0 – 5				SC	FILL Loose, moist, dark brown, Clayey, fine to medium SAND, some gravel, abundant glass, plastic, wood, etc.			
5 – 7				SC	TERRACE DEPOSITS Dense, moist, light orange, slightly Clayey, Gravelly, fine to coarse SAND GRAVEL and Cobbles to 8"			
8					TRENCH TERMINATED AT 7.0 FEET			

Figure A-7 Log of Test Trenches T-9 and T-10

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.

File No. D-4341-J01
April 26, 1989

TRENCH T-17A

ELEVATION 487 MSL DATE DRILLED 3/20/89

EQUIPMENT JD 555

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (U.S.C.S.)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE BLOWS/FT.	DRY DENSITY P.C.F.	MOISTURE CONTENT, %
0 – 2	T17-1			CL	TOPSOIL Soft, damp, dark brown, fine to medium Sandy CLAY		107.0	8.6
4 – 6	T17-2			CL	TERRACE DEPOSITS Stiff, moist, dark reddish-brown, fine to medium Sandy CLAY		99.4	8.0
6 – 12	T17-3			CL	Firm, wet, dark gray, fine Sandy CLAY		104.8	20.2
14					TRENCH TERMINATED AT 13.0 FEET			

TRENCH T-18A Elevation 487 MSL

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (U.S.C.S.)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE BLOWS/FT.	DRY DENSITY P.C.F.	MOISTURE CONTENT, %
0 – 2				CL	TOPSOIL Soft, dry, dark brown, fine to medium, Sandy CLAY			
4 – 8				CL	TERRACE DEPOSITS Stiff, wet, reddish-brown, fine Sandy CLAY			
8 – 10					Hard, moist, dark orange, fine to medium Sandy CLAYSTONE			
12					TRENCH TERMINATED AT 11.0 FEET			

Figure A-8 , Log of Test Trenches T-17 and T-18

SAMPLE SYMBOLS

- ☐ — SAMPLING UNSUCCESSFUL
- ☒ — DISTURBED OR BAG SAMPLE
- ◧ — STANDARD PENETRATION TEST
- ◪ — CHUNK SAMPLE
- ■ — DRIVE SAMPLE (UNDISTURBED)
- ▽ — 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.

FILE NO. D-4435-J01

BORING B 2B

ELEVATION 520 DATE COMPLETED 9/12/89

EQUIPMENT EARTH 120 BUCKET RIG

DEPTH IN FEET	SAMPLE NO.	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0		SC	**TOPSOIL** Loose, dry, dark brown, Clayey medium SAND			
2		SM	**OTAY FORMATION** Medium dense, moist, light gray, Silty fine SANDSTONE, micaceous, massive			
4	B2-1			2	98.3	17.9
6						
8	B2-2	CL/ML	Firm, moist, light pink-gray, Silty CLAY to Clayey SILT			
10	B2-3		becomes hard, thinly laminated claystone/ siltstone, block fractured at 9 feet	3	100.5	23.2
12						
14	B2-4			4		
16			light seepage at 16 feet			
18						
20	B2-5		becomes very hard, light orange, claystone, massive, block fractured at 19 feet	6	102.1	23.8
22	B2-6					
24			heavy seepage at 23.5 feet (perched)			
26		SM	Dense, moist, gray Silty fine SANDSTONE massive, micaceous with alternating layers of thinly laminated light yellow SILTSTONE			
28						

Figure A-9 **Log of Test Boring B 2, page 1 of 2**

SDMC

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.

FILE NO. D-4435-J01

BORING B 2B

ELEVATION 520 DATE COMPLETED 9/12/89

EQUIPMENT EARTH 120 BUCKET RIG

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
30	B2-7					8		
32				CL	Hard, moist, light pink-gray, Silty CLAYSTONE, massive blocky fractured			
34					layer of dense, light gray, fine sandstone, 16 inches thick at 33 feet			
36	B2-8					4	68.9	54.9
			▼		Perched water			
38					BORING TERMINATED AT 38 FEET (REFUSAL)			

Figure A- 9 Log of Test Boring B 2, page 2 of 2

SDMC

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.

FILE NO. D-4435-J01

BORING B 3B

ELEVATION 500 DATE COMPLETED 9/12/89

EQUIPMENT EARTH 120 BUCKET RIG

DEPTH IN FEET	SAMPLE NO.	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0–3.5		CL	**TOPSOIL** Soft, dry, dark brown, fine to Sandy CLAY			
3.5–9	B3-1, B3-2	CL	**TERRACE DEPOSITS** Firm, moist, light orange, fine to medium Sandy CLAY	2	110.2	15.6
9–11.5	B3-3	CL	Hard, moist, dark orange, Silty CLAYSTONE, blocky fractured	2	95.2	23.6
11.5–15	B3-4	SC/CL	Dense, to stiff, moist, orange, Clayey fine SAND to fine Sandy CLAY			
15–19.5	B3-5, B3-5	SM	Dense, moist, light orange, Silty fine to medium SANDSTONE, massive	7	119.3	13.0
19.5–21		GM	Dense, moist, orange, Silty fine to coarse Sandy GRAVEL with boulders up to 18 inches in dimension			

BORING TERMINATED AT 21 FEET (REFUSAL)

Figure A-10 **Log of Test Boring B 3, page 1 of 1**

SDMC

SAMPLE SYMBOLS
- ☐ ... SAMPLING UNSUCCESSFUL
- ☒ ... DISTURBED OR BAG SAMPLE
- ◧ ... STANDARD PENETRATION TEST
- ▨ ... CHUNK SAMPLE
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ▼ ... 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.

FILE NO. D-4435-J01

TRENCH T 1B

ELEVATION 502 DATE COMPLETED 9/14/89

EQUIPMENT JD 555 TRACKHOE

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0 – 3	T1-1			CL	**TOPSOIL** Soft, dry, dark brown, fine Sandy CLAY			
3 – 5	T1-2			CL	**TERRACE DEPOSITS** Stiff, moist, orange, fine Sandy CLAY		104.0	17.2
5 – 9	T1-3			SC	Dense, moist, light orange-yellow, Clayey fine to medium SAND		92.0	16.8
9 – 12	T1-4			CL	Hard, moist, dark orange, Silty CLAYSTONE, blocky fractured, massive		93.4	27.4

TRENCH TERMINATED AT 12 FEET

Figure A-11 Log of Test Trench T 1

SDMC

SAMPLE SYMBOLS
- ☐ ... SAMPLING UNSUCCESSFUL
- ☒ ... DISTURBED OR BAG SAMPLE
- ◧ ... STANDARD PENETRATION TEST
- ▨ ... CHUNK SAMPLE
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ▼ ... 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.

FILE NO. D-4435-J01

TRENCH T 2B

ELEVATION 516 DATE COMPLETED 9/14/89

EQUIPMENT JD 555 TRACKHOE

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0–3				CL	**TOPSOIL** Soft, dry, dark brown, fine Sandy CLAY			
3–6	T2-1			CL	**OTAY FORMATION** Firm, moist, grayish-brown, Silty CLAY areas of thin laminations, some calcium carbonate		98.8	14.9
6–14.5	T2-2			SM	Dense, moist, gray, Silty fine SANDSTONE, micaceous thinly laminated, areas of light gray SILTSTONE		103.9	16.5
	T2-3						95.6	28.0

TRENCH TERMINATED AT 14.5 FEET

Figure A-12 Log of Test Trench T 2

SDMC

SAMPLE SYMBOLS
- ☐ ... SAMPLING UNSUCCESSFUL
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◧ ... STANDARD PENETRATION TEST
- ▨ ... CHUNK SAMPLE
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ▼ ... 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.

FILE NO. D-4435-J01

TRENCH T 3B

ELEVATION 514 DATE COMPLETED 9/14/89

EQUIPMENT JD 555 TRACKHOE

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0 – 2				CL	**TOPSOIL** Soft, dry, dark brown, fine Sandy CLAY			
2 – 4				CL	**OTAY FORMATION**			
4 – 6	T3-1			SC/CL	Firm, dense, orange-brown, fine Sandy CLAY, abundant calcium carbonates, very fractured		102.9	16.5
6 – 9				GC	Dense to hard, moist, orange, Clayey fine SANDSTONE to fine Sandy CLAYSTONE			
					Dense, moist, orange, Clayey medium to coarse SAND with cobbles to 18 inches			

TRENCH TERMINATED AT 9 FEET

Figure A-13, Log of Test Trench T 3

SDMC

SAMPLE SYMBOLS
- ☐ ... SAMPLING UNSUCCESSFUL
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◧ ... STANDARD PENETRATION TEST
- ▨ ... CHUNK SAMPLE
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ▼ ... 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.

FILE NO. D-4435-J01

TRENCH T 4B

ELEVATION 509 DATE COMPLETED 9/14/89

EQUIPMENT JD 555 TRACKHOE

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0–3	T4-1			CL	**TOPSOIL** Soft, dry, dark brown, fine Sandy CLAY		96.3	19.0
3–7				SM	**TERRACE DEPOSITS** Dense, moist, light orange, Silty fine SANDSTONE, massive, some layers of CLAYSTONE some gravel to 6 inches at 6 feet			
7–10	T4-2			CL	Hard, moist, dark orange, Silty CLAYSTONE, blocky fractured		101.0	20.2
10–13				SP	Dense, moist, orange, Clayey fine to medium Gravelly SAND with cobbles to 14 inches			
					TRENCH TERMINATED AT 13 FEET (REFUSAL)			

Figure A-14 Log of Test Trench T 4

SDMC

SAMPLE SYMBOLS ☐ ... SAMPLING UNSUCCESSFUL ◧ ... STANDARD PENETRATION TEST ■ ... DRIVE SAMPLE (UNDISTURBED)
⊠ ... DISTURBED OR BAG SAMPLE ▨ ... CHUNK SAMPLE ▼ ... WATER TABLE OR SEEPAGE

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FILE NO. D-4435-J01

TRENCH T 5B

ELEVATION 496 DATE COMPLETED 9/14/89

EQUIPMENT JD 555 TRACKHOE

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0								
2	T5-1			CL	**TOPSOIL** Soft, dry, dark brown, fine Sandy CLAY		104.3	17.2
4				CL	**TERRACE DEPOSITS** Stiff, moist, orange-brown, medium sandy CLAYSTONE, alternating layers of fine SANDSTONE			
6	T5-2						101.7	17.7
8								
10				SP-SC	Dense, moist, orange, Clayey fine SAND with gravels			

TRENCH TERMINATED AT 11 FEET (REFUSAL)

Figure A-15 Log of Test Trench T 5

SDMC

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.

FILE NO. D-4435-J01

TRENCH T 6B

ELEVATION 490 DATE COMPLETED 9/14/89

EQUIPMENT JD 555 TRACKHOE

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				CL	**TOPSOIL** Soft, dry, brown, fine Sandy CLAY			
2								
4				GM	**TERRACE DEPOSITS** Dense, moist, orange, fine to medium Sandy GRAVEL			
6				SC	Dense, moist, orange, Clayey fine to medium SANDSTONE			
8								
10					TRENCH TERMINATED AT 10 FEET			

Figure A-16 Log of Test Trench T 6

SDMC

SAMPLE SYMBOLS
□ ... SAMPLING UNSUCCESSFUL
◧ ... STANDARD PENETRATION TEST
■ ... DRIVE SAMPLE (UNDISTURBED)
⊠ ... DISTURBED OR BAG SAMPLE
▨ ... CHUNK SAMPLE
▼ ... WATER TABLE OR SEEPAGE

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FILE NO. D-4435-J01

TRENCH T 9B

ELEVATION 500 DATE COMPLETED 9/14/89

EQUIPMENT JD 555 TRACKHOE

DEPTH IN FEET	SAMPLE NO.	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0–3		CL	**TOPSOIL** Soft, moist, dark brown, fine Sandy CLAY gravel layer at 3 feet			
3–9		SC	**TERRACE DEPOSITS** Dense,moist, light orange-brown, Clayey fine to medium SAND			
9–14	T9-1	SM	**OTAY FORMATION** Dense, moist, dark gray, Silty fine SANDSTONE with layers of brown, Silty CLAYSTONE, thinly laminated		93.6	28.2
14–17	T9-2	ML	Hard, moist, dark gray, Clayey SILTSTONE, blocky fractured, thinly laminated, alternating layers of light brown, CLAYSTONE		94.0	28.0
			TRENCH TERMINATED AT 17 FEET			

Figure A-17, Log of Test Trench T 9

SDMC

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◧ ... STANDARD PENETRATION TEST
- ▨ ... CHUNK SAMPLE
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ▼ ... 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.

FILE NO. D-4435-J01

TRENCH T 10B

ELEVATION 506 DATE COMPLETED 9/14/89

EQUIPMENT JD 555 TRACKHOE

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0								
2	T10-1			CL	**TOPSOIL** Soft, dry, dark brown, fine Sandy CLAY; gravel at contact at 3 feet		93.3	23.7
4								
6	T10-2			CL	**OTAY FORMATION** Stiff, moist, orange-brown, Silty CLAYSTONE		83.3	35.6
8								
10	T10-3			ML	Hard, moist, dark gray-green, fine Sandy SILTSTONE, thinly laminated, pockets of white Silty CLAYSTONE		95.5	27.8
12								

TRENCH TERMINATED AT 13 FEET

Figure A-18 Log of Test Trench T 10

SDMC

SAMPLE SYMBOLS ☐ ... SAMPLING UNSUCCESSFUL ⊠ ... DISTURBED OR BAG SAMPLE ◧ ... STANDARD PENETRATION TEST ▨ ... CHUNK SAMPLE ■ ... DRIVE SAMPLE (UNDISTURBED) ▼ ... 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 soil samples were tested for their maximum dry density and optimum moisture content, expansion potential, and shear strength characteristics. Selected soils samples were also tested to evaluate plasticity, water-soluble sulfate contents, pH and resistivity characteristics.

The results of our laboratory tests are presented as follows on Tables B-I through B-VI. The in-place dry density and moisture content results are indicated on the exploratory boring and trench logs.

TABLE B-I
SUMMARY OF LABORATORY MAXIMUM DRY DENSITY AND OPTIMUM MOISTURE CONTENT TEST RESULTS
ASTM D 1557

Sample No.	Description	Maximum Dry Density (pcf)	Optimum Moisture Content (% dry wt.)
T8A-1	Gray brown, fine to medium, Clayey SAND	123.8	11.1
B2B-2	Light pink-gray, Silty CLAY	105.0	19.1
T1B-1	Dark brown, Silty, Sandy CLAY	120.7	13.1

TABLE B-II
SUMMARY OF DIRECT SHEAR TEST RESULTS
ASTM D 3080

Sample No.	Dry Density (pcf)	Moisture Content (%)	Unit Cohesion (psf)	Angle of Shear Resistance (degrees)
T8A-1*	111.4	11.2	310	20
B2B-1	98.3	17.9	440	29
B3B-2	95.2	23.6	760	39
T1B-1*	109.1	12.5	690	10

*Soil sample remolded to 90 percent relative density at near optimum moisture content.

TABLE B-III
SUMMARY OF LABORATORY EXPANSION INDEX TEST RESULTS
ASTM D 4829

Sample No.	Moisture Content		Dry Density (pcf)	Expansion Index	Classification
	Before Test (%)	After Test (%)			
T8A-1	10.4	25.5	107.7	93	High
B2B-2	13.1	37.7	98.3	127	High
B3B-1	12.3	29.6	107.5	102	High
T1B-1	11.1	29.2	105.1	93	High

TABLE B-IV
SUMMARY OF LABORATORY PLASTICITY INDEX TEST RESULTS
ASTM D 4318

Sample No.	Liquid Limit	Plastic Limit	Plasticity Index	USCS Classification
T8A-1	45	14	31	CL

TABLE B-V
SUMMARY OF LABORATORY WATER-SOLUBLE SULFATE TEST RESULTS
CALIFORNIA TEST METHOD NO. 417

Sample No.	Water Soluble Sulfate (%)
T8A-1	0.018
B2B-2	0.028
T1B-1	0.013

TABLE B-VI
SUMMARY OF LABORATORY POTENTIAL OF HYDROGEN (pH)
AND RESISTIVITY TEST RESULTS
(CALIFORNIA TEST METHOD NO. 643)

Sample No.	pH	Resistivity (ohm centimeters)
T8A-1	7.9	440

APPENDIX C

APPENDIX C

RECOMMENDED GRADING SPECIFICATIONS

FOR

SUNROAD OTAY 80
OTAY MESA ROAD AND AVENIDA COSTA AZUL
SAN DIEGO, CALIFORNIA

PROJECT NO. 07740-22-01

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 Incorporated. 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. It will be necessary that the Consultant provide adequate testing and observation services so that he may determine that, in his 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 him 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, adverse weather, and so forth, 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 construction 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 3/4 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 3/4 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. Representative samples of soil materials to be used for fill shall 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

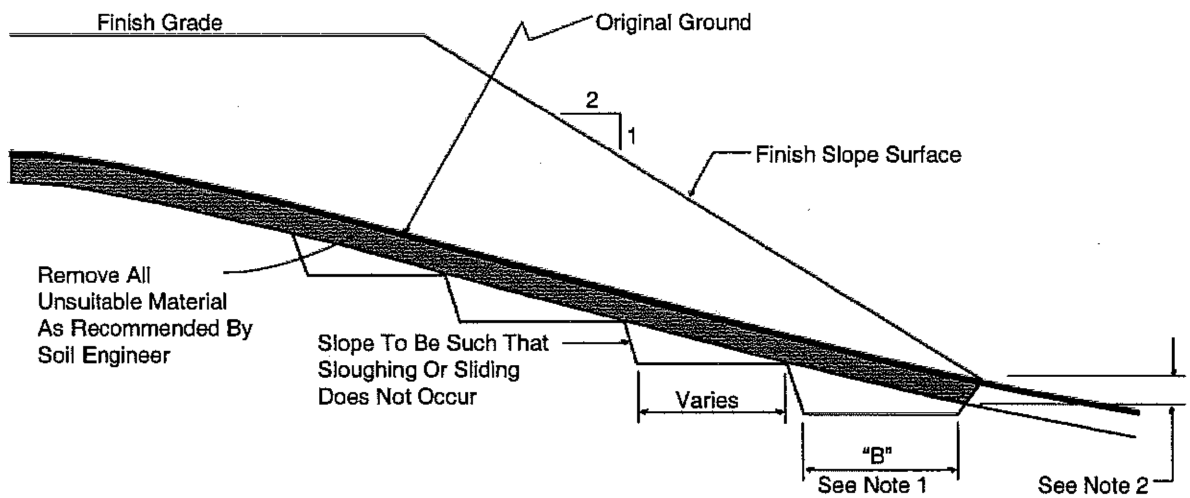
4.1. Areas to be excavated and filled shall be cleared and grubbed. Clearing shall consist of complete removal above the ground surface of trees, stumps, brush, vegetation, man-made structures, and similar debris. Grubbing shall consist of removal of stumps, roots, buried logs and other unsuitable material and shall be performed in areas to be graded. Roots and other projections exceeding 1-1/2 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. Any asphalt pavement material removed during clearing operations should be properly disposed at an approved off-site facility. Concrete fragments which 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 or other unsuitable material, loose or porous soils shall be removed to the depth recommended in the Geotechnical Report. The depth of removal and compaction shall 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 6:1 (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 wide, 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 bottom 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, plowed or scarified, the surface should be disced or bladed by the Contractor until it is uniform and free from large clods. The area should then be moisture conditioned to achieve the proper moisture content, and compacted as recommended in Section 6.0 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 D1557-00.

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 D1557-00. 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. Soils having an Expansion Index of greater than 50 may be used in fills if 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. All rock placement, fill placement and flooding of approved granular soil in the windrows must be continuously observed by the Consultant or his representative.

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, maximum slope of 5 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 will 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 D1196-93, may be performed in both the compacted *soil* fill and in the *rock* fill to aid in determining the number of passes of the compaction equipment to be performed. If performed, a minimum of three plate bearing tests shall 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 shall be present during *rock* fill operations to verify 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. In general, at least one test should be performed for each approximately 5,000 to 10,000 cubic yards of *rock* fill placed.

6.3.5. Test pits shall be excavated by the Contractor so that the Consultant can state that, in his 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. All *rock* fill placement shall be continuously observed during placement by representatives of the Consultant.

7. OBSERVATION AND TESTING

7.1. The Consultant shall be the Owners representative to observe and perform tests during clearing, grubbing, and filling and compaction operations. In general, no more than 2 feet in vertical elevation of *soil* or *soil-rock* fill shall be placed without at least one field density test being performed within that interval. In addition, a minimum of one field density test shall be performed for every 2,000 cubic yards of *soil* or *soil-rock* fill placed and compacted.

7.2. The Consultant shall perform random field density tests of the compacted *soil* or *soil-rock* fill to provide a basis for expressing an opinion as to 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.

7.3. During placement of *rock* fill, the Consultant shall verify that the minimum number of passes have been obtained per the criteria discussed in Section 6.3.3. The Consultant shall 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. If performed, plate bearing tests will be performed randomly on the surface of the most-recently placed lift. Plate bearing tests will be performed to provide a basis for expressing an opinion as to whether the *rock* fill is adequately seated. The maximum deflection in the *rock* fill determined in Section 6.3.3 shall be less than the maximum deflection of the properly compacted *soil* fill. When any of the above criteria 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.

7.4. 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.

7.5. The Consultant shall observe the placement of subdrains, to verify that the drainage devices have been placed and constructed in substantial conformance with project specifications.

7.6. Testing procedures shall conform to the following Standards as appropriate:

7.6.1. Soil and Soil-Rock Fills:

7.6.1.1. Field Density Test, ASTM D1556-00, *Density of Soil In-Place By the Sand-Cone Method.*

7.6.1.2. Field Density Test, Nuclear Method, ASTM D2922-96, *Density of Soil and Soil-Aggregate In-Place by Nuclear Methods (Shallow Depth).*

7.6.1.3. Laboratory Compaction Test, ASTM D1557-00, *Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-Pound Hammer and 18-Inch Drop.*

7.6.1.4. Expansion Index Test, ASTM D4829-95, *Expansion Index Test.*

7.6.2. Rock Fills

7.6.2.1. Field Plate Bearing Test, ASTM D1196-93 (Reapproved 1997) *Standard Method for Nonreparative Static Plate Load Tests of Soils and Flexible Pavement Components, For Use in Evaluation and Design of Airport and Highway Pavements.*

8. PROTECTION OF WORK

8.1. 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.

8.2. 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.

9. CERTIFICATIONS AND FINAL REPORTS

9.1. 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.

9.2. 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.

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