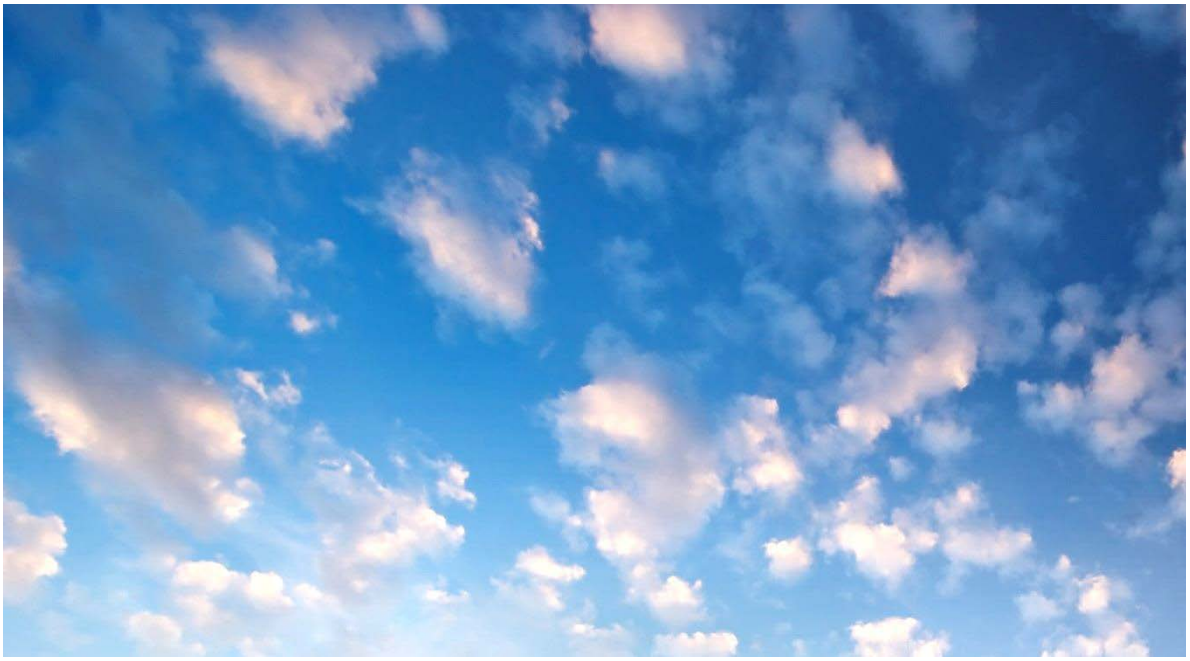

Barrio Flats Mixed-Use Project

Air Quality Study

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1 Project Description

1.1 Introduction

This report is an the analysis of the potential air quality impacts of a proposed mixed-use project, located in the Barrio Logan neighborhood in San Diego, California. The project site is bounded by Logan Avenue to the north, South 26th Street to the east, and is located west of Interstate 5 (I-5). This report has been prepared by Rincon Consultants, Inc. under contract to and for use by Logan Holdings, LLC. The purpose of this report is to analyze the project's air quality impacts related to temporary construction activity and long-term operation.

1.2 Project Summary

The 0.4-acre (17,860 square-foot) project site is located at 2257 Logan Avenue in the Barrio Logan neighborhood in San Diego, California. The project site is bounded by Logan Avenue to the north, South 26th Street to the east, and a service alley along the southwest boundary. I-5 runs northeast of the project site, approximately 200 feet from the northern site boundary. The site consists of four parcels: Assessor's Parcel Numbers (APN) 585-580-15, 585-580-16, 585-580-17, and 585-580-18. A used car sales yard and two, two-story buildings (Gil's Quality Cars) currently occupy the site.

The project entails demolition of a two-story building (totaling 3,812 square feet), a one-story building (1,954 square feet), a carport (144 square feet), and the removal of a 250 square-foot trailer. A new 38,940 square-foot four-story mixed-use building would be constructed on the project site, that contains 24 residential units (totaling 26,655 square feet), four hotel rooms (totaling 4,385 square feet), and five retail spaces (totaling 5,850 square feet). Four of the 24 residential units would be affordable units for very low income. Parking at the project site would consist of 24 parking spaces, one van accessible stall, two carpool/low emission stalls, one EV parking and charging stall, four motorcycle spaces, and seventeen bicycle spaces (fifteen long-term and two short-term). The project includes the planting of eight street trees along Logan Avenue and South 26th Street, a landscaped courtyard, and a bioretention area on-site, designed to conform to the City of San Diego's land development code and standards.

Primary access to the project would occur via one driveway from the alley perpendicular to South 26th Street along the southwest boundary of the project site. Figure 1 shows the project site location and Figure 2 shows the project site plan and configuration of the site.

Proposed development would require grading of 0.36 acres (90 percent) of the site. Out of the 200 cubic yards of soil that would be cut from the project site, 50 cubic yards would remain on-site to be used as fill and 150 cubic yards would be exported off site. The maximum height of fill would be 0.5 feet, and the maximum depth of cut will be one foot. Per project construction details, unearthed soil would be watered three times per day as a measure to reduce fugitive dust. Construction is expected to begin in January 2018 with project opening scheduled for 2019.

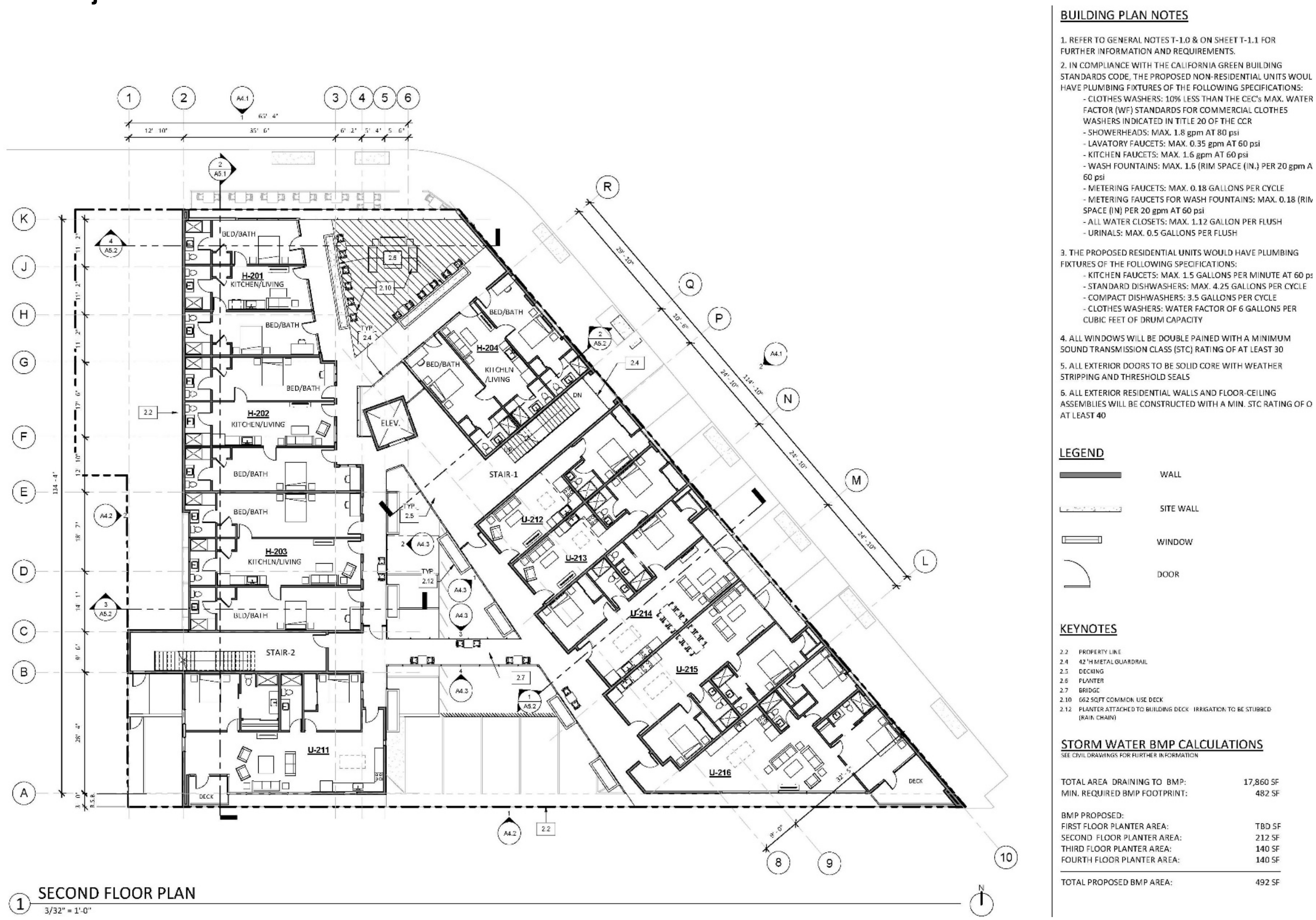
Surrounding land uses include light industrial uses to the south and north (automotive and metals), and commercial and residential uses to the east and west.

Figure 1 Project Location

Imagery provided by Google and its licensors © 2017.

HRA Fig 1 Project Location

Figure 2 Project Site Plan



Source: OBR Architecture, Inc. 2018

2 Air Quality Background

2.1 Air Quality Regulation

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 (U.S. EPA) regulates at the national level; the California Air Resources Control Board (ARB) 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

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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).

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 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 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.

CALIFORNIA AIR RESOURCES BOARD

The ARB, 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. ARB 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 ARB 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 Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	Federal Primary Standards	California Standard
Ozone	8-Hour	0.070 ppm	0.07 ppm
	1-Hour	---	0.09 ppm
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
	1-Hour	0.075 ppm	0.25 ppm
PM_{10}	Annual	---	20 μg/m^3
	24-Hour	150 μg/m^3	50 μg/m^3
PM_{25}	Annual	12 μg/m^3	12 μg/m^3
	24-Hour	35 μg/m^3	---
Lead	30-Day Average	---	1.5 μg/m^3
	3-Month Average	0.15 μg/m^3	---

ppm = parts per million; μg/m^3 = micrograms per cubic meter
Source: ARB 2016a.

2.2 Current Air Quality

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 California Environmental Quality Act (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 San Diego Air Basin (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: SDAPCD NDa.

The SDAPCD monitors air quality conditions at locations throughout the SDAB. For the purpose of this analysis, data from the San Diego – 1110 Beardsley Street Monitoring Station, located approximately 0.6 miles northwest of the project site, was used to characterize existing pollutant concentrations near the Barrio Logan neighborhood. A summary of the data recorded at the Beardsley Street monitoring station from 2014 through 2016 is presented in Table 3.

Table 3 Ambient Air Quality at the Nearest Monitoring Station

Pollutant	2014	2015	2016
Ozone (ppm), 8-Hour Average	0.072	0.066	0.061
Number of days of State exceedances (>0.09 ppm)	2	0	0
Number of days of Federal exceedances (>0.075 ppm)	1	0	0
Ozone (ppm) - Worst Hour	0.093	0.089	0.072
Number of days of State exceedances (>0.09 ppm)	0	0	0
Nitrogen Dioxide (ppm) - Worst Hour	0.075	0.062	0.073
Number of days of State exceedances (>0.18 ppm)	0	0	0
Particulate Matter <10 microns, $\mu g/m^3$, Worst 24 Hours	40.0	53.0	49.0
Number of days above State standard (>50 $\mu g/m^3$)	0	1	1*
Number of days above Federal standard (>150 $\mu g/m^3$)	0	0	0
Particulate Matter <2.5 microns, $\mu g/m^3$, Worst 24 Hours	36.7	33.4	34.4
Number of days above Federal standard (>35 $\mu g/m^3$)	1	0	0

ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter

*State and national pollutant concentration readings and exceedances differ due to sampling methods, conditions, and data analysis requirements. Pollutant concentrations in this table reflect national statistics.

Notes: Data was obtained for the San Diego – 1110 Beardsley Street Monitoring Station for all pollutants.

Source: ARB 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 ARB and the U.S. EPA (ARB 2016b). 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 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 VOC and 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 ARB 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 are included in the SDAPCD report titled "*Measures to Reduce Particulate Matter in San Diego County*" (SDAPCD 2005).

The RAQS relies on information from ARB 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.

2.3 Previous Environmental Review

BARRIO LOGAN COMMUNITY PLAN

The Barrio Logan Community Plan, adopted in 1978, contains a set of goals and recommendations that represent shared vision for the future of the area. The Barrio Logan Community Plan *Environmental Element* (Environmental Element) includes issues and proposals related to the natural environment, pollution conditions, heritage resources, and urban design. The Environmental Element contains specific recommendations related to air quality that are applicable to the Barrio Logan community, including the project site. One of the goals of the Environmental Element is to contribute to the attainment of federal air quality standards through implementation of regional air quality strategies. More specifically, the Barrio Logan Community Plan encourages development of a transportation network designed to minimize air pollution, and include options to other less polluting transportation modes than the automobile (City of San Diego 1978).

BARRIO LOGAN COMMUNITY PLAN UPDATE ENVIRONMENTAL IMPACT REPORT (EIR)

The Barrio Logan Community Plan Update (CPU) EIR was certified in 2013. It must be noted that the 2013 CPU was never adopted and therefore, the goals and recommendations of the 1978 Barrio Logan Community Plan still apply for planning and design regulations. However, since the CPU EIR and associated technical studies were certified as valid documents, the analysis and conclusions therein are presumed to be valid reference resources for the analysis of the proposed project. The CPU EIR found that air emissions due to construction would not exceed the applicable thresholds for individual projects in the Plan area. However, if several of these projects were to occur simultaneously, there would be the potential for multiple projects to exceed significance thresholds. Regardless, individual projects would require project-specific review of grading and construction details to ensure that generation of pollutant emissions would be reduced to the greatest extent practicable.

Operational source emissions would originate from traffic generated within, or as a result of, the proposed CPU. Area source emissions would originate from activities such as the use of natural gas, fireplaces, and consumer products. In addition, landscaping maintenance activities associated with the proposed land uses within the Plan area. The CPU EIR concluded that buildout of the Plan area would result in increases in criteria air pollutant emission for which the SDAB is in nonattainment. However, individual projects would be subject to subsequent review and would be required to use best management practices to decrease emissions (City of San Diego 2013).

SENSITIVE RECEPTORS

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. Sensitive receptors nearest to the project site include residences along the northern project site boundary and across 26th Street to the east.

3 Impact Analysis

3.1 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 demolition, 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 1998).

The grading phase would involve the greatest concentration of heavy equipment use and the highest potential for fugitive dust emissions. The project estimates that 200 cubic yards of soil would be excavated; however, 50 cubic yards would remain on-site to be used as fill and 150 cubic yards would be exported off site. 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. As discussed in *Project Description*, unearthed soil would be watered three times per day throughout excavation activities as a measure to reduce fugitive dust and achieve compliance with SDAPCD Rules 52 and 54. This project construction feature was included in CalEEMod for the grading phase of construction.

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 January 2018 and extend through the middle of 2018.

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, emissions would be compared with the SDAPCD recommended regional thresholds for operational emissions. To provide a conservative estimate of project operational emissions, this analysis did not factor in emissions from existing uses on the project site.

As discussed under *Current Air Quality*, the RAQS relies on information from ARB and SANDAG to project future emissions and then determine from that the strategies necessary for the reduction of emissions through regulatory controls. ARB 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 that 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.

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

City of San Diego CEQA Significance Determination Thresholds

The SDAPCD has developed specific quantitative screening-level thresholds for determining when new or modified stationary sources must prepare an air quality impact analysis. As referenced in the City of San Diego's CEQA Significant Determination Thresholds, the SDAPCD provide criteria in Regulation II, Rule 20.2, Table 20-2-1, "AQIA Trigger Levels." 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
- 25 pounds per hour/250 pounds per day/40 tons per year of NOX
- 25 pounds per hour/250 pounds per day/40 tons per year of SOX
- 100 pounds per hour/550 pounds per day/100 tons per year of CO
- 100 pounds per day/15 tons per year of PM10
- 55 pounds per day/10 tons per year of PM2.5
- 3.2 pounds per day/0.6 tons per year of Lead and Lead Compounds[2]

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

2 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.

levels of service E or F 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 (City of San Diego 2011):

- 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

3.2 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 demolition, grading, construction of the proposed buildings, paving, and architectural coating.

Table 4 summarizes maximum daily pollutant emissions during the construction period.

Table 4 Estimated Maximum Daily Construction Emissions

	Maximum Emissions (lbs/day)					
Construction Year	**ROG**	**NO_X**	**SO_X**	**CO**	**PM_{10}**	**$PM_{2.5}$**
2018	29.8	11.9	<0.1	9.9	1.0	1.0
SDAPCD Daily Thresholds	137	250	250	550	100	55
Threshold Exceeded	**No**	**No**	**No**	**No**	**No**	**No**

See Appendix A for CalEEMod results and assumptions.

Notes: Table includes emissions from the winter or summer report, whichever was greater. Modeling was based on an earlier, larger version of the project so emissions associated with the current project are lower than shown herein.

As shown in Table 4, construction of the proposed project would not exceed the SDAPCD daily construction emission thresholds for the year 2018. 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. As shown in Table 5, construction of the project would also not exceed the SDAPCD hourly thresholds for the year 2018.

Table 5 Estimated Hourly Construction Emissions

	Maximum Emissions (lbs/hour)		
Construction Year	**NO_X**	**SO_X**	**CO**
2018	1.5	<0.01	1.2
SDAPCD Hourly Thresholds	25	25	100
Threshold Exceeded	**No**	**No**	**No**

See Appendix A for CalEEMod results and assumptions. Note that modeling was based on an earlier, larger version of the project so emissions associated with the current project are lower than shown herein.

Table 6 summarizes annual pollutant emissions from construction. As shown therein, annual construction pollutant emissions would not exceed applicable SDAPCD thresholds. Project construction would not result in pollutant emissions that exceed SDAPCD hourly, daily, or annual thresholds; therefore, project construction would not violate any air quality standard or contribute substantially to an existing or projected air quality violation, nor would it result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment.

Table 6 Estimated Annual Construction Emissions

	Maximum Emissions (tons/yr)					
Construction Year	**ROG**	**NO_X**	**SO_X**	**CO**	**PM_{10}**	**$PM_{2.5}$**
2018	0.4	0.7	<0.1	0.5	0.1	<0.1
SDAPCD Annual Thresholds	15	40	40	100	15	10
Threshold Exceeded	**No**	**No**	**No**	**No**	**No**	**No**

See Appendix A for CalEEMod results and assumptions. Note that calculations were done on an earlier, larger version of the project so emissions associated with the current project are lower than shown herein.

Note: Table includes emissions from the annual report.

3.3 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. Table 7 summarizes emissions associated with operation of the proposed project.

Table 7 Estimated Operational Emissions

	Maximum Emissions (lbs/day)					
Category	**ROG**	**NO_X**	**CO**	**SO_X**	**PM_{10}**	**$PM_{2.5}$**
Area	1.0	<0.1	2.0	<0.1	<0.1	<0.1
Energy	<0.1	0.1	0.1	<0.1	<0.1	<0.1
Mobile	0.9	3.6	9.4	<0.1	2.2	0.6
Maximum lbs/day	**1.9**	**3.7**	**11.5**	**<0.1**	**2.2**	**0.6**
SDAPCD Daily Thresholds	137	250	250	550	100	55
Threshold Exceeded	**No**	**No**	**No**	**No**	**No**	**No**

See Appendix A for CalEEMod results and assumptions.

Notes: Table includes emissions from the winter or summer report, whichever was greater. Calculations were done on an earlier, larger version of the project so emissions associated with the current project are lower than shown herein.

As shown in Table 7, the operational emissions would not exceed the SDAPCD daily thresholds for ROG, NO_X, CO, SO_X, PM_{10} or $PM_{2.5}$. Hourly emissions for NO_X, SO_X, and CO were determined by daily anticipated emission by a factor of 24 (hours/day of operation). Table 8 summarizes the hourly emissions for these pollutants. As shown in Table 8, operation of the project would not exceed the SDAPCD hourly thresholds for the year 2018.

Table 8 Estimated Hourly Operational Emissions

Category	Maximum Emissions (lbs/hour)		
	NO_X	SO_X	CO
Area	<0.1	<0.1	0.1
Energy	<0.1	<0.1	<0.1
Mobile	0.1	<0.1	0.4
Maximum lbs/hour	**0.1**	**<0.1**	**0.5**
SDAPCD Hourly Thresholds	25	25	100
Threshold Exceeded	**No**	**No**	**No**

See Appendix A for CalEEMod results and assumptions. Note that calculations were done on an earlier, larger version of the project so emissions associated with the current project are lower than shown herein.

Table 9 summarizes annual pollutant emissions from project operation. As shown, annual operation of the proposed project would not exceed applicable SDAPCD thresholds. Project operation would not result in pollutant emissions that exceed SDAPCD daily thresholds; therefore, project operation would not violate any air quality standard or contribute substantially to an existing or projected air quality violation, nor would it result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment.

Table 9 Estimated Annual Operational Emissions

Category	Maximum Emissions (tons/yr)					
	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
Area	0.2	<0.1	0.2	<0.1	<0.1	<0.1
Energy	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mobile	0.1	0.6	1.6	<0.1	0.4	0.1
Maximum tons/yr	**0.3**	**0.6**	**1.8**	**<0.1**	**0.4**	**0.1**
SDAPCD Annual Thresholds	15	40	40	100	15	10
Threshold Exceeded	**No**	**No**	**No**	**No**	**No**	**No**

See Appendix A for CalEEMod results and assumptions. Note that calculations were done on an earlier, larger version of the project so emissions associated with the current project are lower than shown herein.

Notes: Table includes emissions from the annual report.

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 SDAB 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.

As discussed above, typically 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, or a four-lane road to drop to LOS E or worse. According to the CPU EIR Traffic Impact Study, in 2008, the roadways and intersections surrounding the project site operated at LOS A or LOS B and none of the roadways within one block of the project site are more than 2-lane collector roads (City of San Diego 2013). Interstate 5 runs northeast of the project site, approximately 200 feet from the northern site boundary. I-5 is classified and functions as an 8-lane freeway with four main lanes of traffic in each direction. Impacts related to the freeway are discussed under Toxic Air Contaminants below. Cesar Chavez Parkway functions as a north-south, 4-lane collector between Logan Avenue and National Avenue and between Main Street and Harbor Drive and is approximately 0.5 miles southwest of the project site. 28th Street functions as a north-south, 4-lane collector between Boston Avenue and Main Street and a 4-lane with raised median major arterial between Main Street and Harbor Drive and is approximately 0.3 miles southeast of the project site. Harbor Drive functions as an east-west, 4-lane major arterial between Sigsbee Street and Vesta Street and is approximately 0.3 miles south of the project site.

The proposed project would generate new vehicle trips and increase traffic on area roadways. Project trips were estimated using the Institute of Transportation Engineers (ITE) 9th Edition trip generation rates for hotels (ITE Use Code 310), retail centers (ITE Use Code 826), and apartments (ITE Code 220) to represent the proposed multi-family units. As shown in Table 8, the project would generate an estimated 455 daily trips with 55 AM peak hour trips and 34 PM peak hour trips.

Table 10 Projected-Generated Traffic Volumes

			AM Peak Hour Volumes			PM Peak Hour Volumes		
Land Use	Size	Daily Trip Volume	In	Out	Total	In	Out	Total
Multi-Family Housing [1]	24 Units	160	2	10	12	10	5	15
Hotel[2]	4 rooms	36	2	1	3	1	2	3
Retail Center[3]	5,850 square feet	259	20	20	40	7	9	16
Total		**455**	**24**	**31**	**55**	**18**	**16**	**34**

[1] ITE Land Use Code 220 (Apartment)

[2] ITE Land Use Code 310 (Hotel)

[3] ITE Land Use Code 826 (Retail Center)

Source: Institute of Transportation Engineers 9th Edition.

Project trip generation would be nominal and potential impacts to Cesar Chavez Parkway, 28th Street, Harbor Drive, or I-5 would not be significant (i.e., would not drop LOS to E or less). Therefore, the project would not require CO hotspot screening analysis and the project would not expose sensitive receptors to substantial pollutant concentrations.

TOXIC AIR CONTAMINANTS (TACS)

The nearest sensitive receptors to the project site are residences adjacent to the northern project site boundary and across 26th Street to the east. However, construction and operational emissions, as detailed in Tables 4 and 7 above, are well below SDAPCD thresholds. In addition, the project would not include any stationary sources that may be potential generators of TACs, nor would the proposed uses (hotel, retail, and residential uses) generate TACs. Therefore, the proposed project would not generate substantial TAC pollutant emissions.

A Health Risk Assessment (HRA) was completed by Rincon Consultants, Inc. in July 2017 (see Appendix B), which analyzed the possible health effects associated with TAC emissions from I-5 for the proposed project. The HRA concluded that the maximum exposed individual receptor (MEIR) on the project site would be exposed to a high end (95-percentile), 30-year excess cancer risk of approximately 10.8 in one million. This exceeds the SDAPCD significance threshold of one excess case of cancer in one million individuals without application of Toxics-Best Available Control Technology (T-BACT) (County of San Diego 2007). The excess cancer risk for the average (50-percentile) residency of nine years would be approximately 7.7 in one million, which also exceeds SDAPCD's significance threshold for projects without application of T-BACT. However, this analysis was based on outdoor air concentrations and conservatively assumes that interior concentrations would be the same. U.S. EPA activity factors show that, on average, people in a residential environment spend only a small portion of the day outdoors. Therefore, reducing indoor exposure to diesel exhaust particulates can substantially reduce the overall cancer risk.

As determined in the HRA, inclusion of forced air ventilation with filter screens with a Minimum Efficiency Reporting Value (MERV) 10 rating on outside air intake ducts on all residential units would remove at least 50% of the particulate matter, including fine particulate matter. Diesel particulate filters such as these are considered T-BACT under SDAPCD guidelines (County of San Diego 2007), and would reduce the future residents' cancer risk to below the SDAPCD's cancer risk threshold of ten in one million with application of T-BACT for the high-end estimate for residency time (95-percentile) of 30 years and the average (50-percentile) of nine years. Therefore, with the inclusion of T-BACT, the proposed project would not be exposed to substantial TAC pollutant concentrations from the I-5.

ODORS

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 farming operations with the potential to expose sensitive receptors to objectionable odors could be deemed to have a significant impact. According to the CPU EIR, although the Plan area is adjacent to numerous industrial operations, there are no known sources of specific, long-term odors in the area. Further, there are no agricultural operations in the area that would generate odors or other air emissions (City of San Diego 2013).

The proposed project would involve the use of diesel powered equipment during construction. Diesel exhaust may be noticeable at adjacent properties; however, construction activities would be temporary. The project would include residential, hotel, and retail uses, which are not associated with objectionable odors. However, according to the CPU EIR, there are no known sources of specific, long-term odors in the area. Therefore, impacts related to odors would be less than significant.

RAQS CONSISTENCY

The RAQS relies on information from ARB 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. As shown in Tables 4 and 7, the proposed project's construction and operational emissions are well below the SDAPCD thresholds. The proposed project would include 24 residential units, which would marginally increase the City's population. According to demographic and socioeconomic estimates provided by the SANDAG Data Surfer database, the City has an estimated 2.67 persons per household (SANDAG 2017). At 24 proposed units, the proposed project would generate a population increase of approximately 64 people (2.67 x 67 = 64.08). The City of San Diego has a current population of 1,406,318. However, the SANDAG 2015 Regional Plan reports an estimated growth forecast of 1,453,267 by the year 2020, or an increase of 46,949 persons (California Department of Finance [DOF] 2017; SANDAG 2015) from current conditions. The proposed project would account for approximately 0.1% of the City's projected population growth. Therefore, the level of population growth associated with the project was anticipated in SANDAG's long-term population forecasts and the project would not cause the City population to exceed official population projects. Therefore, the project would be consistent with the RAQS.

4 Conclusion

Implementation of the proposed project would not result in any air quality exceedances of applicable short-term construction and long-term operational thresholds. The proposed project would not generate impacts related to CO hotspots, or odors and the project would be consistent with RAQs. Additionally, with the inclusion of T-BACT the proposed project would not be exposed to substantial toxic air contaminant concentrations from the I-5. Therefore, no additional measures are needed to reduce project air quality impacts.

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Appendix A

CalEEMod Results

Appendix B

Health Risk Assessment

Barrio Flats Mixed-Used Project

San Diego Air Basin, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Enclosed Parking with Elevator	22.00	Space	0.00	8,800.00	0
Hotel	10.00	Room	0.00	4,425.00	0
Apartments Mid Rise	24.00	Dwelling Unit	0.36	27,950.00	69
Strip Mall	6.00	1000sqft	0.00	6,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	40
Climate Zone	13			**Operational Year**	2019
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 - Per project information

Land Use - Per project plans. Residential sf accounts for miscellaneous (i.e., elevator, exit stairs, utility rooms).

Construction Phase - Construction schedule approximated from applicant info. Grading combined with trenching/utilities phase.

Demolition - Per project plans.

Grading - Per applicant questionnaire.

Architectural Coating - Per SDAPCD Rule 67, use of 100 VOC for nonflat coatings.

Woodstoves - No fireplaces per applicant questionnaire.

Area Coating - Per SDAPCD Rule 67, use of 100 VOC for nonflat coatings.

Energy Use -

Construction Off-road Equipment Mitigation - Watering 3 times per applicant questionnaire.

Mobile Land Use Mitigation -

Area Mitigation -

Energy Mitigation -

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Residential_Exterior	250.00	100.00
tblArchitecturalCoating	EF_Residential_Interior	250.00	100.00
tblAreaCoating	Area_EF_Residential_Exterior	250	100
tblAreaCoating	Area_EF_Residential_Interior	250	100
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	40	0
tblConstructionPhase	NumDays	5.00	21.00
tblConstructionPhase	NumDays	100.00	44.00
tblConstructionPhase	NumDays	2.00	41.00
tblConstructionPhase	NumDays	5.00	21.00
tblConstructionPhase	NumDays	1.00	14.00
tblConstructionPhase	PhaseEndDate	7/30/2018	7/1/2018
tblConstructionPhase	PhaseEndDate	6/1/2018	5/31/2018

tblConstructionPhase	PhaseEndDate	3/30/2018	3/31/2018
tblConstructionPhase	PhaseEndDate	6/29/2018	7/1/2018
tblConstructionPhase	PhaseStartDate	6/30/2018	6/1/2018
tblConstructionPhase	PhaseStartDate	3/31/2018	4/1/2018
tblConstructionPhase	PhaseStartDate	6/2/2018	6/1/2018
tblFireplaces	FireplaceDayYear	82.00	0.00
tblFireplaces	FireplaceHourDay	3.00	0.00
tblFireplaces	FireplaceWoodMass	3,078.40	0.00
tblFireplaces	NumberGas	13.20	0.00
tblFireplaces	NumberNoFireplace	2.40	0.00
tblFireplaces	NumberWood	8.40	0.00
tblGrading	AcresOfGrading	7.00	0.50
tblGrading	MaterialExported	0.00	150.00
tblLandUse	BuildingSpaceSquareFeet	14,520.00	4,425.00
tblLandUse	BuildingSpaceSquareFeet	24,000.00	27,950.00
tblLandUse	LandUseSquareFeet	14,520.00	4,425.00
tblLandUse	LandUseSquareFeet	24,000.00	27,950.00
tblLandUse	LotAcreage	0.20	0.00
tblLandUse	LotAcreage	0.33	0.00
tblLandUse	LotAcreage	0.63	0.36
tblLandUse	LotAcreage	0.14	0.00
tblProjectCharacteristics	OperationalYear	2018	2019
tblWoodstoves	NumberCatalytic	1.20	0.00
tblWoodstoves	NumberNoncatalytic	1.20	0.00
tblWoodstoves	WoodstoveDayYear	82.00	0.00
tblWoodstoves	WoodstoveWoodMass	3,019.20	0.00

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					
2018	0.3736	0.6931	0.5354	9.2000e-004	0.0286	0.0416	0.0702	0.0116	0.0390	0.0506	0.0000	82.7407	82.7407	0.0182	0.0000	83.1945
Maximum	**0.3736**	**0.6931**	**0.5354**	**9.2000e-004**	**0.0286**	**0.0416**	**0.0702**	**0.0116**	**0.0390**	**0.0506**	**0.0000**	**82.7407**	**82.7407**	**0.0182**	**0.0000**	**83.1945**

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					
2018	0.3736	0.6931	0.5354	9.2000e-004	0.0172	0.0416	0.0588	6.1600e-003	0.0390	0.0451	0.0000	82.7406	82.7406	0.0182	0.0000	83.1944
Maximum	**0.3736**	**0.6931**	**0.5354**	**9.2000e-004**	**0.0172**	**0.0416**	**0.0588**	**6.1600e-003**	**0.0390**	**0.0451**	**0.0000**	**82.7406**	**82.7406**	**0.0182**	**0.0000**	**83.1944**

	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**	**39.77**	**0.00**	**16.22**	**46.99**	**0.00**	**10.79**	**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	**1-1-2018**	**3-31-2018**	0.3470	0.3470
2	**4-1-2018**	**6-30-2018**	0.7207	0.7207
3	**7-1-2018**	**9-30-2018**	0.0145	0.0145
		Highest	0.7207	0.7207

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	0.1858	2.0800e-003	0.1794	1.0000e-005		9.8000e-004	9.8000e-004		9.8000e-004	9.8000e-004	0.0000	0.2918	0.2918	2.9000e-004	0.0000	0.2990
Energy	2.6200e-003	0.0232	0.0154	1.4000e-004		1.8100e-003	1.8100e-003		1.8100e-003	1.8100e-003	0.0000	123.2482	123.2482	4.4100e-003	1.2900e-003	123.7416
Mobile	0.1504	0.6253	1.6075	4.6200e-003	0.3655	5.3400e-003	0.3709	0.0979	5.0200e-003	0.1029	0.0000	425.1046	425.1046	0.0254	0.0000	425.7397
Waste						0.0000	0.0000		0.0000	0.0000	4.6302	0.0000	4.6302	0.2736	0.0000	11.4712
Water						0.0000	0.0000		0.0000	0.0000	0.7176	14.2955	15.0131	0.0743	1.8600e-003	17.4240
Total	**0.3389**	**0.6506**	**1.8023**	**4.7700e-003**	**0.3655**	**8.1300e-003**	**0.3736**	**0.0979**	**7.8100e-003**	**0.1057**	**5.3478**	**562.9400**	**568.2878**	**0.3780**	**3.1500e-003**	**578.6755**

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	0.1858	2.0800e-003	0.1794	1.0000e-005		9.8000e-004	9.8000e-004		9.8000e-004	9.8000e-004	0.0000	0.2918	0.2918	2.9000e-004	0.0000	0.2990
Energy	2.1200e-003	0.0188	0.0123	1.2000e-004		1.4700e-003	1.4700e-003		1.4700e-003	1.4700e-003	0.0000	110.7614	110.7614	4.0200e-003	1.1300e-003	111.1992
Mobile	0.1501	0.6232	1.6007	4.6000e-003	0.3633	5.3100e-003	0.3686	0.0973	5.0000e-003	0.1023	0.0000	422.7440	422.7440	0.0253	0.0000	423.3762
Waste						0.0000	0.0000		0.0000	0.0000	4.6302	0.0000	4.6302	0.2736	0.0000	11.4712
Water						0.0000	0.0000		0.0000	0.0000	0.7176	14.2955	15.0131	0.0743	1.8600e-003	17.4240
Total	**0.3381**	**0.6441**	**1.7925**	**4.7300e-003**	**0.3633**	**7.7600e-003**	**0.3711**	**0.0973**	**7.4500e-003**	**0.1048**	**5.3478**	**548.0926**	**553.4404**	**0.3775**	**2.9900e-003**	**563.7696**

	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	**0.24**	**1.01**	**0.55**	**0.84**	**0.60**	**4.55**	**0.69**	**0.60**	**4.61**	**0.90**	**0.00**	**2.64**	**2.61**	**0.13**	**5.08**	**2.58**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2018	1/12/2018	5	10	
2	Site Preparation	Site Preparation	1/13/2018	2/1/2018	5	14	
3	Grading	Grading	2/2/2018	3/31/2018	5	41	
4	Building Construction	Building Construction	4/1/2018	5/31/2018	5	44	
5	Paving	Paving	6/1/2018	7/1/2018	5	21	
6	Architectural Coating	Architectural Coating	6/1/2018	7/1/2018	5	21	

Acres of Grading (Site Preparation Phase): 0.5

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 56,599; Residential Outdoor: 18,866; Non-Residential Indoor: 15,638; Non-Residential Outdoor: 5,213; Striped Parking Area: 528 (Architectural Coating – sqft)

OffRoad Equipment

Barrio Flats Mixed-Used Project - San Diego Air Basin, Annual

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Rubber Tired Dozers	1	1.00	247	0.40
Demolition	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Site Preparation	Graders	1	8.00	187	0.41
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Concrete/Industrial Saws	1	8.00	81	0.73
Grading	Rubber Tired Dozers	1	1.00	247	0.40
Grading	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Building Construction	Cranes	1	4.00	231	0.29
Building Construction	Forklifts	2	6.00	89	0.20
Building Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Paving	Cement and Mortar Mixers	4	6.00	9	0.56
Paving	Pavers	1	7.00	130	0.42
Paving	Rollers	1	7.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	4	10.00	0.00	27.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	2	5.00	0.00	19.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	10.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	5	25.00	6.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	5.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Clean Paved Roads

3.2 Demolition - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.9500e-003	0.0000	2.9500e-003	4.5000e-004	0.0000	4.5000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.3200e-003	0.0472	0.0389	6.0000e-005		3.1100e-003	3.1100e-003		2.9700e-003	2.9700e-003	0.0000	5.3041	5.3041	1.0200e-003	0.0000	5.3297
Total	**5.3200e-003**	**0.0472**	**0.0389**	**6.0000e-005**	**2.9500e-003**	**3.1100e-003**	**6.0600e-003**	**4.5000e-004**	**2.9700e-003**	**3.4200e-003**	**0.0000**	**5.3041**	**5.3041**	**1.0200e-003**	**0.0000**	**5.3297**

3.2 Demolition - 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	1.3000e-004	4.3800e-003	9.1000e-004	1.0000e-005	2.3000e-004	2.0000e-005	2.5000e-004	6.0000e-005	2.0000e-005	8.0000e-005	0.0000	1.0638	1.0638	1.0000e-004	0.0000	1.0662
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	2.1000e-004	1.7000e-004	1.6200e-003	0.0000	4.0000e-004	0.0000	4.0000e-004	1.1000e-004	0.0000	1.1000e-004	0.0000	0.3859	0.3859	1.0000e-005	0.0000	0.3862
Total	**3.4000e-004**	**4.5500e-003**	**2.5300e-003**	**1.0000e-005**	**6.3000e-004**	**2.0000e-005**	**6.5000e-004**	**1.7000e-004**	**2.0000e-005**	**1.9000e-004**	**0.0000**	**1.4497**	**1.4497**	**1.1000e-004**	**0.0000**	**1.4525**

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					1.1500e-003	0.0000	1.1500e-003	1.7000e-004	0.0000	1.7000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.3200e-003	0.0472	0.0389	6.0000e-005		3.1100e-003	3.1100e-003		2.9700e-003	2.9700e-003	0.0000	5.3041	5.3041	1.0200e-003	0.0000	5.3296
Total	**5.3200e-003**	**0.0472**	**0.0389**	**6.0000e-005**	**1.1500e-003**	**3.1100e-003**	**4.2600e-003**	**1.7000e-004**	**2.9700e-003**	**3.1400e-003**	**0.0000**	**5.3041**	**5.3041**	**1.0200e-003**	**0.0000**	**5.3296**

3.2 Demolition - 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	1.3000e-004	4.3800e-003	9.1000e-004	1.0000e-005	2.3000e-004	2.0000e-005	2.5000e-004	6.0000e-005	2.0000e-005	8.0000e-005	0.0000	1.0638	1.0638	1.0000e-004	0.0000	1.0662
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	2.1000e-004	1.7000e-004	1.6200e-003	0.0000	4.0000e-004	0.0000	4.0000e-004	1.1000e-004	0.0000	1.1000e-004	0.0000	0.3859	0.3859	1.0000e-005	0.0000	0.3862
Total	**3.4000e-004**	**4.5500e-003**	**2.5300e-003**	**1.0000e-005**	**6.3000e-004**	**2.0000e-005**	**6.5000e-004**	**1.7000e-004**	**2.0000e-005**	**1.9000e-004**	**0.0000**	**1.4497**	**1.4497**	**1.1000e-004**	**0.0000**	**1.4525**

3.3 Site Preparation - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.8000e-004	0.0000	2.8000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.5000e-003	0.0683	0.0298	7.0000e-005		2.9300e-003	2.9300e-003		2.6900e-003	2.6900e-003	0.0000	6.2405	6.2405	1.9400e-003	0.0000	6.2891
Total	**5.5000e-003**	**0.0683**	**0.0298**	**7.0000e-005**	**2.8000e-004**	**2.9300e-003**	**3.2100e-003**	**3.0000e-005**	**2.6900e-003**	**2.7200e-003**	**0.0000**	**6.2405**	**6.2405**	**1.9400e-003**	**0.0000**	**6.2891**

3.3 Site Preparation - 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	9.0000e-005	3.0800e-003	6.4000e-004	1.0000e-005	1.6000e-004	1.0000e-005	1.7000e-004	4.0000e-005	1.0000e-005	6.0000e-005	0.0000	0.7486	0.7486	7.0000e-005	0.0000	0.7503
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	1.5000e-004	1.2000e-004	1.1400e-003	0.0000	2.8000e-004	0.0000	2.8000e-004	7.0000e-005	0.0000	8.0000e-005	0.0000	0.2701	0.2701	1.0000e-005	0.0000	0.2704
Total	**2.4000e-004**	**3.2000e-003**	**1.7800e-003**	**1.0000e-005**	**4.4000e-004**	**1.0000e-005**	**4.5000e-004**	**1.1000e-004**	**1.0000e-005**	**1.4000e-004**	**0.0000**	**1.0188**	**1.0188**	**8.0000e-005**	**0.0000**	**1.0207**

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					1.1000e-004	0.0000	1.1000e-004	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.5000e-003	0.0683	0.0298	7.0000e-005		2.9300e-003	2.9300e-003		2.6900e-003	2.6900e-003	0.0000	6.2405	6.2405	1.9400e-003	0.0000	6.2891
Total	**5.5000e-003**	**0.0683**	**0.0298**	**7.0000e-005**	**1.1000e-004**	**2.9300e-003**	**3.0400e-003**	**1.0000e-005**	**2.6900e-003**	**2.7000e-003**	**0.0000**	**6.2405**	**6.2405**	**1.9400e-003**	**0.0000**	**6.2891**

3.3 Site Preparation - 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	9.0000e-005	3.0800e-003	6.4000e-004	1.0000e-005	1.6000e-004	1.0000e-005	1.7000e-004	4.0000e-005	1.0000e-005	6.0000e-005	0.0000	0.7486	0.7486	7.0000e-005	0.0000	0.7503
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	1.5000e-004	1.2000e-004	1.1400e-003	0.0000	2.8000e-004	0.0000	2.8000e-004	7.0000e-005	0.0000	8.0000e-005	0.0000	0.2701	0.2701	1.0000e-005	0.0000	0.2704
Total	**2.4000e-004**	**3.2000e-003**	**1.7800e-003**	**1.0000e-005**	**4.4000e-004**	**1.0000e-005**	**4.5000e-004**	**1.1000e-004**	**1.0000e-005**	**1.4000e-004**	**0.0000**	**1.0188**	**1.0188**	**8.0000e-005**	**0.0000**	**1.0207**

3.4 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0154	0.0000	0.0154	8.4800e-003	0.0000	8.4800e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0218	0.1933	0.1594	2.5000e-004		0.0128	0.0128		0.0122	0.0122	0.0000	21.7467	21.7467	4.1900e-003	0.0000	21.8516
Total	**0.0218**	**0.1933**	**0.1594**	**2.5000e-004**	**0.0154**	**0.0128**	**0.0282**	**8.4800e-003**	**0.0122**	**0.0207**	**0.0000**	**21.7467**	**21.7467**	**4.1900e-003**	**0.0000**	**21.8516**

3.4 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	8.8000e-004	6.9000e-004	6.6500e-003	2.0000e-005	1.6400e-003	1.0000e-005	1.6600e-003	4.4000e-004	1.0000e-005	4.5000e-004	0.0000	1.5821	1.5821	5.0000e-005	0.0000	1.5835
Total	**8.8000e-004**	**6.9000e-004**	**6.6500e-003**	**2.0000e-005**	**1.6400e-003**	**1.0000e-005**	**1.6600e-003**	**4.4000e-004**	**1.0000e-005**	**4.5000e-004**	**0.0000**	**1.5821**	**1.5821**	**5.0000e-005**	**0.0000**	**1.5835**

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					6.0200e-003	0.0000	6.0200e-003	3.3100e-003	0.0000	3.3100e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0218	0.1933	0.1594	2.5000e-004		0.0128	0.0128		0.0122	0.0122	0.0000	21.7467	21.7467	4.1900e-003	0.0000	21.8515
Total	**0.0218**	**0.1933**	**0.1594**	**2.5000e-004**	**6.0200e-003**	**0.0128**	**0.0188**	**3.3100e-003**	**0.0122**	**0.0155**	**0.0000**	**21.7467**	**21.7467**	**4.1900e-003**	**0.0000**	**21.8515**

3.4 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	8.8000e-004	6.9000e-004	6.6500e-003	2.0000e-005	1.6400e-003	1.0000e-005	1.6600e-003	4.4000e-004	1.0000e-005	4.5000e-004	0.0000	1.5821	1.5821	5.0000e-005	0.0000	1.5835
Total	**8.8000e-004**	**6.9000e-004**	**6.6500e-003**	**2.0000e-005**	**1.6400e-003**	**1.0000e-005**	**1.6600e-003**	**4.4000e-004**	**1.0000e-005**	**4.5000e-004**	**0.0000**	**1.5821**	**1.5821**	**5.0000e-005**	**0.0000**	**1.5835**

3.5 Building Construction - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0239	0.2427	0.1705	2.5000e-004		0.0156	0.0156		0.0143	0.0143	0.0000	22.8826	22.8826	7.1200e-003	0.0000	23.0607
Total	**0.0239**	**0.2427**	**0.1705**	**2.5000e-004**		**0.0156**	**0.0156**		**0.0143**	**0.0143**	**0.0000**	**22.8826**	**22.8826**	**7.1200e-003**	**0.0000**	**23.0607**

3.5 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	6.9000e-004	0.0176	4.8500e-003	4.0000e-005	8.8000e-004	1.4000e-004	1.0100e-003	2.5000e-004	1.3000e-004	3.8000e-004	0.0000	3.5331	3.5331	2.9000e-004	0.0000	3.5404
Worker	2.3500e-003	1.8600e-003	0.0179	5.0000e-005	4.4100e-003	3.0000e-005	4.4400e-003	1.1700e-003	3.0000e-005	1.2000e-003	0.0000	4.2448	4.2448	1.5000e-004	0.0000	4.2484
Total	**3.0400e-003**	**0.0195**	**0.0227**	**9.0000e-005**	**5.2900e-003**	**1.7000e-004**	**5.4500e-003**	**1.4200e-003**	**1.6000e-004**	**1.5800e-003**	**0.0000**	**7.7779**	**7.7779**	**4.4000e-004**	**0.0000**	**7.7888**

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	0.0239	0.2427	0.1705	2.5000e-004		0.0156	0.0156		0.0143	0.0143	0.0000	22.8825	22.8825	7.1200e-003	0.0000	23.0606
Total	**0.0239**	**0.2427**	**0.1705**	**2.5000e-004**		**0.0156**	**0.0156**		**0.0143**	**0.0143**	**0.0000**	**22.8825**	**22.8825**	**7.1200e-003**	**0.0000**	**23.0606**

3.5 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	6.9000e-004	0.0176	4.8500e-003	4.0000e-005	8.8000e-004	1.4000e-004	1.0100e-003	2.5000e-004	1.3000e-004	3.8000e-004	0.0000	3.5331	3.5331	2.9000e-004	0.0000	3.5404
Worker	2.3500e-003	1.8600e-003	0.0179	5.0000e-005	4.4100e-003	3.0000e-005	4.4400e-003	1.1700e-003	3.0000e-005	1.2000e-003	0.0000	4.2448	4.2448	1.5000e-004	0.0000	4.2484
Total	**3.0400e-003**	**0.0195**	**0.0227**	**9.0000e-005**	**5.2900e-003**	**1.7000e-004**	**5.4500e-003**	**1.4200e-003**	**1.6000e-004**	**1.5800e-003**	**0.0000**	**7.7779**	**7.7779**	**4.4000e-004**	**0.0000**	**7.7888**

3.6 Paving - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	9.6600e-003	0.0918	0.0759	1.2000e-004		5.3600e-003	5.3600e-003		4.9700e-003	4.9700e-003	0.0000	10.1935	10.1935	2.8700e-003	0.0000	10.2654
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**9.6600e-003**	**0.0918**	**0.0759**	**1.2000e-004**		**5.3600e-003**	**5.3600e-003**		**4.9700e-003**	**4.9700e-003**	**0.0000**	**10.1935**	**10.1935**	**2.8700e-003**	**0.0000**	**10.2654**

3.6 Paving - 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	8.1000e-004	6.4000e-004	6.1300e-003	2.0000e-005	1.5200e-003	1.0000e-005	1.5300e-003	4.0000e-004	1.0000e-005	4.1000e-004	0.0000	1.4587	1.4587	5.0000e-005	0.0000	1.4599
Total	**8.1000e-004**	**6.4000e-004**	**6.1300e-003**	**2.0000e-005**	**1.5200e-003**	**1.0000e-005**	**1.5300e-003**	**4.0000e-004**	**1.0000e-005**	**4.1000e-004**	**0.0000**	**1.4587**	**1.4587**	**5.0000e-005**	**0.0000**	**1.4599**

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	9.6600e-003	0.0918	0.0759	1.2000e-004		5.3600e-003	5.3600e-003		4.9700e-003	4.9700e-003	0.0000	10.1935	10.1935	2.8700e-003	0.0000	10.2654
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**9.6600e-003**	**0.0918**	**0.0759**	**1.2000e-004**		**5.3600e-003**	**5.3600e-003**		**4.9700e-003**	**4.9700e-003**	**0.0000**	**10.1935**	**10.1935**	**2.8700e-003**	**0.0000**	**10.2654**

3.6 Paving - 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	8.1000e-004	6.4000e-004	6.1300e-003	2.0000e-005	1.5200e-003	1.0000e-005	1.5300e-003	4.0000e-004	1.0000e-005	4.1000e-004	0.0000	1.4587	1.4587	5.0000e-005	0.0000	1.4599
Total	**8.1000e-004**	**6.4000e-004**	**6.1300e-003**	**2.0000e-005**	**1.5200e-003**	**1.0000e-005**	**1.5300e-003**	**4.0000e-004**	**1.0000e-005**	**4.1000e-004**	**0.0000**	**1.4587**	**1.4587**	**5.0000e-005**	**0.0000**	**1.4599**

3.7 Architectural Coating - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.2988					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.1400e-003	0.0211	0.0195	3.0000e-005		1.5800e-003	1.5800e-003		1.5800e-003	1.5800e-003	0.0000	2.6809	2.6809	2.5000e-004	0.0000	2.6873
Total	**0.3019**	**0.0211**	**0.0195**	**3.0000e-005**		**1.5800e-003**	**1.5800e-003**		**1.5800e-003**	**1.5800e-003**	**0.0000**	**2.6809**	**2.6809**	**2.5000e-004**	**0.0000**	**2.6873**

3.7 Architectural Coating - 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	2.2000e-004	1.8000e-004	1.7000e-003	0.0000	4.2000e-004	0.0000	4.2000e-004	1.1000e-004	0.0000	1.1000e-004	0.0000	0.4052	0.4052	1.0000e-005	0.0000	0.4055
Total	**2.2000e-004**	**1.8000e-004**	**1.7000e-003**	**0.0000**	**4.2000e-004**	**0.0000**	**4.2000e-004**	**1.1000e-004**	**0.0000**	**1.1000e-004**	**0.0000**	**0.4052**	**0.4052**	**1.0000e-005**	**0.0000**	**0.4055**

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	0.2988					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.1400e-003	0.0211	0.0195	3.0000e-005		1.5800e-003	1.5800e-003		1.5800e-003	1.5800e-003	0.0000	2.6809	2.6809	2.5000e-004	0.0000	2.6873
Total	**0.3019**	**0.0211**	**0.0195**	**3.0000e-005**		**1.5800e-003**	**1.5800e-003**		**1.5800e-003**	**1.5800e-003**	**0.0000**	**2.6809**	**2.6809**	**2.5000e-004**	**0.0000**	**2.6873**

3.7 Architectural Coating - 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	2.2000e-004	1.8000e-004	1.7000e-003	0.0000	4.2000e-004	0.0000	4.2000e-004	1.1000e-004	0.0000	1.1000e-004	0.0000	0.4052	0.4052	1.0000e-005	0.0000	0.4055
Total	**2.2000e-004**	**1.8000e-004**	**1.7000e-003**	**0.0000**	**4.2000e-004**	**0.0000**	**4.2000e-004**	**1.1000e-004**	**0.0000**	**1.1000e-004**	**0.0000**	**0.4052**	**0.4052**	**1.0000e-005**	**0.0000**	**0.4055**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Integrate Below Market Rate Housing

	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	0.1501	0.6232	1.6007	4.6000e-003	0.3633	5.3100e-003	0.3686	0.0973	5.0000e-003	0.1023	0.0000	422.7440	422.7440	0.0253	0.0000	423.3762
Unmitigated	0.1504	0.6253	1.6075	4.6200e-003	0.3655	5.3400e-003	0.3709	0.0979	5.0200e-003	0.1029	0.0000	425.1046	425.1046	0.0254	0.0000	425.7397

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	159.60	153.36	140.64	445,427	442,755
Enclosed Parking with Elevator	0.00	0.00	0.00		
Hotel	81.70	81.90	59.50	149,253	148,358
Strip Mall	265.92	252.24	122.58	374,980	372,731
Total	507.22	487.50	322.72	969,661	963,843

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
Apartments Mid Rise	10.80	7.30	7.50	41.60	18.80	39.60	86	11	3
Enclosed Parking with Elevator	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Hotel	9.50	7.30	7.30	19.40	61.60	19.00	58	38	4
Strip Mall	9.50	7.30	7.30	16.60	64.40	19.00	45	40	15

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Enclosed Parking with Elevator	0.581689	0.044135	0.186694	0.113515	0.018244	0.005600	0.015197	0.022573	0.001888	0.002088	0.006279	0.000742	0.001357
Hotel	0.581689	0.044135	0.186694	0.113515	0.018244	0.005600	0.015197	0.022573	0.001888	0.002088	0.006279	0.000742	0.001357
Apartments Mid Rise	0.581689	0.044135	0.186694	0.113515	0.018244	0.005600	0.015197	0.022573	0.001888	0.002088	0.006279	0.000742	0.001357
Strip Mall	0.581689	0.044135	0.186694	0.113515	0.018244	0.005600	0.015197	0.022573	0.001888	0.002088	0.006279	0.000742	0.001357

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

	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	89.7723	89.7723	3.6100e-003	7.5000e-004	90.0854
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	97.3336	97.3336	3.9200e-003	8.1000e-004	97.6731
NaturalGas Mitigated	2.1200e-003	0.0188	0.0123	1.2000e-004		1.4700e-003	1.4700e-003		1.4700e-003	1.4700e-003	0.0000	20.9890	20.9890	4.0000e-004	3.8000e-004	21.1138
NaturalGas Unmitigated	2.6200e-003	0.0232	0.0154	1.4000e-004		1.8100e-003	1.8100e-003		1.8100e-003	1.8100e-003	0.0000	25.9145	25.9145	5.0000e-004	4.8000e-004	26.0685

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					
Apartments Mid Rise	212830	1.1500e-003	9.8100e-003	4.1700e-003	6.0000e-005		7.9000e-004	7.9000e-004		7.9000e-004	7.9000e-004	0.0000	11.3574	11.3574	2.2000e-004	2.1000e-004	11.4249
Enclosed Parking with Elevator	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
Hotel	259349	1.4000e-003	0.0127	0.0107	8.0000e-005		9.7000e-004	9.7000e-004		9.7000e-004	9.7000e-004	0.0000	13.8399	13.8399	2.7000e-004	2.5000e-004	13.9221
Strip Mall	13440	7.0000e-005	6.6000e-004	5.5000e-004	0.0000		5.0000e-005	5.0000e-005		5.0000e-005	5.0000e-005	0.0000	0.7172	0.7172	1.0000e-005	1.0000e-005	0.7215
Total		**2.6200e-003**	**0.0232**	**0.0154**	**1.4000e-004**		**1.8100e-003**	**1.8100e-003**		**1.8100e-003**	**1.8100e-003**	**0.0000**	**25.9145**	**25.9145**	**5.0000e-004**	**4.7000e-004**	**26.0685**

5.2 Energy by Land Use - NaturalGas

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					
Apartments Mid Rise	181327	9.8000e-004	8.3600e-003	3.5600e-003	5.0000e-005		6.8000e-004	6.8000e-004		6.8000e-004	6.8000e-004	0.0000	9.6763	9.6763	1.9000e-004	1.8000e-004	9.7338
Enclosed Parking with Elevator	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
Hotel	200484	1.0800e-003	9.8300e-003	8.2600e-003	6.0000e-005		7.5000e-004	7.5000e-004		7.5000e-004	7.5000e-004	0.0000	10.6986	10.6986	2.1000e-004	2.0000e-004	10.7622
Strip Mall	11508	6.0000e-005	5.6000e-004	4.7000e-004	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.6141	0.6141	1.0000e-005	1.0000e-005	0.6178
Total		**2.1200e-003**	**0.0188**	**0.0123**	**1.1000e-004**		**1.4700e-003**	**1.4700e-003**		**1.4700e-003**	**1.4700e-003**	**0.0000**	**20.9890**	**20.9890**	**4.1000e-004**	**3.9000e-004**	**21.1138**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Mid Rise	102370	33.4555	1.3500e-003	2.8000e-004	33.5722
Enclosed Parking with Elevator	59312	19.3837	7.8000e-004	1.6000e-004	19.4513
Hotel	58808.2	19.2191	7.7000e-004	1.6000e-004	19.2861
Strip Mall	77340	25.2754	1.0200e-003	2.1000e-004	25.3636
Total		**97.3336**	**3.9200e-003**	**8.1000e-004**	**97.6731**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Mid Rise	100711	32.9132	1.3200e-003	2.7000e-004	33.0280
Enclosed Parking with Elevator	49653.1	16.2271	6.5000e-004	1.4000e-004	16.2837
Hotel	52600.9	17.1904	6.9000e-004	1.4000e-004	17.2504
Strip Mall	71728.8	23.4416	9.4000e-004	2.0000e-004	23.5234
Total		**89.7723**	**3.6000e-003**	**7.5000e-004**	**90.0854**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Residential Interior

Use Low VOC Paint - Residential Exterior

No Hearths Installed

	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	0.1858	2.0800e-003	0.1794	1.0000e-005		9.8000e-004	9.8000e-004		9.8000e-004	9.8000e-004	0.0000	0.2918	0.2918	2.9000e-004	0.0000	0.2990
Unmitigated	0.1858	2.0800e-003	0.1794	1.0000e-005		9.8000e-004	9.8000e-004		9.8000e-004	9.8000e-004	0.0000	0.2918	0.2918	2.9000e-004	0.0000	0.2990

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	0.0299					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.1504					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	5.5200e-003	2.0800e-003	0.1794	1.0000e-005		9.8000e-004	9.8000e-004		9.8000e-004	9.8000e-004	0.0000	0.2918	0.2918	2.9000e-004	0.0000	0.2990
Total	**0.1858**	**2.0800e-003**	**0.1794**	**1.0000e-005**		**9.8000e-004**	**9.8000e-004**		**9.8000e-004**	**9.8000e-004**	**0.0000**	**0.2918**	**0.2918**	**2.9000e-004**	**0.0000**	**0.2990**

6.2 Area by SubCategory

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	0.0299					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.1504					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	5.5200e-003	2.0800e-003	0.1794	1.0000e-005		9.8000e-004	9.8000e-004		9.8000e-004	9.8000e-004	0.0000	0.2918	0.2918	2.9000e-004	0.0000	0.2990
Total	**0.1858**	**2.0800e-003**	**0.1794**	**1.0000e-005**		**9.8000e-004**	**9.8000e-004**		**9.8000e-004**	**9.8000e-004**	**0.0000**	**0.2918**	**0.2918**	**2.9000e-004**	**0.0000**	**0.2990**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	15.0131	0.0743	1.8600e-003	17.4240
Unmitigated	15.0131	0.0743	1.8600e-003	17.4240

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Mid Rise	1.5637 / 0.985809	10.7295	0.0514	1.2900e-003	12.3976
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
Hotel	0.253668 / 0.0281853	1.2623	8.3100e-003	2.1000e-004	1.5312
Strip Mall	0.444435 / 0.272396	3.0213	0.0146	3.7000e-004	3.4953
Total		**15.0131**	**0.0743**	**1.8700e-003**	**17.4240**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Mid Rise	1.5637 / 0.985809	10.7295	0.0514	1.2900e-003	12.3976
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
Hotel	0.253668 / 0.0281853	1.2623	8.3100e-003	2.1000e-004	1.5312
Strip Mall	0.444435 / 0.272396	3.0213	0.0146	3.7000e-004	3.4953
Total		**15.0131**	**0.0743**	**1.8700e-003**	**17.4240**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	4.6302	0.2736	0.0000	11.4712
Unmitigated	4.6302	0.2736	0.0000	11.4712

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Mid Rise	11.04	2.2410	0.1324	0.0000	5.5520
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
Hotel	5.47	1.1104	0.0656	0.0000	2.7509
Strip Mall	6.3	1.2788	0.0756	0.0000	3.1683
Total		**4.6302**	**0.2736**	**0.0000**	**11.4712**

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Mid Rise	11.04	2.2410	0.1324	0.0000	5.5520
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
Hotel	5.47	1.1104	0.0656	0.0000	2.7509
Strip Mall	6.3	1.2788	0.0756	0.0000	3.1683
Total		**4.6302**	**0.2736**	**0.0000**	**11.4712**

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

Barrio Flats Mixed-Used Project

San Diego Air Basin, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Enclosed Parking with Elevator	22.00	Space	0.00	8,800.00	0
Hotel	10.00	Room	0.00	4,425.00	0
Apartments Mid Rise	24.00	Dwelling Unit	0.36	27,950.00	69
Strip Mall	6.00	1000sqft	0.00	6,000.00	0

1.2 Other Project Characteristics

Urbanization Urban **Wind Speed (m/s)** 2.6 **Precipitation Freq (Days)** 40

Climate Zone 13 **Operational Year** 2019

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 - Per project information

Land Use - Per project plans. Residential sf accounts for miscellaneous (i.e., elevator, exit stairs, utility rooms).

Construction Phase - Construction schedule approximated from applicant info. Grading combined with trenching/utilities phase.

Demolition - Per project plans.

Grading - Per applicant questionnaire.

Architectural Coating - Per SDAPCD Rule 67, use of 100 VOC for nonflat coatings.

Woodstoves - No fireplaces per applicant questionnaire.

Area Coating - Per SDAPCD Rule 67, use of 100 VOC for nonflat coatings.

Energy Use -

Construction Off-road Equipment Mitigation - Watering 3 times per applicant questionnaire.

Mobile Land Use Mitigation -

Area Mitigation -

Energy Mitigation -

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Residential_Exterior	250.00	100.00
tblArchitecturalCoating	EF_Residential_Interior	250.00	100.00
tblAreaCoating	Area_EF_Residential_Exterior	250	100
tblAreaCoating	Area_EF_Residential_Interior	250	100
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	40	0
tblConstructionPhase	NumDays	5.00	21.00
tblConstructionPhase	NumDays	100.00	44.00
tblConstructionPhase	NumDays	2.00	41.00
tblConstructionPhase	NumDays	5.00	21.00
tblConstructionPhase	NumDays	1.00	14.00
tblConstructionPhase	PhaseEndDate	7/30/2018	7/1/2018
tblConstructionPhase	PhaseEndDate	6/1/2018	5/31/2018

Barrio Flats Mixed-Used Project - San Diego Air Basin, Summer

tblConstructionPhase	PhaseEndDate	3/30/2018	3/31/2018
tblConstructionPhase	PhaseEndDate	6/29/2018	7/1/2018
tblConstructionPhase	PhaseStartDate	6/30/2018	6/1/2018
tblConstructionPhase	PhaseStartDate	3/31/2018	4/1/2018
tblConstructionPhase	PhaseStartDate	6/2/2018	6/1/2018
tblFireplaces	FireplaceDayYear	82.00	0.00
tblFireplaces	FireplaceHourDay	3.00	0.00
tblFireplaces	FireplaceWoodMass	3,078.40	0.00
tblFireplaces	NumberGas	13.20	0.00
tblFireplaces	NumberNoFireplace	2.40	0.00
tblFireplaces	NumberWood	8.40	0.00
tblGrading	AcresOfGrading	7.00	0.50
tblGrading	MaterialExported	0.00	150.00
tblLandUse	BuildingSpaceSquareFeet	14,520.00	4,425.00
tblLandUse	BuildingSpaceSquareFeet	24,000.00	27,950.00
tblLandUse	LandUseSquareFeet	14,520.00	4,425.00
tblLandUse	LandUseSquareFeet	24,000.00	27,950.00
tblLandUse	LotAcreage	0.20	0.00
tblLandUse	LotAcreage	0.33	0.00
tblLandUse	LotAcreage	0.63	0.36
tblLandUse	LotAcreage	0.14	0.00
tblProjectCharacteristics	OperationalYear	2018	2019
tblWoodstoves	NumberCatalytic	1.20	0.00
tblWoodstoves	NumberNoncatalytic	1.20	0.00
tblWoodstoves	WoodstoveDayYear	82.00	0.00
tblWoodstoves	WoodstoveWoodMass	3,019.20	0.00

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					
2018	29.7696	11.8987	9.8656	0.0163	0.8349	0.7164	1.4583	0.4356	0.6593	1.0304	0.0000	1,557.9474	1,557.9474	0.3788	0.0000	1,566.3351
Maximum	**29.7696**	**11.8987**	**9.8656**	**0.0163**	**0.8349**	**0.7164**	**1.4583**	**0.4356**	**0.6593**	**1.0304**	**0.0000**	**1,557.9474**	**1,557.9474**	**0.3788**	**0.0000**	**1,566.3351**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	29.7696	11.8987	9.8656	0.0163	0.3757	0.7164	0.9991	0.1832	0.6593	0.7780	0.0000	1,557.9474	1,557.9474	0.3788	0.0000	1,566.3351
Maximum	**29.7696**	**11.8987**	**9.8656**	**0.0163**	**0.3757**	**0.7164**	**0.9991**	**0.1832**	**0.6593**	**0.7780**	**0.0000**	**1,557.9474**	**1,557.9474**	**0.3788**	**0.0000**	**1,566.3351**

	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	55.00	0.00	31.49	57.95	0.00	24.50	0.00	0.00	0.00	0.00	0.00	0.00

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.0493	0.0231	1.9938	1.0000e-004		0.0109	0.0109		0.0109	0.0109	0.0000	3.5736	3.5736	3.5200e-003	0.0000	3.6616
Energy	0.0144	0.1270	0.0844	7.8000e-004		9.9100e-003	9.9100e-003		9.9100e-003	9.9100e-003		156.5252	156.5252	3.0000e-003	2.8700e-003	157.4554
Mobile	0.9246	3.5245	9.4140	0.0280	2.1651	0.0308	2.1959	0.5788	0.0290	0.6078		2,834.2053	2,834.2053	0.1625		2,838.2675
Total	**1.9883**	**3.6746**	**11.4922**	**0.0288**	**2.1651**	**0.0516**	**2.2167**	**0.5788**	**0.0498**	**0.6286**	**0.0000**	**2,994.3041**	**2,994.3041**	**0.1690**	**2.8700e-003**	**2,999.3846**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.0493	0.0231	1.9938	1.0000e-004		0.0109	0.0109		0.0109	0.0109	0.0000	3.5736	3.5736	3.5200e-003	0.0000	3.6616
Energy	0.0116	0.1027	0.0673	6.3000e-004		8.0300e-003	8.0300e-003		8.0300e-003	8.0300e-003		126.7751	126.7751	2.4300e-003	2.3200e-003	127.5285
Mobile	0.9227	3.5130	9.3718	0.0278	2.1521	0.0307	2.1827	0.5753	0.0288	0.6041		2,818.4663	2,818.4663	0.1618		2,822.5101
Total	**1.9837**	**3.6388**	**11.4329**	**0.0285**	**2.1521**	**0.0496**	**2.2017**	**0.5753**	**0.0478**	**0.6231**	**0.0000**	**2,948.8150**	**2,948.8150**	**0.1677**	**2.3200e-003**	**2,953.7002**

	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	0.23	0.98	0.52	1.04	0.60	3.95	0.68	0.60	4.09	0.88	0.00	1.52	1.52	0.78	19.16	1.52

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2018	1/12/2018	5	10	
2	Site Preparation	Site Preparation	1/13/2018	2/1/2018	5	14	
3	Grading	Grading	2/2/2018	3/31/2018	5	41	
4	Building Construction	Building Construction	4/1/2018	5/31/2018	5	44	
5	Paving	Paving	6/1/2018	7/1/2018	5	21	
6	Architectural Coating	Architectural Coating	6/1/2018	7/1/2018	5	21	

Acres of Grading (Site Preparation Phase): 0.5

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 56,599; Residential Outdoor: 18,866; Non-Residential Indoor: 15,638; Non-Residential Outdoor: 5,213; Striped Parking Area: 528 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Rubber Tired Dozers	1	1.00	247	0.40
Demolition	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Site Preparation	Graders	1	8.00	187	0.41
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Concrete/Industrial Saws	1	8.00	81	0.73
Grading	Rubber Tired Dozers	1	1.00	247	0.40
Grading	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Building Construction	Cranes	1	4.00	231	0.29
Building Construction	Forklifts	2	6.00	89	0.20
Building Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Paving	Cement and Mortar Mixers	4	6.00	9	0.56
Paving	Pavers	1	7.00	130	0.42
Paving	Rollers	1	7.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	4	10.00	0.00	27.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	2	5.00	0.00	19.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	10.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	5	25.00	6.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	5.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Clean Paved Roads

3.2 Demolition - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.5890	0.0000	0.5890	0.0892	0.0000	0.0892			0.0000			0.0000
Off-Road	1.0643	9.4295	7.7762	0.0120		0.6228	0.6228		0.5943	0.5943		1,169.350 2	1,169.350 2	0.2254		1,174.985 7
Total	**1.0643**	**9.4295**	**7.7762**	**0.0120**	**0.5890**	**0.6228**	**1.2118**	**0.0892**	**0.5943**	**0.6835**		**1,169.350 2**	**1,169.350 2**	**0.2254**		**1,174.985 7**

3.2 Demolition - 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	0.0247	0.8588	0.1771	2.1700e-003	0.0472	3.3800e-003	0.0506	0.0129	3.2300e-003	0.0162		236.1837	236.1837	0.0208		236.7042
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0426	0.0307	0.3423	9.0000e-004	0.0822	5.9000e-004	0.0827	0.0218	5.5000e-004	0.0223		89.7225	89.7225	3.0700e-003		89.7992
Total	**0.0673**	**0.8895**	**0.5195**	**3.0700e-003**	**0.1293**	**3.9700e-003**	**0.1333**	**0.0347**	**3.7800e-003**	**0.0385**		**325.9062**	**325.9062**	**0.0239**		**326.5034**

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					0.2297	0.0000	0.2297	0.0348	0.0000	0.0348			0.0000			0.0000
Off-Road	1.0643	9.4295	7.7762	0.0120		0.6228	0.6228		0.5943	0.5943	0.0000	1,169.3502	1,169.3502	0.2254		1,174.9857
Total	**1.0643**	**9.4295**	**7.7762**	**0.0120**	**0.2297**	**0.6228**	**0.8525**	**0.0348**	**0.5943**	**0.6291**	**0.0000**	**1,169.3502**	**1,169.3502**	**0.2254**		**1,174.9857**

3.2 Demolition - 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	0.0247	0.8588	0.1771	2.1700e-003	0.0472	3.3800e-003	0.0506	0.0129	3.2300e-003	0.0162		236.1837	236.1837	0.0208		236.7042
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0426	0.0307	0.3423	9.0000e-004	0.0822	5.9000e-004	0.0827	0.0218	5.5000e-004	0.0223		89.7225	89.7225	3.0700e-003		89.7992
Total	**0.0673**	**0.8895**	**0.5195**	**3.0700e-003**	**0.1293**	**3.9700e-003**	**0.1333**	**0.0347**	**3.7800e-003**	**0.0385**		**325.9062**	**325.9062**	**0.0239**		**326.5034**

3.3 Site Preparation - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0394	0.0000	0.0394	4.3200e-003	0.0000	4.3200e-003			0.0000			0.0000
Off-Road	0.7858	9.7572	4.2514	9.7600e-003		0.4180	0.4180		0.3846	0.3846		982.7113	982.7113	0.3059		990.3596
Total	**0.7858**	**9.7572**	**4.2514**	**9.7600e-003**	**0.0394**	**0.4180**	**0.4574**	**4.3200e-003**	**0.3846**	**0.3889**		**982.7113**	**982.7113**	**0.3059**		**990.3596**

3.3 Site Preparation - 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	0.0124	0.4317	0.0890	1.0900e-003	0.0237	1.7000e-003	0.0254	6.5000e-003	1.6200e-003	8.1200e-003		118.7167	118.7167	0.0105		118.9783
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	0.0213	0.0153	0.1712	4.5000e-004	0.0411	3.0000e-004	0.0414	0.0109	2.7000e-004	0.0112		44.8612	44.8612	1.5400e-003		44.8996
Total	**0.0337**	**0.4470**	**0.2602**	**1.5400e-003**	**0.0648**	**2.0000e-003**	**0.0668**	**0.0174**	**1.8900e-003**	**0.0193**		**163.5779**	**163.5779**	**0.0120**		**163.8779**

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					0.0154	0.0000	0.0154	1.6800e-003	0.0000	1.6800e-003			0.0000			0.0000
Off-Road	0.7858	9.7572	4.2514	9.7600e-003		0.4180	0.4180		0.3846	0.3846	0.0000	982.7113	982.7113	0.3059		990.3596
Total	**0.7858**	**9.7572**	**4.2514**	**9.7600e-003**	**0.0154**	**0.4180**	**0.4334**	**1.6800e-003**	**0.3846**	**0.3862**	**0.0000**	**982.7113**	**982.7113**	**0.3059**		**990.3596**

3.3 Site Preparation - 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	0.0124	0.4317	0.0890	1.0900e-003	0.0237	1.7000e-003	0.0254	6.5000e-003	1.6200e-003	8.1200e-003		118.7167	118.7167	0.0105		118.9783
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	0.0213	0.0153	0.1712	4.5000e-004	0.0411	3.0000e-004	0.0414	0.0109	2.7000e-004	0.0112		44.8612	44.8612	1.5400e-003		44.8996
Total	**0.0337**	**0.4470**	**0.2602**	**1.5400e-003**	**0.0648**	**2.0000e-003**	**0.0668**	**0.0174**	**1.8900e-003**	**0.0193**		**163.5779**	**163.5779**	**0.0120**		**163.8779**

3.4 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.7528	0.0000	0.7528	0.4138	0.0000	0.4138			0.0000			0.0000
Off-Road	1.0643	9.4295	7.7762	0.0120		0.6228	0.6228		0.5943	0.5943		1,169.3502	1,169.3502	0.2254		1,174.9857
Total	**1.0643**	**9.4295**	**7.7762**	**0.0120**	**0.7528**	**0.6228**	**1.3755**	**0.4138**	**0.5943**	**1.0081**		**1,169.3502**	**1,169.3502**	**0.2254**		**1,174.9857**

3.4 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	0.0426	0.0307	0.3423	9.0000e-004	0.0822	5.9000e-004	0.0827	0.0218	5.5000e-004	0.0223		89.7225	89.7225	3.0700e-003		89.7992
Total	**0.0426**	**0.0307**	**0.3423**	**9.0000e-004**	**0.0822**	**5.9000e-004**	**0.0827**	**0.0218**	**5.5000e-004**	**0.0223**		**89.7225**	**89.7225**	**3.0700e-003**		**89.7992**

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					0.2936	0.0000	0.2936	0.1614	0.0000	0.1614			0.0000			0.0000
Off-Road	1.0643	9.4295	7.7762	0.0120		0.6228	0.6228		0.5943	0.5943	0.0000	1,169.3502	1,169.3502	0.2254		1,174.9857
Total	**1.0643**	**9.4295**	**7.7762**	**0.0120**	**0.2936**	**0.6228**	**0.9163**	**0.1614**	**0.5943**	**0.7557**	**0.0000**	**1,169.3502**	**1,169.3502**	**0.2254**		**1,174.9857**

3.4 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	0.0426	0.0307	0.3423	9.0000e-004	0.0822	5.9000e-004	0.0827	0.0218	5.5000e-004	0.0223		89.7225	89.7225	3.0700e-003		89.7992
Total	**0.0426**	**0.0307**	**0.3423**	**9.0000e-004**	**0.0822**	**5.9000e-004**	**0.0827**	**0.0218**	**5.5000e-004**	**0.0223**		**89.7225**	**89.7225**	**3.0700e-003**		**89.7992**

3.5 Building Construction - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0848	11.0316	7.7512	0.0114		0.7087	0.7087		0.6520	0.6520		1,146.5323	1,146.5323	0.3569		1,155.4555
Total	**1.0848**	**11.0316**	**7.7512**	**0.0114**		**0.7087**	**0.7087**		**0.6520**	**0.6520**		**1,146.5323**	**1,146.5323**	**0.3569**		**1,155.4555**

3.5 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	0.0309	0.7905	0.2093	1.6700e-003	0.0406	6.1800e-003	0.0468	0.0117	5.9100e-003	0.0176		178.9139	178.9139	0.0142		179.2684
Worker	0.1064	0.0766	0.8558	2.2500e-003	0.2054	1.4800e-003	0.2069	0.0545	1.3600e-003	0.0558		224.3061	224.3061	7.6800e-003		224.4980
Total	**0.1374**	**0.8672**	**1.0652**	**3.9200e-003**	**0.2460**	**7.6600e-003**	**0.2537**	**0.0662**	**7.2700e-003**	**0.0735**		**403.2201**	**403.2201**	**0.0219**		**403.7664**

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	1.0848	11.0316	7.7512	0.0114		0.7087	0.7087		0.6520	0.6520	0.0000	1,146.532 3	1,146.532 3	0.3569		1,155.455 5
Total	**1.0848**	**11.0316**	**7.7512**	**0.0114**		**0.7087**	**0.7087**		**0.6520**	**0.6520**	**0.0000**	**1,146.532 3**	**1,146.532 3**	**0.3569**		**1,155.455 5**

3.5 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	0.0309	0.7905	0.2093	1.6700e-003	0.0406	6.1800e-003	0.0468	0.0117	5.9100e-003	0.0176		178.9139	178.9139	0.0142		179.2684
Worker	0.1064	0.0766	0.8558	2.2500e-003	0.2054	1.4800e-003	0.2069	0.0545	1.3600e-003	0.0558		224.3061	224.3061	7.6800e-003		224.4980
Total	**0.1374**	**0.8672**	**1.0652**	**3.9200e-003**	**0.2460**	**7.6600e-003**	**0.2537**	**0.0662**	**7.2700e-003**	**0.0735**		**403.2201**	**403.2201**	**0.0219**		**403.7664**

3.6 Paving - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9202	8.7447	7.2240	0.0113		0.5109	0.5109		0.4735	0.4735		1,070.1372	1,070.1372	0.3017		1,077.6798
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9202**	**8.7447**	**7.2240**	**0.0113**		**0.5109**	**0.5109**		**0.4735**	**0.4735**		**1,070.1372**	**1,070.1372**	**0.3017**		**1,077.6798**

3.6 Paving - 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	0.0766	0.0552	0.6162	1.6200e-003	0.1479	1.0600e-003	0.1489	0.0392	9.8000e-004	0.0402		161.5004	161.5004	5.5300e-003		161.6386
Total	**0.0766**	**0.0552**	**0.6162**	**1.6200e-003**	**0.1479**	**1.0600e-003**	**0.1489**	**0.0392**	**9.8000e-004**	**0.0402**		**161.5004**	**161.5004**	**5.5300e-003**		**161.6386**

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	0.9202	8.7447	7.2240	0.0113		0.5109	0.5109		0.4735	0.4735	0.0000	1,070.1372	1,070.1372	0.3017		1,077.6798
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9202**	**8.7447**	**7.2240**	**0.0113**		**0.5109**	**0.5109**		**0.4735**	**0.4735**	**0.0000**	**1,070.1372**	**1,070.1372**	**0.3017**		**1,077.6798**

3.6 Paving - 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	0.0766	0.0552	0.6162	1.6200e-003	0.1479	1.0600e-003	0.1489	0.0392	9.8000e-004	0.0402		161.5004	161.5004	5.5300e-003		161.6386
Total	**0.0766**	**0.0552**	**0.6162**	**1.6200e-003**	**0.1479**	**1.0600e-003**	**0.1489**	**0.0392**	**9.8000e-004**	**0.0402**		**161.5004**	**161.5004**	**5.5300e-003**		**161.6386**

3.7 Architectural Coating - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	28.4528					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2986	2.0058	1.8542	2.9700e-003		0.1506	0.1506		0.1506	0.1506		281.4485	281.4485	0.0267		282.1171
Total	**28.7515**	**2.0058**	**1.8542**	**2.9700e-003**		**0.1506**	**0.1506**		**0.1506**	**0.1506**		**281.4485**	**281.4485**	**0.0267**		**282.1171**

3.7 Architectural Coating - 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	0.0213	0.0153	0.1712	4.5000e-004	0.0411	3.0000e-004	0.0414	0.0109	2.7000e-004	0.0112		44.8612	44.8612	1.5400e-003		44.8996
Total	**0.0213**	**0.0153**	**0.1712**	**4.5000e-004**	**0.0411**	**3.0000e-004**	**0.0414**	**0.0109**	**2.7000e-004**	**0.0112**		**44.8612**	**44.8612**	**1.5400e-003**		**44.8996**

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	28.4528					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2986	2.0058	1.8542	2.9700e-003		0.1506	0.1506		0.1506	0.1506	0.0000	281.4485	281.4485	0.0267		282.1171
Total	**28.7515**	**2.0058**	**1.8542**	**2.9700e-003**		**0.1506**	**0.1506**		**0.1506**	**0.1506**	**0.0000**	**281.4485**	**281.4485**	**0.0267**		**282.1171**

3.7 Architectural Coating - 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	0.0213	0.0153	0.1712	4.5000e-004	0.0411	3.0000e-004	0.0414	0.0109	2.7000e-004	0.0112		44.8612	44.8612	1.5400e-003		44.8996
Total	**0.0213**	**0.0153**	**0.1712**	**4.5000e-004**	**0.0411**	**3.0000e-004**	**0.0414**	**0.0109**	**2.7000e-004**	**0.0112**		**44.8612**	**44.8612**	**1.5400e-003**		**44.8996**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Integrate Below Market Rate Housing

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.9227	3.5130	9.3718	0.0278	2.1521	0.0307	2.1827	0.5753	0.0288	0.6041		2,818.466 3	2,818.466 3	0.1618		2,822.510 1
Unmitigated	0.9246	3.5245	9.4140	0.0280	2.1651	0.0308	2.1959	0.5788	0.0290	0.6078		2,834.205 3	2,834.205 3	0.1625		2,838.267 5

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	159.60	153.36	140.64	445,427	442,755
Enclosed Parking with Elevator	0.00	0.00	0.00		
Hotel	81.70	81.90	59.50	149,253	148,358
Strip Mall	265.92	252.24	122.58	374,980	372,731
Total	507.22	487.50	322.72	969,661	963,843

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
Apartments Mid Rise	10.80	7.30	7.50	41.60	18.80	39.60	86	11	3
Enclosed Parking with Elevator	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Hotel	9.50	7.30	7.30	19.40	61.60	19.00	58	38	4
Strip Mall	9.50	7.30	7.30	16.60	64.40	19.00	45	40	15

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Enclosed Parking with Elevator	0.581689	0.044135	0.186694	0.113515	0.018244	0.005600	0.015197	0.022573	0.001888	0.002088	0.006279	0.000742	0.001357
Hotel	0.581689	0.044135	0.186694	0.113515	0.018244	0.005600	0.015197	0.022573	0.001888	0.002088	0.006279	0.000742	0.001357
Apartments Mid Rise	0.581689	0.044135	0.186694	0.113515	0.018244	0.005600	0.015197	0.022573	0.001888	0.002088	0.006279	0.000742	0.001357
Strip Mall	0.581689	0.044135	0.186694	0.113515	0.018244	0.005600	0.015197	0.022573	0.001888	0.002088	0.006279	0.000742	0.001357

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

	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	0.0116	0.1027	0.0673	6.3000e-004		8.0300e-003	8.0300e-003		8.0300e-003	8.0300e-003		126.7751	126.7751	2.4300e-003	2.3200e-003	127.5285
NaturalGas Unmitigated	0.0144	0.1270	0.0844	7.8000e-004		9.9100e-003	9.9100e-003		9.9100e-003	9.9100e-003		156.5252	156.5252	3.0000e-003	2.8700e-003	157.4554

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					
Apartments Mid Rise	583.097	6.2900e-003	0.0537	0.0229	3.4000e-004		4.3400e-003	4.3400e-003		4.3400e-003	4.3400e-003		68.5996	68.5996	1.3100e-003	1.2600e-003	69.0073
Enclosed Parking with Elevator	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
Hotel	710.546	7.6600e-003	0.0697	0.0585	4.2000e-004		5.2900e-003	5.2900e-003		5.2900e-003	5.2900e-003		83.5936	83.5936	1.6000e-003	1.5300e-003	84.0904
Strip Mall	36.8219	4.0000e-004	3.6100e-003	3.0300e-003	2.0000e-005		2.7000e-004	2.7000e-004		2.7000e-004	2.7000e-004		4.3320	4.3320	8.0000e-005	8.0000e-005	4.3577
Total		**0.0144**	**0.1270**	**0.0844**	**7.8000e-004**		**9.9000e-003**	**9.9000e-003**		**9.9000e-003**	**9.9000e-003**		**156.5252**	**156.5252**	**2.9900e-003**	**2.8700e-003**	**157.4554**

5.2 Energy by Land Use - NaturalGas

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					
Apartments Mid Rise	0.496787	5.3600e-003	0.0458	0.0195	2.9000e-004		3.7000e-003	3.7000e-003		3.7000e-003	3.7000e-003		58.4456	58.4456	1.1200e-003	1.0700e-003	58.7929
Enclosed Parking with Elevator	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
Hotel	0.549272	5.9200e-003	0.0539	0.0452	3.2000e-004		4.0900e-003	4.0900e-003		4.0900e-003	4.0900e-003		64.6203	64.6203	1.2400e-003	1.1800e-003	65.0043
Strip Mall	0.0315288	3.4000e-004	3.0900e-003	2.6000e-003	2.0000e-005		2.3000e-004	2.3000e-004		2.3000e-004	2.3000e-004		3.7093	3.7093	7.0000e-005	7.0000e-005	3.7313
Total		**0.0116**	**0.1027**	**0.0673**	**6.3000e-004**		**8.0200e-003**	**8.0200e-003**		**8.0200e-003**	**8.0200e-003**		**126.7751**	**126.7751**	**2.4300e-003**	**2.3200e-003**	**127.5285**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Residential Interior

Use Low VOC Paint - Residential Exterior

No Hearths Installed

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.0493	0.0231	1.9938	1.0000e-004		0.0109	0.0109		0.0109	0.0109	0.0000	3.5736	3.5736	3.5200e-003	0.0000	3.6616
Unmitigated	1.0493	0.0231	1.9938	1.0000e-004		0.0109	0.0109		0.0109	0.0109	0.0000	3.5736	3.5736	3.5200e-003	0.0000	3.6616

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.1637					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.8243					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0613	0.0231	1.9938	1.0000e-004		0.0109	0.0109		0.0109	0.0109		3.5736	3.5736	3.5200e-003		3.6616
Total	**1.0493**	**0.0231**	**1.9938**	**1.0000e-004**		**0.0109**	**0.0109**		**0.0109**	**0.0109**	**0.0000**	**3.5736**	**3.5736**	**3.5200e-003**	**0.0000**	**3.6616**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.1637					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.8243					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0613	0.0231	1.9938	1.0000e-004		0.0109	0.0109		0.0109	0.0109		3.5736	3.5736	3.5200e-003		3.6616
Total	**1.0493**	**0.0231**	**1.9938**	**1.0000e-004**		**0.0109**	**0.0109**		**0.0109**	**0.0109**	**0.0000**	**3.5736**	**3.5736**	**3.5200e-003**	**0.0000**	**3.6616**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

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

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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

Boilers

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

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Barrio Flats Mixed-Used Project

San Diego Air Basin, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Enclosed Parking with Elevator	22.00	Space	0.00	8,800.00	0
Hotel	10.00	Room	0.00	4,425.00	0
Apartments Mid Rise	24.00	Dwelling Unit	0.36	27,950.00	69
Strip Mall	6.00	1000sqft	0.00	6,000.00	0

1.2 Other Project Characteristics

Urbanization Urban **Wind Speed (m/s)** 2.6 **Precipitation Freq (Days)** 40

Climate Zone 13 **Operational Year** 2019

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 - Per project information

Land Use - Per project plans. Residential sf accounts for miscellaneous (i.e., elevator, exit stairs, utility rooms).

Construction Phase - Construction schedule approximated from applicant info. Grading combined with trenching/utilities phase.

Demolition - Per project plans.

Grading - Per applicant questionnaire.

Architectural Coating - Per SDAPCD Rule 67, use of 100 VOC for nonflat coatings.

Woodstoves - No fireplaces per applicant questionnaire.

Area Coating - Per SDAPCD Rule 67, use of 100 VOC for nonflat coatings.

Energy Use -

Construction Off-road Equipment Mitigation - Watering 3 times per applicant questionnaire.

Mobile Land Use Mitigation -

Area Mitigation -

Energy Mitigation -

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Residential_Exterior	250.00	100.00
tblArchitecturalCoating	EF_Residential_Interior	250.00	100.00
tblAreaCoating	Area_EF_Residential_Exterior	250	100
tblAreaCoating	Area_EF_Residential_Interior	250	100
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	40	0
tblConstructionPhase	NumDays	5.00	21.00
tblConstructionPhase	NumDays	100.00	44.00
tblConstructionPhase	NumDays	2.00	41.00
tblConstructionPhase	NumDays	5.00	21.00
tblConstructionPhase	NumDays	1.00	14.00
tblConstructionPhase	PhaseEndDate	7/30/2018	7/1/2018
tblConstructionPhase	PhaseEndDate	6/1/2018	5/31/2018

tblConstructionPhase	PhaseEndDate	3/30/2018	3/31/2018
tblConstructionPhase	PhaseEndDate	6/29/2018	7/1/2018
tblConstructionPhase	PhaseStartDate	6/30/2018	6/1/2018
tblConstructionPhase	PhaseStartDate	3/31/2018	4/1/2018
tblConstructionPhase	PhaseStartDate	6/2/2018	6/1/2018
tblFireplaces	FireplaceDayYear	82.00	0.00
tblFireplaces	FireplaceHourDay	3.00	0.00
tblFireplaces	FireplaceWoodMass	3,078.40	0.00
tblFireplaces	NumberGas	13.20	0.00
tblFireplaces	NumberNoFireplace	2.40	0.00
tblFireplaces	NumberWood	8.40	0.00
tblGrading	AcresOfGrading	7.00	0.50
tblGrading	MaterialExported	0.00	150.00
tblLandUse	BuildingSpaceSquareFeet	14,520.00	4,425.00
tblLandUse	BuildingSpaceSquareFeet	24,000.00	27,950.00
tblLandUse	LandUseSquareFeet	14,520.00	4,425.00
tblLandUse	LandUseSquareFeet	24,000.00	27,950.00
tblLandUse	LotAcreage	0.20	0.00
tblLandUse	LotAcreage	0.33	0.00
tblLandUse	LotAcreage	0.63	0.36
tblLandUse	LotAcreage	0.14	0.00
tblProjectCharacteristics	OperationalYear	2018	2019
tblWoodstoves	NumberCatalytic	1.20	0.00
tblWoodstoves	NumberNoncatalytic	1.20	0.00
tblWoodstoves	WoodstoveDayYear	82.00	0.00
tblWoodstoves	WoodstoveWoodMass	3,019.20	0.00

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					
2018	29.7822	11.9095	9.8251	0.0162	0.8349	0.7165	1.4583	0.4356	0.6594	1.0304	0.0000	1,545.321 1	1,545.321 1	0.3793	0.0000	1,553.700 1
Maximum	**29.7822**	**11.9095**	**9.8251**	**0.0162**	**0.8349**	**0.7165**	**1.4583**	**0.4356**	**0.6594**	**1.0304**	**0.0000**	**1,545.321 1**	**1,545.321 1**	**0.3793**	**0.0000**	**1,553.700 1**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	29.7822	11.9095	9.8251	0.0162	0.3757	0.7165	0.9991	0.1832	0.6594	0.7780	0.0000	1,545.321 1	1,545.321 1	0.3793	0.0000	1,553.700 1
Maximum	**29.7822**	**11.9095**	**9.8251**	**0.0162**	**0.3757**	**0.7165**	**0.9991**	**0.1832**	**0.6594**	**0.7780**	**0.0000**	**1,545.321 1**	**1,545.321 1**	**0.3793**	**0.0000**	**1,553.700 1**

	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	55.00	0.00	31.49	57.95	0.00	24.50	0.00	0.00	0.00	0.00	0.00	0.00

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.0493	0.0231	1.9938	1.0000e-004		0.0109	0.0109		0.0109	0.0109	0.0000	3.5736	3.5736	3.5200e-003	0.0000	3.6616
Energy	0.0144	0.1270	0.0844	7.8000e-004		9.9100e-003	9.9100e-003		9.9100e-003	9.9100e-003		156.5252	156.5252	3.0000e-003	2.8700e-003	157.4554
Mobile	0.9013	3.6173	9.4872	0.0265	2.1651	0.0312	2.1962	0.5788	0.0293	0.6081		2,685.3481	2,685.3481	0.1646		2,689.4633
Total	**1.9649**	**3.7674**	**11.5654**	**0.0274**	**2.1651**	**0.0520**	**2.2170**	**0.5788**	**0.0501**	**0.6289**	**0.0000**	**2,845.4469**	**2,845.4469**	**0.1711**	**2.8700e-003**	**2,850.5804**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.0493	0.0231	1.9938	1.0000e-004		0.0109	0.0109		0.0109	0.0109	0.0000	3.5736	3.5736	3.5200e-003	0.0000	3.6616
Energy	0.0116	0.1027	0.0673	6.3000e-004		8.0300e-003	8.0300e-003		8.0300e-003	8.0300e-003		126.7751	126.7751	2.4300e-003	2.3200e-003	127.5285
Mobile	0.8994	3.6050	9.4486	0.0263	2.1521	0.0310	2.1831	0.5753	0.0292	0.6044		2,670.3990	2,670.3990	0.1639		2,674.4964
Total	**1.9604**	**3.7308**	**11.5096**	**0.0271**	**2.1521**	**0.0499**	**2.2020**	**0.5753**	**0.0481**	**0.6234**	**0.0000**	**2,800.7477**	**2,800.7477**	**0.1699**	**2.3200e-003**	**2,805.6865**

	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	0.23	0.97	0.48	1.10	0.60	3.92	0.68	0.60	4.05	0.88	0.00	1.57	1.57	0.75	19.16	1.57

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2018	1/12/2018	5	10	
2	Site Preparation	Site Preparation	1/13/2018	2/1/2018	5	14	
3	Grading	Grading	2/2/2018	3/31/2018	5	41	
4	Building Construction	Building Construction	4/1/2018	5/31/2018	5	44	
5	Paving	Paving	6/1/2018	7/1/2018	5	21	
6	Architectural Coating	Architectural Coating	6/1/2018	7/1/2018	5	21	

Acres of Grading (Site Preparation Phase): 0.5

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 56,599; Residential Outdoor: 18,866; Non-Residential Indoor: 15,638; Non-Residential Outdoor: 5,213; Striped Parking Area: 528 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Rubber Tired Dozers	1	1.00	247	0.40
Demolition	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Site Preparation	Graders	1	8.00	187	0.41
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Concrete/Industrial Saws	1	8.00	81	0.73
Grading	Rubber Tired Dozers	1	1.00	247	0.40
Grading	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Building Construction	Cranes	1	4.00	231	0.29
Building Construction	Forklifts	2	6.00	89	0.20
Building Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Paving	Cement and Mortar Mixers	4	6.00	9	0.56
Paving	Pavers	1	7.00	130	0.42
Paving	Rollers	1	7.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	4	10.00	0.00	27.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	2	5.00	0.00	19.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	10.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	5	25.00	6.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	5.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Clean Paved Roads

3.2 Demolition - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.5890	0.0000	0.5890	0.0892	0.0000	0.0892			0.0000			0.0000
Off-Road	1.0643	9.4295	7.7762	0.0120		0.6228	0.6228		0.5943	0.5943		1,169.350 2	1,169.350 2	0.2254		1,174.985 7
Total	**1.0643**	**9.4295**	**7.7762**	**0.0120**	**0.5890**	**0.6228**	**1.2118**	**0.0892**	**0.5943**	**0.6835**		**1,169.350 2**	**1,169.350 2**	**0.2254**		**1,174.985 7**

3.2 Demolition - 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	0.0254	0.8680	0.1904	2.1400e-003	0.0472	3.4600e-003	0.0506	0.0129	3.3100e-003	0.0162		232.2645	232.2645	0.0216		232.8045
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0481	0.0344	0.3247	8.5000e-004	0.0822	5.9000e-004	0.0827	0.0218	5.5000e-004	0.0223		84.2327	84.2327	2.9200e-003		84.3057
Total	**0.0735**	**0.9024**	**0.5152**	**2.9900e-003**	**0.1293**	**4.0500e-003**	**0.1334**	**0.0347**	**3.8600e-003**	**0.0386**		**316.4972**	**316.4972**	**0.0245**		**317.1102**

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					0.2297	0.0000	0.2297	0.0348	0.0000	0.0348			0.0000			0.0000
Off-Road	1.0643	9.4295	7.7762	0.0120		0.6228	0.6228		0.5943	0.5943	0.0000	1,169.3502	1,169.3502	0.2254		1,174.9857
Total	**1.0643**	**9.4295**	**7.7762**	**0.0120**	**0.2297**	**0.6228**	**0.8525**	**0.0348**	**0.5943**	**0.6291**	**0.0000**	**1,169.3502**	**1,169.3502**	**0.2254**		**1,174.9857**

3.2 Demolition - 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	0.0254	0.8680	0.1904	2.1400e-003	0.0472	3.4600e-003	0.0506	0.0129	3.3100e-003	0.0162		232.2645	232.2645	0.0216		232.8045
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0481	0.0344	0.3247	8.5000e-004	0.0822	5.9000e-004	0.0827	0.0218	5.5000e-004	0.0223		84.2327	84.2327	2.9200e-003		84.3057
Total	**0.0735**	**0.9024**	**0.5152**	**2.9900e-003**	**0.1293**	**4.0500e-003**	**0.1334**	**0.0347**	**3.8600e-003**	**0.0386**		**316.4972**	**316.4972**	**0.0245**		**317.1102**

3.3 Site Preparation - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0394	0.0000	0.0394	4.3200e-003	0.0000	4.3200e-003			0.0000			0.0000
Off-Road	0.7858	9.7572	4.2514	9.7600e-003		0.4180	0.4180		0.3846	0.3846		982.7113	982.7113	0.3059		990.3596
Total	**0.7858**	**9.7572**	**4.2514**	**9.7600e-003**	**0.0394**	**0.4180**	**0.4574**	**4.3200e-003**	**0.3846**	**0.3889**		**982.7113**	**982.7113**	**0.3059**		**990.3596**

3.3 Site Preparation - 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	0.0128	0.4363	0.0957	1.0700e-003	0.0237	1.7400e-003	0.0255	6.5000e-003	1.6600e-003	8.1600e-003		116.7467	116.7467	0.0109		117.0181
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	0.0240	0.0172	0.1624	4.2000e-004	0.0411	3.0000e-004	0.0414	0.0109	2.7000e-004	0.0112		42.1164	42.1164	1.4600e-003		42.1529
Total	**0.0368**	**0.4535**	**0.2581**	**1.4900e-003**	**0.0648**	**2.0400e-003**	**0.0668**	**0.0174**	**1.9300e-003**	**0.0193**		**158.8631**	**158.8631**	**0.0123**		**159.1710**

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					0.0154	0.0000	0.0154	1.6800e-003	0.0000	1.6800e-003			0.0000			0.0000
Off-Road	0.7858	9.7572	4.2514	9.7600e-003		0.4180	0.4180		0.3846	0.3846	0.0000	982.7113	982.7113	0.3059		990.3596
Total	**0.7858**	**9.7572**	**4.2514**	**9.7600e-003**	**0.0154**	**0.4180**	**0.4334**	**1.6800e-003**	**0.3846**	**0.3862**	**0.0000**	**982.7113**	**982.7113**	**0.3059**		**990.3596**

3.3 Site Preparation - 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	0.0128	0.4363	0.0957	1.0700e-003	0.0237	1.7400e-003	0.0255	6.5000e-003	1.6600e-003	8.1600e-003		116.7467	116.7467	0.0109		117.0181
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	0.0240	0.0172	0.1624	4.2000e-004	0.0411	3.0000e-004	0.0414	0.0109	2.7000e-004	0.0112		42.1164	42.1164	1.4600e-003		42.1529
Total	**0.0368**	**0.4535**	**0.2581**	**1.4900e-003**	**0.0648**	**2.0400e-003**	**0.0668**	**0.0174**	**1.9300e-003**	**0.0193**		**158.8631**	**158.8631**	**0.0123**		**159.1710**

3.4 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.7528	0.0000	0.7528	0.4138	0.0000	0.4138			0.0000			0.0000
Off-Road	1.0643	9.4295	7.7762	0.0120		0.6228	0.6228		0.5943	0.5943		1,169.350 2	1,169.350 2	0.2254		1,174.985 7
Total	**1.0643**	**9.4295**	**7.7762**	**0.0120**	**0.7528**	**0.6228**	**1.3755**	**0.4138**	**0.5943**	**1.0081**		**1,169.350 2**	**1,169.350 2**	**0.2254**		**1,174.985 7**

3.4 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	0.0481	0.0344	0.3247	8.5000e-004	0.0822	5.9000e-004	0.0827	0.0218	5.5000e-004	0.0223		84.2327	84.2327	2.9200e-003		84.3057
Total	**0.0481**	**0.0344**	**0.3247**	**8.5000e-004**	**0.0822**	**5.9000e-004**	**0.0827**	**0.0218**	**5.5000e-004**	**0.0223**		**84.2327**	**84.2327**	**2.9200e-003**		**84.3057**

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					0.2936	0.0000	0.2936	0.1614	0.0000	0.1614			0.0000			0.0000
Off-Road	1.0643	9.4295	7.7762	0.0120		0.6228	0.6228		0.5943	0.5943	0.0000	1,169.3502	1,169.3502	0.2254		1,174.9857
Total	**1.0643**	**9.4295**	**7.7762**	**0.0120**	**0.2936**	**0.6228**	**0.9163**	**0.1614**	**0.5943**	**0.7557**	**0.0000**	**1,169.3502**	**1,169.3502**	**0.2254**		**1,174.9857**

3.4 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	0.0481	0.0344	0.3247	8.5000e-004	0.0822	5.9000e-004	0.0827	0.0218	5.5000e-004	0.0223		84.2327	84.2327	2.9200e-003		84.3057
Total	**0.0481**	**0.0344**	**0.3247**	**8.5000e-004**	**0.0822**	**5.9000e-004**	**0.0827**	**0.0218**	**5.5000e-004**	**0.0223**		**84.2327**	**84.2327**	**2.9200e-003**		**84.3057**

3.5 Building Construction - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0848	11.0316	7.7512	0.0114		0.7087	0.7087		0.6520	0.6520		1,146.5323	1,146.5323	0.3569		1,155.4555
Total	**1.0848**	**11.0316**	**7.7512**	**0.0114**		**0.7087**	**0.7087**		**0.6520**	**0.6520**		**1,146.5323**	**1,146.5323**	**0.3569**		**1,155.4555**

3.5 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	0.0323	0.7919	0.2316	1.6300e-003	0.0406	6.2900e-003	0.0469	0.0117	6.0100e-003	0.0177		174.4188	174.4188	0.0151		174.7961
Worker	0.1202	0.0861	0.8118	2.1200e-003	0.2054	1.4800e-003	0.2069	0.0545	1.3600e-003	0.0558		210.5818	210.5818	7.3000e-003		210.7643
Total	**0.1525**	**0.8779**	**1.0434**	**3.7500e-003**	**0.2460**	**7.7700e-003**	**0.2538**	**0.0662**	**7.3700e-003**	**0.0736**		**385.0006**	**385.0006**	**0.0224**		**385.5603**

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	1.0848	11.0316	7.7512	0.0114		0.7087	0.7087		0.6520	0.6520	0.0000	1,146.5323	1,146.5323	0.3569		1,155.4555
Total	**1.0848**	**11.0316**	**7.7512**	**0.0114**		**0.7087**	**0.7087**		**0.6520**	**0.6520**	**0.0000**	**1,146.5323**	**1,146.5323**	**0.3569**		**1,155.4555**

3.5 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	0.0323	0.7919	0.2316	1.6300e-003	0.0406	6.2900e-003	0.0469	0.0117	6.0100e-003	0.0177		174.4188	174.4188	0.0151		174.7961
Worker	0.1202	0.0861	0.8118	2.1200e-003	0.2054	1.4800e-003	0.2069	0.0545	1.3600e-003	0.0558		210.5818	210.5818	7.3000e-003		210.7643
Total	**0.1525**	**0.8779**	**1.0434**	**3.7500e-003**	**0.2460**	**7.7700e-003**	**0.2538**	**0.0662**	**7.3700e-003**	**0.0736**		**385.0006**	**385.0006**	**0.0224**		**385.5603**

3.6 Paving - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9202	8.7447	7.2240	0.0113		0.5109	0.5109		0.4735	0.4735		1,070.1372	1,070.1372	0.3017		1,077.6798
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9202**	**8.7447**	**7.2240**	**0.0113**		**0.5109**	**0.5109**		**0.4735**	**0.4735**		**1,070.1372**	**1,070.1372**	**0.3017**		**1,077.6798**

3.6 Paving - 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	0.0866	0.0620	0.5845	1.5200e-003	0.1479	1.0600e-003	0.1489	0.0392	9.8000e-004	0.0402		151.6189	151.6189	5.2500e-003		151.7503
Total	**0.0866**	**0.0620**	**0.5845**	**1.5200e-003**	**0.1479**	**1.0600e-003**	**0.1489**	**0.0392**	**9.8000e-004**	**0.0402**		**151.6189**	**151.6189**	**5.2500e-003**		**151.7503**

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	0.9202	8.7447	7.2240	0.0113		0.5109	0.5109		0.4735	0.4735	0.0000	1,070.1372	1,070.1372	0.3017		1,077.6798
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9202**	**8.7447**	**7.2240**	**0.0113**		**0.5109**	**0.5109**		**0.4735**	**0.4735**	**0.0000**	**1,070.1372**	**1,070.1372**	**0.3017**		**1,077.6798**

3.6 Paving - 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	0.0866	0.0620	0.5845	1.5200e-003	0.1479	1.0600e-003	0.1489	0.0392	9.8000e-004	0.0402		151.6189	151.6189	5.2500e-003		151.7503
Total	**0.0866**	**0.0620**	**0.5845**	**1.5200e-003**	**0.1479**	**1.0600e-003**	**0.1489**	**0.0392**	**9.8000e-004**	**0.0402**		**151.6189**	**151.6189**	**5.2500e-003**		**151.7503**

3.7 Architectural Coating - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	28.4528					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2986	2.0058	1.8542	2.9700e-003		0.1506	0.1506		0.1506	0.1506		281.4485	281.4485	0.0267		282.1171
Total	**28.7515**	**2.0058**	**1.8542**	**2.9700e-003**		**0.1506**	**0.1506**		**0.1506**	**0.1506**		**281.4485**	**281.4485**	**0.0267**		**282.1171**

3.7 Architectural Coating - 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	0.0240	0.0172	0.1624	4.2000e-004	0.0411	3.0000e-004	0.0414	0.0109	2.7000e-004	0.0112		42.1164	42.1164	1.4600e-003		42.1529
Total	**0.0240**	**0.0172**	**0.1624**	**4.2000e-004**	**0.0411**	**3.0000e-004**	**0.0414**	**0.0109**	**2.7000e-004**	**0.0112**		**42.1164**	**42.1164**	**1.4600e-003**		**42.1529**

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	28.4528					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2986	2.0058	1.8542	2.9700e-003		0.1506	0.1506		0.1506	0.1506	0.0000	281.4485	281.4485	0.0267		282.1171
Total	**28.7515**	**2.0058**	**1.8542**	**2.9700e-003**		**0.1506**	**0.1506**		**0.1506**	**0.1506**	**0.0000**	**281.4485**	**281.4485**	**0.0267**		**282.1171**

3.7 Architectural Coating - 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	0.0240	0.0172	0.1624	4.2000e-004	0.0411	3.0000e-004	0.0414	0.0109	2.7000e-004	0.0112		42.1164	42.1164	1.4600e-003		42.1529
Total	**0.0240**	**0.0172**	**0.1624**	**4.2000e-004**	**0.0411**	**3.0000e-004**	**0.0414**	**0.0109**	**2.7000e-004**	**0.0112**		**42.1164**	**42.1164**	**1.4600e-003**		**42.1529**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Integrate Below Market Rate Housing

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.8994	3.6050	9.4486	0.0263	2.1521	0.0310	2.1831	0.5753	0.0292	0.6044		2,670.399 0	2,670.399 0	0.1639		2,674.496 4
Unmitigated	0.9013	3.6173	9.4872	0.0265	2.1651	0.0312	2.1962	0.5788	0.0293	0.6081		2,685.348 1	2,685.348 1	0.1646		2,689.463 3

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	159.60	153.36	140.64	445,427	442,755
Enclosed Parking with Elevator	0.00	0.00	0.00		
Hotel	81.70	81.90	59.50	149,253	148,358
Strip Mall	265.92	252.24	122.58	374,980	372,731
Total	507.22	487.50	322.72	969,661	963,843

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
Apartments Mid Rise	10.80	7.30	7.50	41.60	18.80	39.60	86	11	3
Enclosed Parking with Elevator	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Hotel	9.50	7.30	7.30	19.40	61.60	19.00	58	38	4
Strip Mall	9.50	7.30	7.30	16.60	64.40	19.00	45	40	15

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Enclosed Parking with Elevator	0.581689	0.044135	0.186694	0.113515	0.018244	0.005600	0.015197	0.022573	0.001888	0.002088	0.006279	0.000742	0.001357
Hotel	0.581689	0.044135	0.186694	0.113515	0.018244	0.005600	0.015197	0.022573	0.001888	0.002088	0.006279	0.000742	0.001357
Apartments Mid Rise	0.581689	0.044135	0.186694	0.113515	0.018244	0.005600	0.015197	0.022573	0.001888	0.002088	0.006279	0.000742	0.001357
Strip Mall	0.581689	0.044135	0.186694	0.113515	0.018244	0.005600	0.015197	0.022573	0.001888	0.002088	0.006279	0.000742	0.001357

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

	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	0.0116	0.1027	0.0673	6.3000e-004		8.0300e-003	8.0300e-003		8.0300e-003	8.0300e-003		126.7751	126.7751	2.4300e-003	2.3200e-003	127.5285
NaturalGas Unmitigated	0.0144	0.1270	0.0844	7.8000e-004		9.9100e-003	9.9100e-003		9.9100e-003	9.9100e-003		156.5252	156.5252	3.0000e-003	2.8700e-003	157.4554

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					
Apartments Mid Rise	583.097	6.2900e-003	0.0537	0.0229	3.4000e-004		4.3400e-003	4.3400e-003		4.3400e-003	4.3400e-003		68.5996	68.5996	1.3100e-003	1.2600e-003	69.0073
Enclosed Parking with Elevator	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
Hotel	710.546	7.6600e-003	0.0697	0.0585	4.2000e-004		5.2900e-003	5.2900e-003		5.2900e-003	5.2900e-003		83.5936	83.5936	1.6000e-003	1.5300e-003	84.0904
Strip Mall	36.8219	4.0000e-004	3.6100e-003	3.0300e-003	2.0000e-005		2.7000e-004	2.7000e-004		2.7000e-004	2.7000e-004		4.3320	4.3320	8.0000e-005	8.0000e-005	4.3577
Total		**0.0144**	**0.1270**	**0.0844**	**7.8000e-004**		**9.9000e-003**	**9.9000e-003**		**9.9000e-003**	**9.9000e-003**		**156.5252**	**156.5252**	**2.9900e-003**	**2.8700e-003**	**157.4554**

5.2 Energy by Land Use - NaturalGas

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					
Apartments Mid Rise	0.496787	5.3600e-003	0.0458	0.0195	2.9000e-004		3.7000e-003	3.7000e-003		3.7000e-003	3.7000e-003		58.4456	58.4456	1.1200e-003	1.0700e-003	58.7929
Enclosed Parking with Elevator	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
Hotel	0.549272	5.9200e-003	0.0539	0.0452	3.2000e-004		4.0900e-003	4.0900e-003		4.0900e-003	4.0900e-003		64.6203	64.6203	1.2400e-003	1.1800e-003	65.0043
Strip Mall	0.0315288	3.4000e-004	3.0900e-003	2.6000e-003	2.0000e-005		2.3000e-004	2.3000e-004		2.3000e-004	2.3000e-004		3.7093	3.7093	7.0000e-005	7.0000e-005	3.7313
Total		**0.0116**	**0.1027**	**0.0673**	**6.3000e-004**		**8.0200e-003**	**8.0200e-003**		**8.0200e-003**	**8.0200e-003**		**126.7751**	**126.7751**	**2.4300e-003**	**2.3200e-003**	**127.5285**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Residential Interior

Use Low VOC Paint - Residential Exterior

No Hearths Installed

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.0493	0.0231	1.9938	1.0000e-004		0.0109	0.0109		0.0109	0.0109	0.0000	3.5736	3.5736	3.5200e-003	0.0000	3.6616
Unmitigated	1.0493	0.0231	1.9938	1.0000e-004		0.0109	0.0109		0.0109	0.0109	0.0000	3.5736	3.5736	3.5200e-003	0.0000	3.6616

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.1637					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.8243					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0613	0.0231	1.9938	1.0000e-004		0.0109	0.0109		0.0109	0.0109		3.5736	3.5736	3.5200e-003		3.6616
Total	**1.0493**	**0.0231**	**1.9938**	**1.0000e-004**		**0.0109**	**0.0109**		**0.0109**	**0.0109**	**0.0000**	**3.5736**	**3.5736**	**3.5200e-003**	**0.0000**	**3.6616**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.1637					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.8243					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0613	0.0231	1.9938	1.0000e-004		0.0109	0.0109		0.0109	0.0109		3.5736	3.5736	3.5200e-003		3.6616
Total	**1.0493**	**0.0231**	**1.9938**	**1.0000e-004**		**0.0109**	**0.0109**		**0.0109**	**0.0109**	**0.0000**	**3.5736**	**3.5736**	**3.5200e-003**	**0.0000**	**3.6616**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

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

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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

Boilers

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

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

CLIMATE ACTION PLAN CONSISTENCY CHECKLIST INTRODUCTION

In December 2015, the City adopted a Climate Action Plan (CAP) that outlines the actions that City will undertake to achieve its proportional share of State greenhouse gas (GHG) emission reductions. The purpose of the Climate Action Plan Consistency Checklist (Checklist) is to, in conjunction with the CAP, provide a streamlined review process for proposed new development projects that are subject to discretionary review and trigger environmental review pursuant to the California Environmental Quality Act (CEQA).[1]

Analysis of GHG emissions and potential climate change impacts from new development is required under CEQA. The CAP is a plan for the reduction of GHG emissions in accordance with CEQA Guidelines Section 15183.5. Pursuant to CEQA Guidelines Sections 15064(h)(3), 15130(d), and 15183(b), a project's incremental contribution to a cumulative GHG emissions effect may be determined not to be cumulatively considerable if it complies with the requirements of the CAP.

This Checklist is part of the CAP and contains measures that are required to be implemented on a project-by-project basis to ensure that the specified emissions targets identified in the CAP are achieved. Implementation of these measures would ensure that new development is consistent with the CAP's assumptions for relevant CAP strategies toward achieving the identified GHG reduction targets. Projects that are consistent with the CAP as determined through the use of this Checklist may rely on the CAP for the cumulative impacts analysis of GHG emissions. Projects that are not consistent with the CAP must prepare a comprehensive project-specific analysis of GHG emissions, including quantification of existing and projected GHG emissions and incorporation of the measures in this Checklist to the extent feasible. Cumulative GHG impacts would be significant for any project that is not consistent with the CAP.

The Checklist may be updated to incorporate new GHG reduction techniques or to comply with later amendments to the CAP or local, State, or federal law.

[1] Certain projects seeking ministerial approval may be required to complete the Checklist. For example, projects in a Community Plan Implementation Overlay Zone may be required to use the Checklist to qualify for ministerial level review. See Supplemental Development Regulations in the project's community plan to determine applicability.

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CAP CONSISTENCY CHECKLIST SUBMITTAL APPLICATION

- The Checklist is required only for projects subject to CEQA review.[2]
- If required, the Checklist must be included in the project submittal package. Application submittal procedures can be found in Chapter 11: Land Development Procedures of the City's Municipal Code.
- The requirements in the Checklist will be included in the project's conditions of approval.
- The applicant must provide an explanation of how the proposed project will implement the requirements described herein to the satisfaction of the Planning Department.

Application Information

Contact Information

Project No./Name: 541700/ Barrio Flats Mixed-Use Project

Property Address: 2257-2275 Logan Avenue, San Diego, CA 92113

Applicant Name/Co.: Melissa Chandler, OBR Architecture

Contact Phone: 619-564-7586 Contact Email: chandler@obrarchitecture.com

Was a consultant retained to complete this checklist? ■ Yes ☐ No If Yes, complete the following

Consultant Name: Erik Feldman Contact Phone: 805-644-4455 ext. 27

Company Name: Rincon Consultants, Inc. Contact Email: efeldman@rinconconsultants.com

Project Information

1. What is the size of the project (acres)? 0.41 acres
2. Identify all applicable proposed land uses:
   - ☐ Residential (indicate # of single-family units):
   - ■ Residential (indicate # of multi-family units): 24 residential units and 4 hotel rooms
   - ■ Commercial (total square footage): 5,859 square feet of retail space
   - ☐ Industrial (total square footage):
   - ☐ Other (describe):
3. Is the project or a portion of the project located in a Transit Priority Area? ■ Yes ☐ No
4. Provide a brief description of the project proposed:

   The proposed project involves construction of a 38,375 square-foot, four-story, mixed-use building with 24 residential units, 4 hotel rooms, 5,859 square feet of retail space, and 24 parking spaces. In addition, 15% of provided residential units would be designated very-low income.

[2] Certain projects seeking ministerial approval may be required to complete the Checklist. For example, projects in a Community Plan Implementation Overlay Zone may be required to use the Checklist to qualify for ministerial level review. See Supplemental Development Regulations in the project's community plan to determine applicability.

CAP CONSISTENCY CHECKLIST QUESTIONS

Step 1: Land Use Consistency

The first step in determining CAP consistency for discretionary development projects is to assess the project's consistency with the growth projections used in the development of the CAP. This section allows the City to determine a project's consistency with the land use assumptions used in the CAP.

Step 1: Land Use Consistency		
Checklist Item (Check the appropriate box and provide explanation and supporting documentation for your answer)	Yes	No
A. Is the proposed project consistent with the existing General Plan and Community Plan land use and zoning designations?;[3] OR, B. If the proposed project is not consistent with the existing land use plan and zoning designations, and includes a land use plan and/or zoning designation amendment, would the proposed amendment result in an increased density within a Transit Priority Area (TPA)[4] and implement CAP Strategy 3 actions, as determined in Step 3 to the satisfaction of the Development Services Department?; OR, C. If the proposed project is not consistent with the existing land use plan and zoning designations, does the project include a land use plan and/or zoning designation amendment that would result in an equivalent or less GHG-intensive project when compared to the existing designations?	☑	☐

If "***Yes***," proceed to Step 2 of the Checklist. For question B above, complete Step 3. For question C above, provide estimated project emissions under both existing and proposed designation(s) for comparison. Compare the maximum buildout of the existing designation and the maximum buildout of the proposed designation.

If "***No***," in accordance with the City's Significance Determination Thresholds, the project's GHG impact is significant. The project must nonetheless incorporate each of the measures identified in Step 2 to mitigate cumulative GHG emissions impacts unless the decision maker finds that a measure is infeasible in accordance with CEQA Guidelines Section 15091. Proceed and complete Step 2 of the Checklist.

The proposed project is located in an area designated Multiple Use by the City's General Plan and zoned Barrio Logan Planned District: Redevelopment Subdistrict (BLPD-REDEVLP-SUBD) with a Transit Area Overlay. The proposed project would involve the construction of a new 38,375 square-foot, mixed-use building with 24 residential units, 4 hotel rooms, and 5,859 square feet of retail space. According to the General Plan, the Multiple Use category provides for housing in a mixed-use setting and convenience shopping. Per Section 152.0315 of the San Diego Municipal Code, the Redevelopment Subdistrict zone is intended to implement the goals and objectives of the Barrio Logan Redevelopment Project. The Redevelopment Subdistrict designates land uses and development standards intended to create a compact, small scale, pedestrian oriented environment, and encourage compatible mixed-use land patterns. In addition, per Section 132.1001 of the San Diego Municipal Code, the purpose of the Transit Area Overlay Zone is to provide supplemental parking regulations for areas receiving a high level of transit service.

[3] This question may also be answered in the affirmative if the project is consistent with SANDAG Series 12 growth projections, which were used to determine the CAP projections, as determined by the Planning Department.

[4] This category applies to all projects that answered in the affirmative to question 3 on the previous page: Is the project or a portion of the project located in a transit priority area.

Step 2: CAP Strategies Consistency

The second step of the CAP consistency review is to review and evaluate a project's consistency with the applicable strategies and actions of the CAP. Step 2 only applies to development projects that involve permits that would require a certificate of occupancy from the Building Official or projects comprised of one and two family dwellings or townhouses as defined in the California Residential Code and their accessory structures.[5] All other development projects that would not require a certificate of occupancy from the Building Official shall implement Best Management Practices for construction activities as set forth in the Greenbook (for public projects).

Step 2: CAP Strategies Consistency			
Checklist Item (Check the appropriate box and provide explanation for your answer)	Yes	No	N/A
Strategy 1: Energy & Water Efficient Buildings			
1. *Cool/Green Roofs*. • Would the project include roofing materials with a minimum 3-year aged solar reflection and thermal emittance or solar reflection index equal to or greater than the values specified in the voluntary measures under California Green Building Standards Code (Attachment A)?; OR • Would the project roof construction have a thermal mass over the roof membrane, including areas of vegetated (green) roofs, weighing at least 25 pounds per square foot as specified in the voluntary measures under California Green Building Standards Code?; OR • Would the project include a combination of the above two options? Check "N/A" only if the project does not include a roof component. In compliance with the California Green Building Standards Code, the proposed low-rise residential and non-residential building roofs would have the following specifications, which will be indicated in the final plans: - If slope is less than or equal to 2/12: Thermal Emittance: 0.75 Solar Reflective Index: 64 - If slope is greater than 2/12: Thermal Emittance: 0.75 Solar Reflective Index: 16	☑	☐	☐

[5] Actions that are not subject to Step 2 would include, for example: 1) discretionary map actions that do not propose specific development, 2) permits allowing wireless communication facilities, 3) special events permits, 4) use permits or other permits that do not result in the expansion or enlargement of a building (e.g., decks, garages, etc.), and 5) non-building infrastructure projects such as roads and pipelines. Because such actions would not result in new occupancy buildings from which GHG emissions reductions could be achieved, the items contained in Step 2 would not be applicable.

2. *Plumbing fixtures and fittings* With respect to plumbing fixtures or fittings provided as part of the project, would those low-flow fixtures/appliances be consistent with each of the following: Residential buildings: • Kitchen faucets: maximum flow rate not to exceed 1.5 gallons per minute at 60 psi; • Standard dishwashers: 4.25 gallons per cycle; • Compact dishwashers: 3.5 gallons per cycle; and • Clothes washers: water factor of 6 gallons per cubic feet of drum capacity? Nonresidential buildings: • Plumbing fixtures and fittings that do not exceed the maximum flow rate specified in Table A5.303.2.3.1 (voluntary measures) of the California Green Building Standards Code (See Attachment A); and • Appliances and fixtures for commercial applications that meet the provisions of Section A5.303.3 (voluntary measures) of the California Green Building Standards Code (See Attachment A)? Check "N/A" only if the project does not include any plumbing fixtures or fittings. In compliance with the California Green Building Standards Code, the proposed non-residential units would have plumbing fixtures of the following specifications, which will be indicated on the final plans: - Clothes washers: 10% less than the California Energy Commission's Maximum Water Factor (WF) standards for commercial clothes washers indicated in Title 20 of the CCR. - Showerheads: Maximum 1.8 gpm at 80 psi - Lavatory faucets: Maximum 0.35 gpm at 60 psi - Kitchen faucets: Maximum 1.6 gpm at 60 psi - Wash fountains: Maximum 1.6 [rim space (in.) per 20 gpm @ 60 psi] - Metering faucets: Maximum 0.18 gallons per cycle - Metering faucets for wash fountains: Maximum 0.18 [rim space (in.) per 20 gpm at 60 psi - All water closets: Maximum 1.12 gallon per flush - Urinals: Maximum 0.5 gallons per flush The proposed residential units would have plumbing fixtures of the following specifications: - Kitchen faucets: Maximum 1.5 gallons per minute at 60 psi - Standard dishwashers: Maximum 4.25 gallons per cycle - Compact dishwashers: 3.5 gallons per cycle - Clothes washers: water factor of 6 gallons per cubic feet of drum capacity	☑	☐	☐

Strategy 3: Bicycling, Walking, Transit & Land Use			
3. *Electric Vehicle Charging* • Multiple-family projects of 17 dwelling units or less: Would 3% of the total parking spaces required, or a minimum of one space, whichever is greater, be provided with a listed cabinet, box or enclosure connected to a conduit linking the parking spaces with the electrical service, in a manner approved by the building and safety official, to allow for the future installation of electric vehicle supply equipment to provide electric vehicle charging stations at such time as it is needed for use by residents? • Multiple-family projects of more than 17 dwelling units: Of the total required listed cabinets, boxes or enclosures, would 50% have the necessary electric vehicle supply equipment installed to provide active electric vehicle charging stations ready for use by residents? • Non-residential projects: Of the total required listed cabinets, boxes or enclosures, would 50% have the necessary electric vehicle supply equipment installed to provide active electric vehicle charging stations ready for use? Check "N/A" only if the project is a single-family project or would not require the provision of listed cabinets, boxes, or enclosures connected to a conduit linking the parking spaces with electrical service, e.g., projects requiring fewer than 10 parking spaces. The proposed project would include more than 17 dwelling units (24 residential units) as well as 4 hotel rooms and 5,859 square feet of commercial space. The proposed project would include 24 parking spaces to be shared by residents, hotel and commercial patrons, and employees, in accordance with the requirements of Municipal Code Section 142.0545. Three percent (3%) of the provided parking, or one (1) parking space, would include an EV charging station with supply equipment ready for use at time of the proposed project's operation, in compliance with the Green Building Standard Code. These parking provisions will be indicated in the final plans.	☑	☐	☐

Strategy 3: Bicycling, Walking, Transit & Land Use (Complete this section if project includes non-residential or mixed uses)			
4. *Bicycle Parking Spaces* Would the project provide more short- and long-term bicycle parking spaces than required in the City's Municipal Code (Chapter 14, Article 2, Division 5)?[6] Check "N/A" only if the project is a residential project. According to Chapter 14, Article 2, Division 5 of the City's Municipal Code, the project would requires a minimum of 12 long-term and 2 short-term bicycle spaces. To meet the requirements of Strategy 3, Item 4 above, the project will include 15 long-term bicycle spaces for residents and full-time employees (on-site, secure location to be determined), and 2 short-term bicycle spaces for retail uses along the street (exact location to be determined). See Sheet AS1.1.	☑	☐	☐

[6] Non-portable bicycle corrals within 600 feet of project frontage can be counted towards the project's bicycle parking requirements.

5. *Shower facilities*

If the project includes nonresidential development that would accommodate over 10 tenant occupants (employees), would the project include changing/shower facilities in accordance with the voluntary measures under the California Green Building Standards Code as shown in the table below?

Number of Tenant Occupants (Employees)	Shower/Changing Facilities Required	Two-Tier (12" X 15" X 72") Personal Effects Lockers Required
0-10	0	0
11-50	1 shower stall	2
51-100	1 shower stall	3
101-200	1 shower stall	4
Over 200	1 shower stall plus 1 additional shower stall for each 200 additional tenant-occupants	1 two-tier locker plus 1 two-tier locker for each 50 additional tenant-occupants

Check "N/A" only if the project is a residential project, or if it does not include nonresidential development that would accommodate over 10 tenant occupants (employees).

It is anticipated that the commercial and hotel components of the proposed project would generate approximately 21 total employees (17 retail and 4 hotel employees). The proposed building will therefore be required to include 1 shower stall and 2, two-tier personal effects lockers, as required by the Green Building Standards Code. See Sheet A2.1.

☑ ☐ ☐

6. *Designated Parking Spaces*

If the project includes a nonresidential use in a TPA, would the project provide designated parking for a combination of low-emitting, fuel-efficient, and carpool/vanpool vehicles in accordance with the following table?

Number of Required Parking Spaces	Number of Designated Parking Spaces
0-9	0
10-25	2
26-50	4
51-75	6
76-100	9
101-150	11
151-200	18
201 and over	At least 10% of total

This measure does not cover electric vehicles. See Question 4 for electric vehicle parking requirements.

Note: Vehicles bearing Clean Air Vehicle stickers from expired HOV lane programs may be considered eligible for designated parking spaces. The required designated parking spaces are to be provided within the overall minimum parking requirement, not in addition to it.

Check "N/A" only if the project is a residential project, or if it does not include nonresidential use in a TPA.

☑ ☐ ☐

The proposed project would include a total of 24 shared automobile parking spaces, including one ADA van accessible space, one EV space (as discussed in Item 3 above), and two designated motorcycle spaces. Out of the 24 shared spaces, and in addition to the EV space, the project will designate two (2) parking spaces for low-emitting, fuel-efficient, or carpool/vanpool vehicles as required by the California Green Building Standards Code. These parking provisions will be indicated in the final plans.

7. *Transportation Demand Management Program* If the project would accommodate over 50 tenant-occupants (employees), would it include a transportation demand management program that would be applicable to existing tenants and future tenants that includes: At least one of the following components: • Parking cash out program • Parking management plan that includes charging employees market-rate for single-occupancy vehicle parking and providing reserved, discounted, or free spaces for registered carpools or vanpools • Unbundled parking whereby parking spaces would be leased or sold separately from the rental or purchase fees for the development for the life of the development And at least three of the following components: • Commitment to maintaining an employer network in the SANDAG iCommute program and promoting its RideMatcher service to tenants/employees • On-site carsharing vehicle(s) or bikesharing • Flexible or alternative work hours • Telework program • Transit, carpool, and vanpool subsidies • Pre-tax deduction for transit or vanpool fares and bicycle commute costs • Access to services that reduce the need to drive, such as cafes, commercial stores, banks, post offices, restaurants, gyms, or childcare, either onsite or within 1,320 feet (1/4 mile) of the structure/use? Check "N/A" only if the project is a residential project or if it would not accommodate over 50 tenant-occupants (employees). The proposed mixed-use project would include 4 hotel rooms and 5,859 square feet of retail space, which would generate approximately 21 employees. The project is not anticipated to accommodate more than 50 employees; therefore, the project would not require implementation of a Transportation Demand Management Program.	☐	☐	☑

Step 3: Project CAP Conformance Evaluation (if applicable)

The third step of the CAP consistency review only applies if Step 1 is answered in the affirmative under option B. The purpose of this step is to determine whether a project that is located in a TPA but that includes a land use plan and/or zoning designation amendment is nevertheless consistent with the assumptions in the CAP because it would implement CAP Strategy 3 actions. In general, a project that would result in a reduction in density inside a TPA would not be consistent with Strategy 3.The following questions must each be answered in the affirmative and fully explained.

1. **Would the proposed project implement the General Plan's City of Villages strategy in an identified Transit Priority Area (TPA) that will result in an increase in the capacity for transit-supportive residential and/or employment densities?**

   Considerations for this question:
   - Does the proposed land use and zoning designation associated with the project provide capacity for transit-supportive residential densities within the TPA?
   - Is the project site suitable to accommodate mixed-use village development, as defined in the General Plan, within the TPA?
   - Does the land use and zoning associated with the project increase the capacity for transit-supportive employment intensities within the TPA?

2. **Would the proposed project implement the General Plan's Mobility Element in Transit Priority Areas to increase the use of transit?**

   Considerations for this question:
   - Does the proposed project support/incorporate identified transit routes and stops/stations?
   - Does the project include transit priority measures?

3. **Would the proposed project implement pedestrian improvements in Transit Priority Areas to increase walking opportunities?**

   Considerations for this question:
   - Does the proposed project circulation system provide multiple and direct pedestrian connections and accessibility to local activity centers (such as transit stations, schools, shopping centers, and libraries)?
   - Does the proposed project urban design include features for walkability to promote a transit supportive environment?

4. **Would the proposed project implement the City of San Diego's Bicycle Master Plan to increase bicycling opportunities?**

   Considerations for this question:
   - Does the proposed project circulation system include bicycle improvements consistent with the Bicycle Master Plan?
   - Does the overall project circulation system provide a balanced, multimodal, "complete streets" approach to accommodate mobility needs of all users?

5. **Would the proposed project incorporate implementation mechanisms that support Transit Oriented Development?**

   Considerations for this question:
   - Does the proposed project include new or expanded urban public spaces such as plazas, pocket parks, or urban greens in the TPA?
   - Does the land use and zoning associated with the proposed project increase the potential for jobs within the TPA?
   - Do the zoning/implementing regulations associated with the proposed project support the efficient use of parking through mechanisms such as: shared parking, parking districts, unbundled parking, reduced parking, paid or time-limited parking, etc.?

6. **Would the proposed project implement the Urban Forest Management Plan to increase urban tree canopy coverage?**

   Considerations for this question:
   - Does the proposed project provide at least three different species for the primary, secondary and accent trees in order to accommodate varying parkway widths?
   - Does the proposed project include policies or strategies for preserving existing trees?
   - Does the proposed project incorporate tree planting that will contribute to the City's 20% urban canopy tree coverage goal?

CLIMATE ACTION PLAN CONSISTENCY CHECKLIST
ATTACHMENT A

This attachment provides performance standards for applicable Climate Action Pan (CAP) Consistency Checklist measures.

Table 1	**Roof Design Values for Question 1: Cool/Green Roofs supporting Strategy 1: Energy & Water Efficient Buildings of the Climate Action Plan**			
Land Use Type	Roof Slope	Minimum 3-Year Aged Solar Reflectance	Thermal Emittance	Solar Reflective Index
Low-Rise Residential	≤ 2:12	0.55	0.75	64
	> 2:12	0.20	0.75	16
High-Rise Residential Buildings, Hotels and Motels	≤ 2:12	0.55	0.75	64
	> 2:12	0.20	0.75	16
Non-Residential	≤ 2:12	0.55	0.75	64
	> 2:12	0.20	0.75	16

Source: Adapted from the California Green Building Standards Code (CALGreen) Tier 1 residential and non-residential voluntary measures shown in Tables A4.106.5.1 and A5.106.11.2.2, respectively. Roof installation and verification shall occur in accordance with the CALGreen Code.

CALGreen does not include recommended values for low-rise residential buildings with roof slopes of ≤ 2:12 for San Diego's climate zones (7 and 10). Therefore, the values for climate zone 15 that covers Imperial County are adapted here.

Solar Reflectance Index (SRI) equal to or greater than the values specified in this table may be used as an alternative to compliance with the aged solar reflectance values and thermal emittance.

Table 2	**Fixture Flow Rates for Non-Residential Buildings related to Question 2: Plumbing Fixtures and Fittings supporting Strategy 1: Energy & Water Efficient Buildings of the Climate Action Plan**
Fixture Type	**Maximum Flow Rate**
Showerheads	1.8 gpm @ 80 psi
Lavatory Faucets	0.35 gpm @60 psi
Kitchen Faucets	1.6 gpm @ 60 psi
Wash Fountains	1.6 [rim space(in.)/20 gpm @ 60 psi]
Metering Faucets	0.18 gallons/cycle
Metering Faucets for Wash Fountains	0.18 [rim space(in.)/20 gpm @ 60 psi]
Gravity Tank-type Water Closets	1.12 gallons/flush
Flushometer Tank Water Closets	1.12 gallons/flush
Flushometer Valve Water Closets	1.12 gallons/flush
Electromechanical Hydraulic Water Closets	1.12 gallons/flush
Urinals	0.5 gallons/flush

Source: Adapted from the California Green Building Standards Code (CALGreen) Tier 1 non-residential voluntary measures shown in Tables A5.303.2.3.1 and A5.106.11.2.2, respectively. See the California Plumbing Code for definitions of each fixture type.

Where complying faucets are unavailable, aerators rated at 0.35 gpm or other means may be used to achieve reduction.

Acronyms:
gpm = gallons per minute
psi = pounds per square inch (unit of pressure)
in. = inch

<table>
<tr><th>Table 3</th><th colspan="2">Standards for Appliances and Fixtures for Commercial Application related to Question 2: Plumbing Fixtures and Fittings supporting Strategy 1: Energy & Water Efficient Buildings of the Climate Action Plan</th></tr>
<tr><th>Appliance/Fixture Type</th><th colspan="2">Standard</th></tr>
<tr><td>Clothes Washers</td><td colspan="2">Maximum Water Factor (WF) that will reduce the use of water by 10 percent below the California Energy Commissions' WF standards for commercial clothes washers located in Title 20 of the California Code of Regulations.</td></tr>
<tr><td>Conveyor-type Dishwashers</td><td>0.70 maximum gallons per rack (2.6 L) (High-Temperature)</td><td>0.62 maximum gallons per rack (4.4 L) (Chemical)</td></tr>
<tr><td>Door-type Dishwashers</td><td>0.95 maximum gallons per rack (3.6 L) (High-Temperature)</td><td>1.16 maximum gallons per rack (2.6 L) (Chemical)</td></tr>
<tr><td>Undercounter-type Dishwashers</td><td>0.90 maximum gallons per rack (3.4 L) (High-Temperature)</td><td>0.98 maximum gallons per rack (3.7 L) (Chemical)</td></tr>
<tr><td>Combination Ovens</td><td colspan="2">Consume no more than 10 gallons per hour (38 L/h) in the full operational mode.</td></tr>
<tr><td>Commercial Pre-rinse Spray Valves (manufactured on or after January 1, 2006)</td><td colspan="2">Function at equal to or less than 1.6 gallons per minute (0.10 L/s) at 60 psi (414 kPa) and
• Be capable of cleaning 60 plates in an average time of not more than 30 seconds per plate.
• Be equipped with an integral automatic shutoff.
• Operate at static pressure of at least 30 psi (207 kPa) when designed for a flow rate of 1.3 gallons per minute (0.08 L/s) or less.</td></tr>
<tr><td colspan="3">Source: Adapted from the California Green Building Standards Code (CALGreen) Tier 1 non-residential voluntary measures shown in Section A5.303.3. See the California Plumbing Code for definitions of each appliance/fixture type.

Acronyms:
L = liter
L/h = liters per hour
L/s = liters per second
psi = pounds per square inch (unit of pressure)
kPa = kilopascal (unit of pressure)</td></tr>
</table>

Preliminary

Drainage Study

Logan Avenue & 26th Street Mixed-Use Project

San Diego, CA

Prepared for:

obr
ARCHITECTURE
3817 RAY STREET
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Prepared by:

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REGISTERED PROFESSIONAL ENGINEER
JEFF RENO CROSS
NO. 67530
Expires
6/30/2019
CIVIL
STATE OF CALIFORNIA

May, 2018

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INTRODUCTION

I. Purpose and Scope

This Drainage Study provides both hydrology and hydraulic calculations for both the onsite and off-site drainage related to the project. This report will calculate, analyze, and compare storm water runoff for both the existing and proposed site conditions in order to ensure that proposed drainage improvements are sized adequately for the project.

This Study limits its content to hydrology and hydraulics. For issues of stormwater quality please refer to the Storm Water Quality Management Plan. The design outlined in this Study follows the City of San Diego Drainage Design Manual and has been formulated so its application in the overall planning and design of drainage facilities will be practical and economical in the majority of situations.

II. Description

The project site is located at 2275 Logan Avenue on the west side of 26th Street in the Barrio Logan area within the City of San Diego.

The existing site has an existing alley at the south and an existing market/housing to the west. The project site area is approximately 0.39 acres. The existing site is a used car lot (Gil's Quality Cars) with a small two-story building and asphalt parking lot. The existing 2-story building within the property northwest corner will remain as is and will be separate from the project.

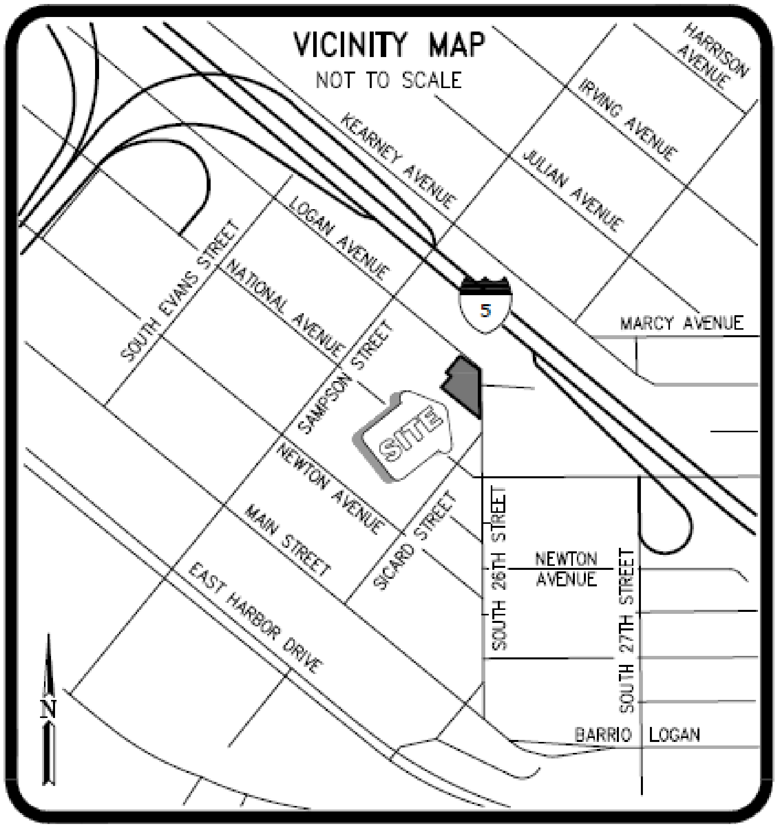
The proposed project is a mixed-use commercial and residential development with a new 4 story building, including 40 proposed parking spaces on the ground level (covered beneath floors above). The new project proposes outdoor common space areas on each level. The project proposes to activate the streetscape along Logan Avenue and 26th Street with outdoor commercial space. Biofiltration of rooftop stormwater will be accommodated through the use of planter drains on each floor level. New raised planter drains will also be part of the first floor.

III. RWQCB Federal Clean Water Act Section 401 and 404.

Section 401 and 404 of the Federal Clean Water Act requires any applicant for Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into the navigable waters, shall provide the licensing or permitting agency a certification from the State in which the discharge originates.

This project sheet flows via hard surface to storm drains which lead directly to the San Diego Bay. This project is not a "Federal license or permit" and it does not discharge to "navigable waters". Thus, is exempt from the FCWA sections 401 and 404.

IV. Vicinity Map



V. FEMA Flood Mapping Information

The FEMA Flood Map Service shows this site is outside the 100-year and 500-year flood plains and is considered an “area of minimal flood hazard – zone x”. The Map provided from the FEMA website is provided:

HYDROLOGIC AND HYDRAULIC METHOD AND DESIGN CRITERIA

VI. Hydrologic Design Criteria

The Rational Method

Storm discharge flows shall be based on the Rational Method (RM) for areas less than one square mile, per the San Diego Drainage Design Manual. The Rational Method is a mathematical formula used to determine maximum runoff rate from a given rainfall. It is used to estimate peak runoff rates from small urban and rural watersheds for the design of storm drains and small drainage structures. The RM will be applied to this project using a 50-year design storm frequency. The RM formula estimates the peak rate of runoff at any location in a watershed as a function of the drainage area (A), runoff coefficient (C), and rainfall intensity (I) for a duration equal to the time of concentration (T_c), which is the time required for water to flow from the most remote point of the basin to the location being analyzed. The RM formula is expressed as follows:

$$Q = C\,I\,A$$

Where:
- Q = peak discharge, in cubic feet per second (cfs)
- C = runoff coefficient, proportion of the rainfall that runs off the surface (no units)
- I = average rainfall intensity for a duration equal to the T_c for the area, in inches per hour (Note: If the computed T_c is less than 5 minutes, use 5 minutes for computing the peak discharge, Q)
- A = drainage area contributing to the design location, in acres

The RM formula is based on the assumption that for constant rainfall intensity, the peak discharge rate at a point will occur when the raindrop that falls at the most upstream point in the tributary drainage basin arrives at the point of interest.

Storm water runoff for both the existing and proposed site conditions is calculated, analyzed, and compared in order to ensure that the proposed conditions do not negatively affect the existing hydrologic regime. Hydrologic basin boundaries, landscape areas, and flow path characteristics such as change in elevation and length of flow are obtained from the Existing and Proposed Conditions Maps created as part of this Study.

Runoff Coefficient

Table 3-1 lists the estimated runoff coefficients for urban areas. The runoff coefficients are based on land use and soil type. Soil type can be determined from the soil type map. An appropriate runoff coefficient (C) for each type of land use in the subarea should be selected from this table and multiplied by the percentage of the total area (A) included in that class. The sum of the products for all land uses is the weighted runoff coefficient ($\sum$[CA]). In any event, the impervious percentage (% Impervious) as given in the table, for any area, shall govern the selected value for C. The runoff coefficient can also be calculated for an area based on soil type and impervious percentage using the following formula:

$$C = 0.90 \times (\% \text{ Impervious}) + Cp \times (1 - \% \text{ Impervious})$$

Where: Cp = Pervious Coefficient Runoff Value for the soil type (shown in Table 3-1 as Undisturbed Natural Terrain/Permanent Open Space, 0% Impervious). Soil type can be determined from the soil type map.

The values in Table 3-1 are typical for most urban areas. A soil type D shall be used for most all areas within the City of San Diego, unless a soils report provides supplemental information.

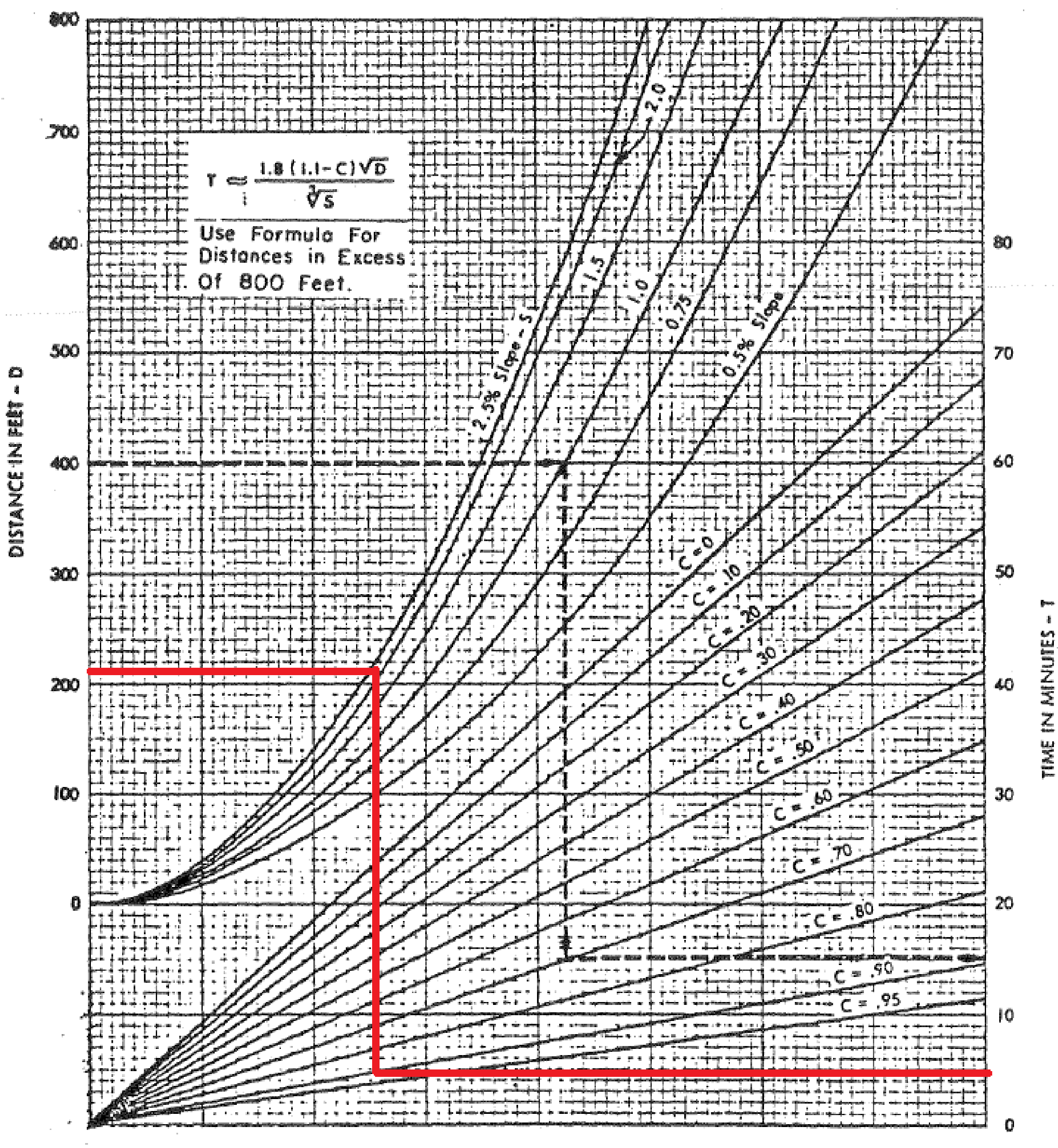
Table 3-1
RUNOFF COEFFICIENTS FOR URBAN AREAS

Land Use		Runoff Coefficient "C"				
			Soil Type			
NRCS Elements	County Elements	% IMPER.	A	B	C	D
Undisturbed Natural Terrain (Natural)	Permanent Open Space	0*	0.20	0.25	0.30	0.35
Low Density Residential (LDR)	Residential, 1.0 DU/A or less	10	0.27	0.32	0.36	0.41
Low Density Residential (LDR)	Residential, 2.0 DU/A or less	20	0.34	0.38	0.42	0.46
Low Density Residential (LDR)	Residential, 2.9 DU/A or less	25	0.38	0.41	0.45	0.49
Medium Density Residential (MDR)	Residential, 4.3 DU/A or less	30	0.41	0.45	0.48	0.52
Medium Density Residential (MDR)	Residential, 7.3 DU/A or less	40	0.48	0.51	0.54	0.57
Medium Density Residential (MDR)	Residential, 10.9 DU/A or less	45	0.52	0.54	0.57	0.60
Medium Density Residential (MDR)	Residential, 14.5 DU/A or less	50	0.55	0.58	0.60	0.63
High Density Residential (HDR)	Residential, 24.0 DU/A or less	65	0.66	0.67	0.69	0.71
High Density Residential (HDR)	Residential, 43.0 DU/A or less	80	0.76	0.77	0.78	0.79
Commercial/Industrial (N. Com)	Neighborhood Commercial	80	0.76	0.77	0.78	0.79
Commercial/Industrial (G. Com)	General Commercial	85	0.80	0.80	0.81	0.82
Commercial/Industrial (O.P. Com)	Office Professional/Commercial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (Limited I.)	Limited Industrial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (General I.)	General Industrial	95	0.87	0.87	0.87	0.87

*The values associated with 0% impervious may be used for direct calculation of the runoff coefficient as described in Section 3.1.2 (representing the pervious runoff coefficient, Cp, for the soil type), or for areas that will remain undisturbed in perpetuity. Justification must be given that the area will remain natural forever (e.g., the area is located in Cleveland National Forest).
DU/A = dwelling units per acre
NRCS = National Resources Conservation Service

Time of Concentration, Tc

The time of concentration is the time required for the runoff to flow from the most remote part of the watershed to the outlet point under consideration. Methods of calculation differ for natural watersheds (non-urbanized) and for urban drainage systems. The Tc for urban areas are computed using the "Urban Areas Overland Time of Flow Curves", per page 86 of the City of San Diego Drainage Design Manual.



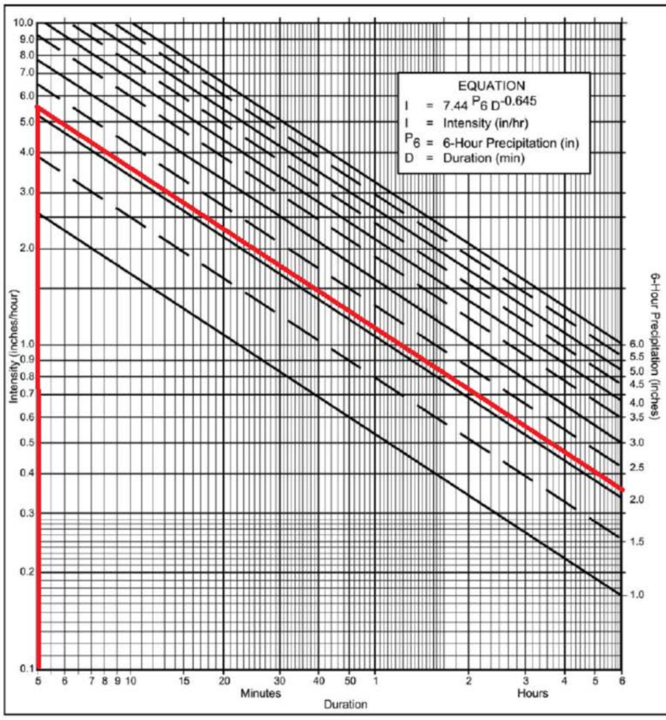
Surface Flow Time Curves

Rainfall Intensity

The rainfall intensity (I) is the rainfall in inches per hour (in/hr) for a duration equal to the Tc for a selected storm frequency. Once a particular storm frequency has been selected for design and a Tc calculated for the drainage area, the rainfall intensity can be determined from the Intensity-Duration Design Chart (Figure 3-1). The 6-hour storm rainfall amount (P6) and the 24-hour storm rainfall amount (P24) for the selected storm frequency are also needed for calculation of I. P6 and P24 can be read from the isopluvial maps provided in Appendix B. An Intensity-Duration Design Chart applicable to all areas within San Diego County is provided as Figure 3-1. Figure 3-2 provides an example of use of the Intensity-Duration Design Chart. Intensity can also be calculated using the following equation:

$$I = 7.44\, P_6\, D^{-0.645}$$

Where: P6 = adjusted 6-hour storm rainfall amount (see discussion below)
D = duration in minutes (use Tc)



Directions for Application:

(1) From precipitation maps determine 6 hr and 24 hr amounts for the selected frequency. These maps are included in the County Hydrology Manual (10, 50, and 100 yr maps included in the Design and Procedure Manual).

(2) Adjust 6 hr precipitation (if necessary) so that it is within the range of 45% to 65% of the 24 hr precipitation (not applicaple to Desert).

(3) Plot 6 hr precipitation on the right side of the chart.

(4) Draw a line through the point parallel to the plotted lines.

(5) This line is the intensity-duration curve for the location being analyzed.

Application Form:

(a) Selected frequency 50 year

(b) P_6 = 2.1 in., P_{24} = 3.5, $\frac{P_6}{P_{24}}$ = 60 %(2)

(c) Adjusted P_6(2) = 2.1 in.

(d) t_x = 5 min.

(e) I = 5.5 in./hr.

Note: This chart replaces the Intensity-Duration-Frequency curves used since 1965.

P6	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
Duration	I	I	I	I	I	I	I	I	I	I	I
5	2.63	3.95	5.27	6.59	7.90	9.22	10.54	11.86	13.17	14.49	15.81
7	2.12	3.18	4.24	5.30	6.36	7.42	8.48	9.54	10.60	11.66	12.72
10	1.68	2.53	3.37	4.21	5.05	5.90	6.74	7.58	8.42	9.27	10.11
15	1.30	1.95	2.59	3.24	3.89	4.54	5.19	5.84	6.49	7.13	7.78
20	1.08	1.62	2.15	2.69	3.23	3.77	4.31	4.85	5.39	5.93	6.46
25	0.93	1.40	1.87	2.33	2.80	3.27	3.73	4.20	4.67	5.13	5.60
30	0.83	1.24	1.66	2.07	2.49	2.90	3.32	3.73	4.15	4.56	4.98
40	0.69	1.03	1.38	1.72	2.07	2.41	2.76	3.10	3.45	3.79	4.13
50	0.60	0.90	1.19	1.49	1.79	2.09	2.39	2.69	2.98	3.28	3.58
60	0.53	0.80	1.06	1.33	1.59	1.86	2.12	2.39	2.65	2.92	3.18
90	0.41	0.61	0.82	1.02	1.23	1.43	1.63	1.84	2.04	2.25	2.45
120	0.34	0.51	0.68	0.85	1.02	1.19	1.36	1.53	1.70	1.87	2.04
150	0.29	0.44	0.59	0.73	0.88	1.03	1.18	1.32	1.47	1.62	1.76
180	0.26	0.39	0.52	0.65	0.78	0.91	1.04	1.18	1.31	1.44	1.57
240	0.22	0.33	0.43	0.54	0.65	0.76	0.87	0.98	1.08	1.19	1.30
300	0.19	0.28	0.38	0.47	0.56	0.66	0.75	0.85	0.94	1.03	1.13
360	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	0.84	0.92	1.00

Intensity-Duration Design Chart - Template

FIGURE 3-1

Directions for Application:

(1) From precipitation maps determine 6 hr and 24 hr amounts for the selected frequency. These maps are included in the County Hydrology Manual (10, 50, and 100 yr maps included in the Design and Procedure Manual).

(2) Adjust 6 hr precipitation (if necessary) so that it is within the range of 45% to 65% of the 24 hr precipitation (not applicaple to Desert).

(3) Plot 6 hr precipitation on the right side of the chart.

(4) Draw a line through the point parallel to the plotted lines.

(5) This line is the intensity-duration curve for the location being analyzed.

Application Form:

(a) Selected frequency 100 year

(b) P_6 = 2.4 in., P_{24} = 4.0, $\frac{P_6}{P_{24}}$ = 60 %(2)

(c) Adjusted P_6(2) = 2.4 in.

(d) t_x = 5 min.

(e) I = 6.14 in./hr.

Note: This chart replaces the Intensity-Duration-Frequency curves used since 1965.

P6	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
Duration	I	I	I	I	I	I	I	I	I	I	I
5	2.63	3.95	5.27	6.59	7.90	9.22	10.54	11.86	13.17	14.49	15.81
7	2.12	3.18	4.24	5.30	6.36	7.42	8.48	9.54	10.60	11.66	12.72
10	1.68	2.53	3.37	4.21	5.05	5.90	6.74	7.58	8.42	9.27	10.11
15	1.30	1.95	2.59	3.24	3.89	4.54	5.19	5.84	6.49	7.13	7.78
20	1.08	1.62	2.15	2.69	3.23	3.77	4.31	4.85	5.39	5.93	6.46
25	0.93	1.40	1.87	2.33	2.80	3.27	3.73	4.20	4.67	5.13	5.60
30	0.83	1.24	1.66	2.07	2.49	2.90	3.32	3.73	4.15	4.56	4.98
40	0.69	1.03	1.38	1.72	2.07	2.41	2.76	3.10	3.45	3.79	4.13
50	0.60	0.90	1.19	1.49	1.79	2.09	2.39	2.69	2.98	3.28	3.58
60	0.53	0.80	1.06	1.33	1.59	1.86	2.12	2.39	2.65	2.92	3.18
90	0.41	0.61	0.82	1.02	1.23	1.43	1.63	1.84	2.04	2.25	2.45
120	0.34	0.51	0.68	0.85	1.02	1.19	1.36	1.53	1.70	1.87	2.04
150	0.29	0.44	0.59	0.73	0.88	1.03	1.18	1.32	1.47	1.62	1.76
180	0.26	0.39	0.52	0.65	0.78	0.91	1.04	1.18	1.31	1.44	1.57
240	0.22	0.33	0.43	0.54	0.65	0.76	0.87	0.98	1.08	1.19	1.30
300	0.19	0.28	0.38	0.47	0.56	0.66	0.75	0.85	0.94	1.03	1.13
360	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	0.84	0.92	1.00

FIGURE 3-1

HYDROLOGY AND HYDRAULIC CALCULATIONS

VII. Hydrology Calculations

Calculations have been performed per the Rational Method described in above methodology, per the San Diego Drainage Design Manual. The existing site is 100% impervious with the existing asphalt parking lot and buildings located onsite. Using Table shown in above "Surface Flow Time Curves", with the following:

Existing Conditions

100-YEAR STORM

Runoff Coefficient = C = 0.9 x (100% Impervious) = 0.90
Hydraulic Length = L = 210 feet
ΔE = 67'-62' = 5'
Slope = S = (67' - 62') / (210') = 2.4%
Time of Concentration = Tc = 4.6 minutes (Use 5 minutes as minimum) = 5 min.
Intensity = I_{100} = 6.14 inches/hour (as shown in above Table 3-1)
Area = 0.39 acres
Peak Discharge = Q_{100} = CIA = (0.9)(6.14)(0.39) = 2.16 cfs

50-YEAR STORM

Runoff Coefficient = C = 0.9 x (100% Impervious) = 0.90
Hydraulic Length = L = 210 feet
ΔE = 67'-62' = 5'
Slope = S = (67' - 62') / (210') = 2.4%
Time of Concentration = Tc = 4.6 minutes (Use 5 minutes as minimum) = 5 min.
Intensity = I_{50} = 5.5 inches/hour (as shown in above Table 3-1)
Area = 0.39 acres
Peak Discharge = Q_{50} = CIA = (0.9)(5.5)(0.39) = 1.93 cfs

Proposed Conditions

100-YEAR STORM

C = 0.9 x (97% Impervious) + 0.35 x (3% Pervious) = 0.88
L = 210 feet
S = Building Plumbing Piping per Cal Plumbing Code = 2.0%
V = Velocity = $\frac{1.49}{n}R^{2/3}S^{2/3} = \frac{1.49}{0.02}(0.25)^{2/3}(0.02)^{2/3}$ = 4 ft/sec

Tc = L/V = 210 / 4 = 52.5 seconds = 0.88 minutes = Use 5 minutes minimum.
I_{100} = 6.14 inches/hour (per Table 3-1 above)
A = 0.39 acres
Q_{100} = 2.10 cfs

50-YEAR STORM

C = 0.9 x (97% Impervious) + 0.35 x (3% Pervious) = 0.88
L = 210 feet
S = Building Plumbing Piping per Cal Plumbing Code = 2.0%
V = Velocity = $\frac{1.49}{n}R^{2/3}S^{2/3} = \frac{1.49}{0.02}(0.25)^{2/3}(0.02)^{2/3}$ = 4 ft/sec

Tc = L/V = 210 / 4 = 52.5 seconds = 0.88 minutes = Use 5 minutes minimum.
I_{50} = 5.5 inches/hour (per Table 3-1 above)
A = 0.39 acres
Q_{50} = 1.89 cfs
(SEE DRAINAGE EXHIBIT MAP FOR EACH DRAINAGE AREA WITH SPREADSHEET CALCULATIONS)

VIII. Hydraulic Calculations

Storm Drains

Building Storm Drains are all interior to building and will be designed by the plumbing engineer. However, at the exit point (at SE property line) the plumbing drain will connect into the Curb Outlet at 26th Street.

The calculation for the maximum Q for the rectangular underwalk drain (aka Curb Outlet) is as follows:

Qmax = $\frac{1.49}{n} AR^{2/3}\sqrt{s}$

A = area of rectangle = L x h = 3' x 0.25' = 0.75 ft^2

R = hydraulic radius = Lh/(L+2h) = 3(0.25) / (3+2(0.25)) = 0.214

S = slope = 0.015

n = Manning Roughness Coefficient = 0.015 (concrete)

Qmax = $\frac{1.49}{(0.015)}(0.75)(0.214)^{2/3}\sqrt{0.015}$ = 3.26 cfs

Thus, since maximum flow the underwalk drain can handle (3.26 cfs) is greater than the proposed site Qmax (2.1 cfs), drain size is good.

Velocity at the exit point is determined by piping exiting the building storm drain circular pipe:

A = Area of pipe = $\pi R^2 = \pi(0.33)^2$ = 0.34 ft^2 (assuming 8 inch pipe diameter)

V = Velocity = Q/A = 2.1/0.34 = 6.17 ft/sec

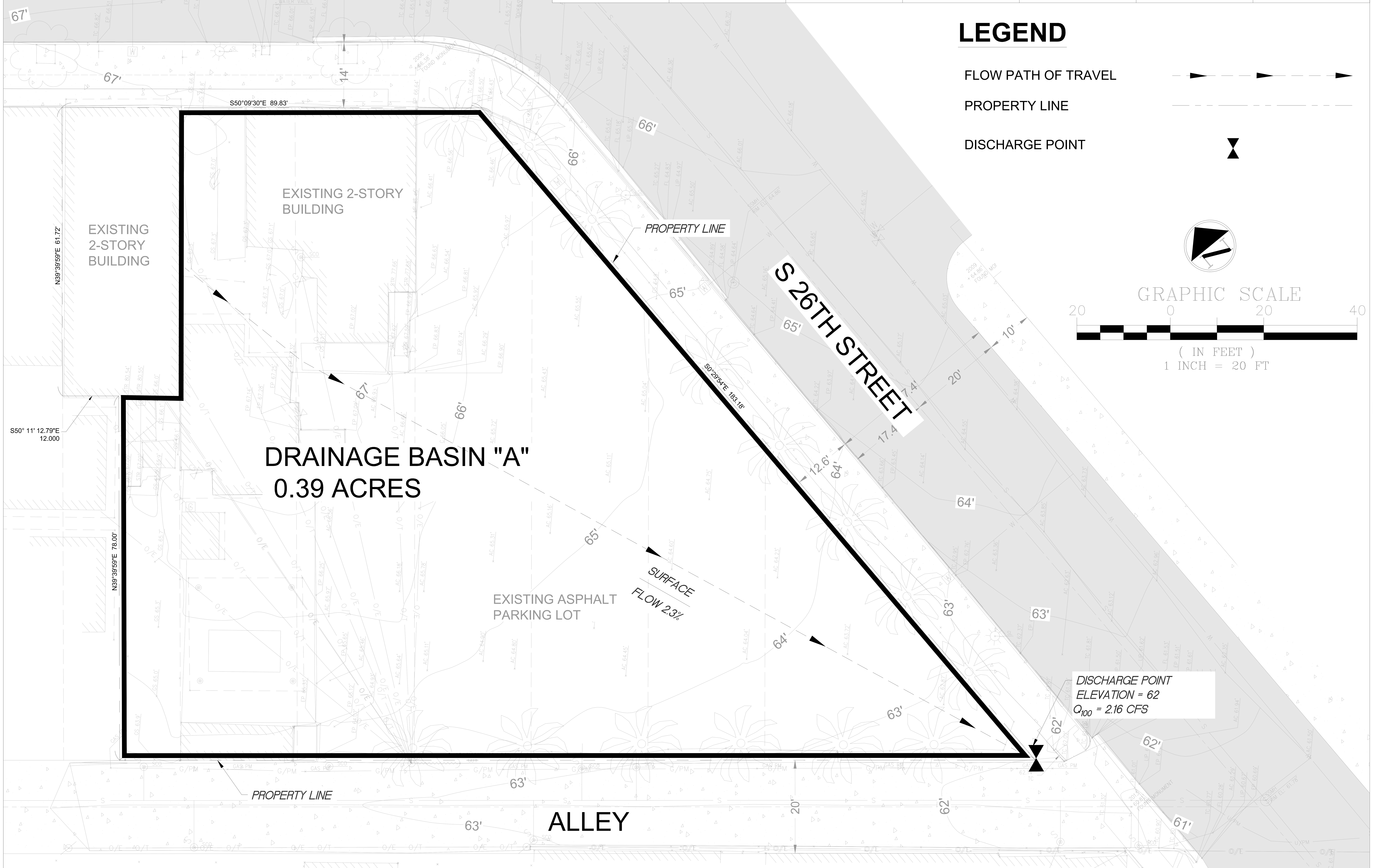
EXISTING DRAINAGE CONDITIONS - THE BARRIO FLATS, LOGAN AVENUE						
DRAINAGE BASIN	AREA (ACRES)	IMPERVIOUSNESS %	RUNOFF COEFFICIENT C	TIME OF CONCENTRATION Tc (MINS)	INTENSITY, I_{100} (IN/HR)	PEAK FLOW RATE Q_{100} (CFS)
A	0.39	100	0.90	5	6.14	2.16

LEGEND

FLOW PATH OF TRAVEL

PROPERTY LINE

DISCHARGE POINT



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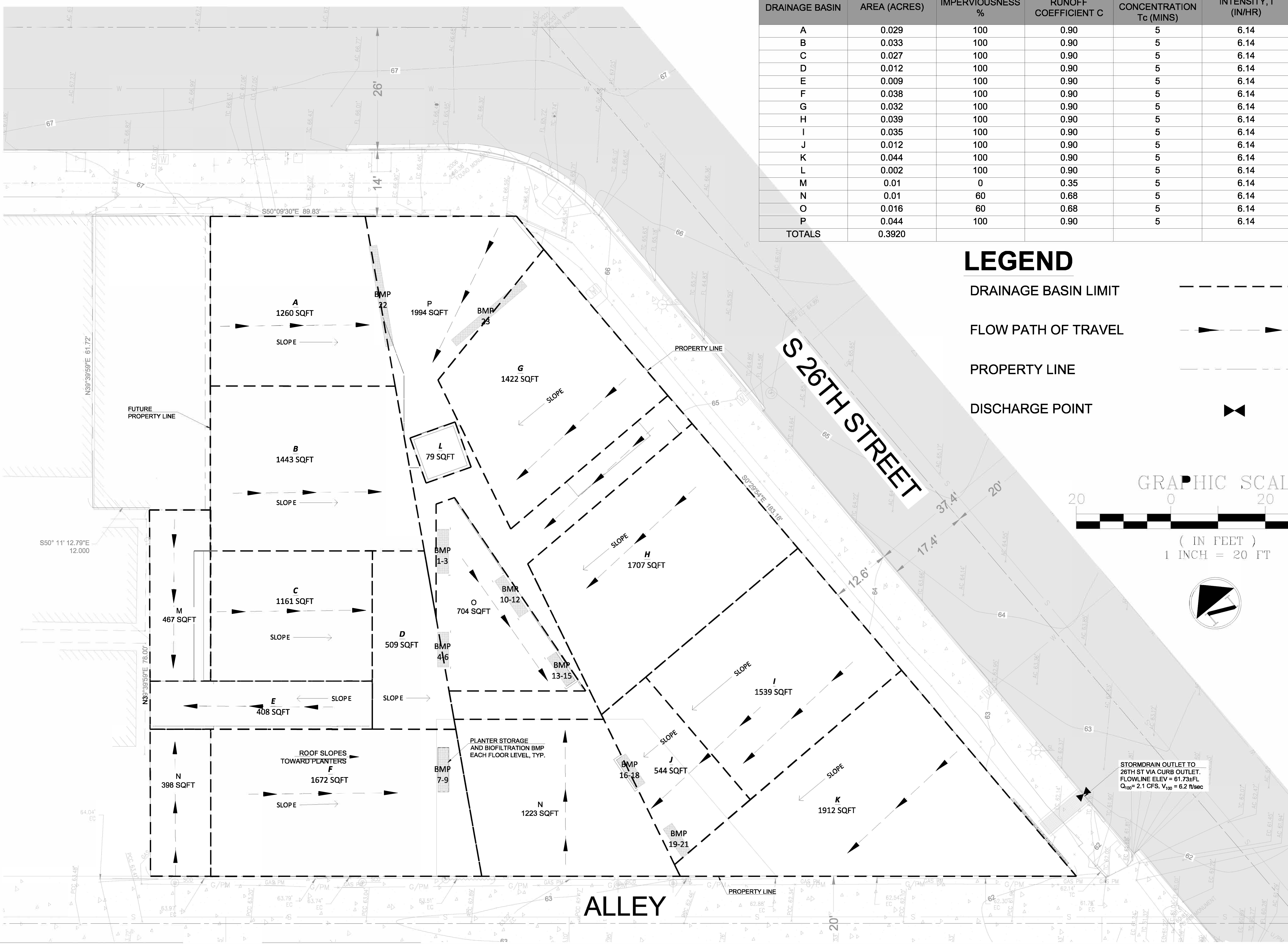
PROPOSED DRAINAGE CONDITIONS - THE BARRIO FLATS, LOGAN AVENUE						
DRAINAGE BASIN	AREA (ACRES)	IMPERVIOUSNESS %	RUNOFF COEFFICIENT C	TIME OF CONCENTRATION Tc (MINS)	INTENSITY, I (IN/HR)	PEAK FLOW RATE Q_{100} (CFS)
A	0.029	100	0.90	5	6.14	0.16
B	0.033	100	0.90	5	6.14	0.18
C	0.027	100	0.90	5	6.14	0.15
D	0.012	100	0.90	5	6.14	0.07
E	0.009	100	0.90	5	6.14	0.05
F	0.038	100	0.90	5	6.14	0.21
G	0.032	100	0.90	5	6.14	0.18
H	0.039	100	0.90	5	6.14	0.22
I	0.035	100	0.90	5	6.14	0.19
J	0.012	100	0.90	5	6.14	0.07
K	0.044	100	0.90	5	6.14	0.24
L	0.002	100	0.90	5	6.14	0.01
M	0.01	0	0.35	5	6.14	0.02
N	0.01	60	0.68	5	6.14	0.04
O	0.016	60	0.68	5	6.14	0.07
P	0.044	100	0.90	5	6.14	0.24
TOTALS	0.3920					2.0973



LEGEND

DRAINAGE BASIN LIMIT

FLOW PATH OF TRAVEL

PROPERTY LINE

DISCHARGE POINT

GRAPHIC SCALE

20 0 20 40

(IN FEET)
1 INCH = 20 FT

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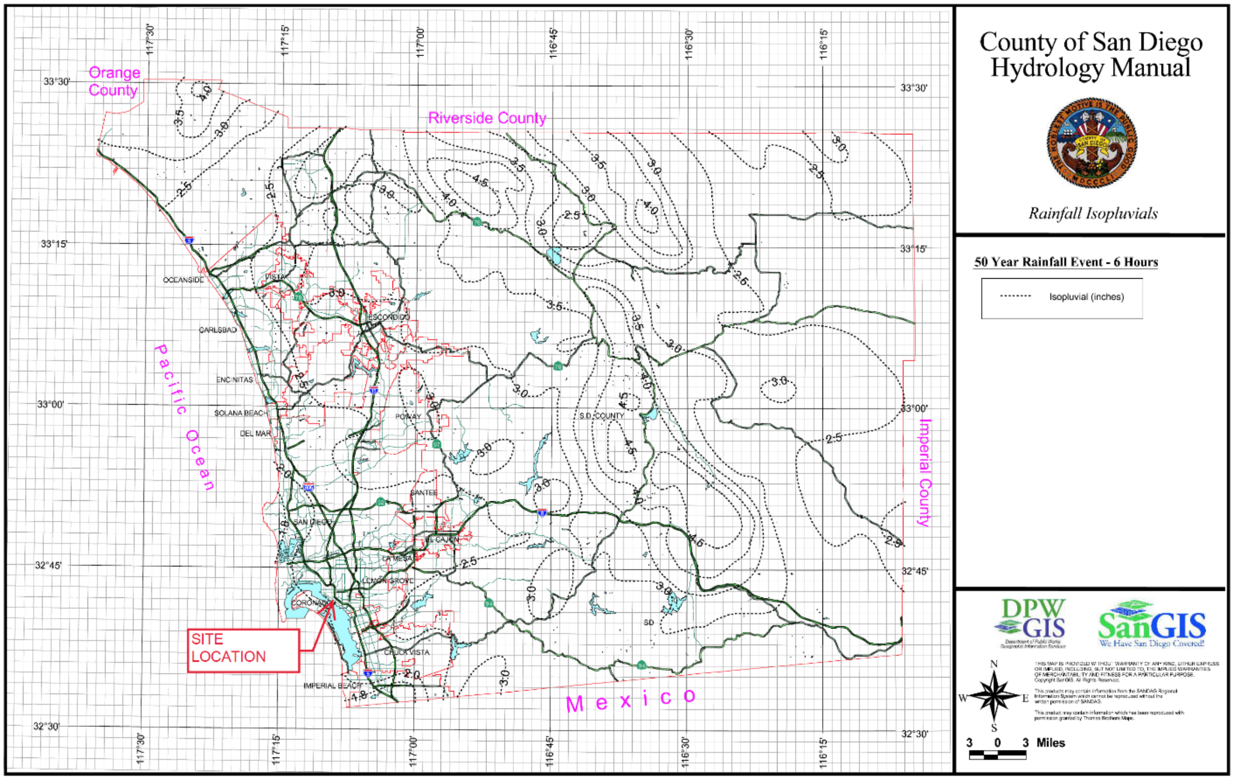
1A

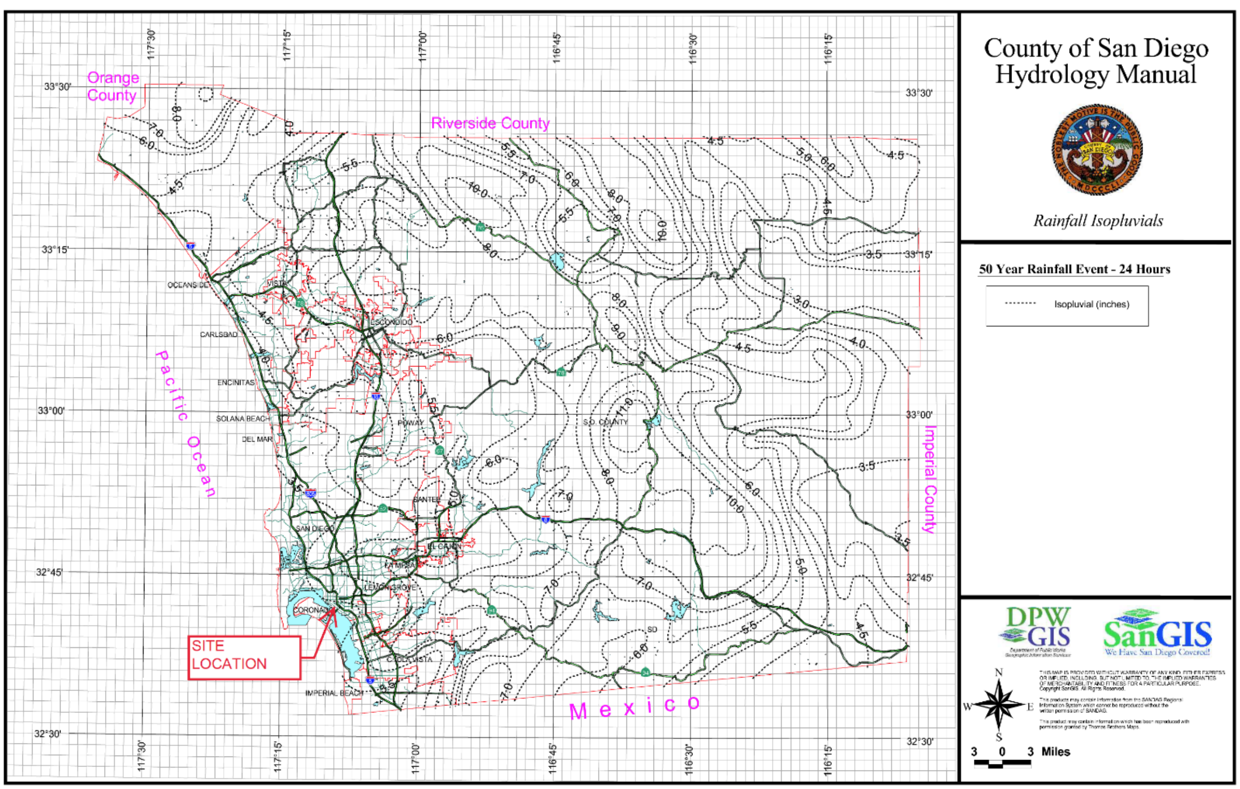
CONCLUSION

The proposed discharge flow rate at 2.1 ft^3/sec is less than existing site 100-year flow rate of 2.2 ft^3/sec. The decrease in flow rate can be attributed to the increased landscaping within the new design. Thus, the proposed improvements will help reduce the overall flow rate from the site.

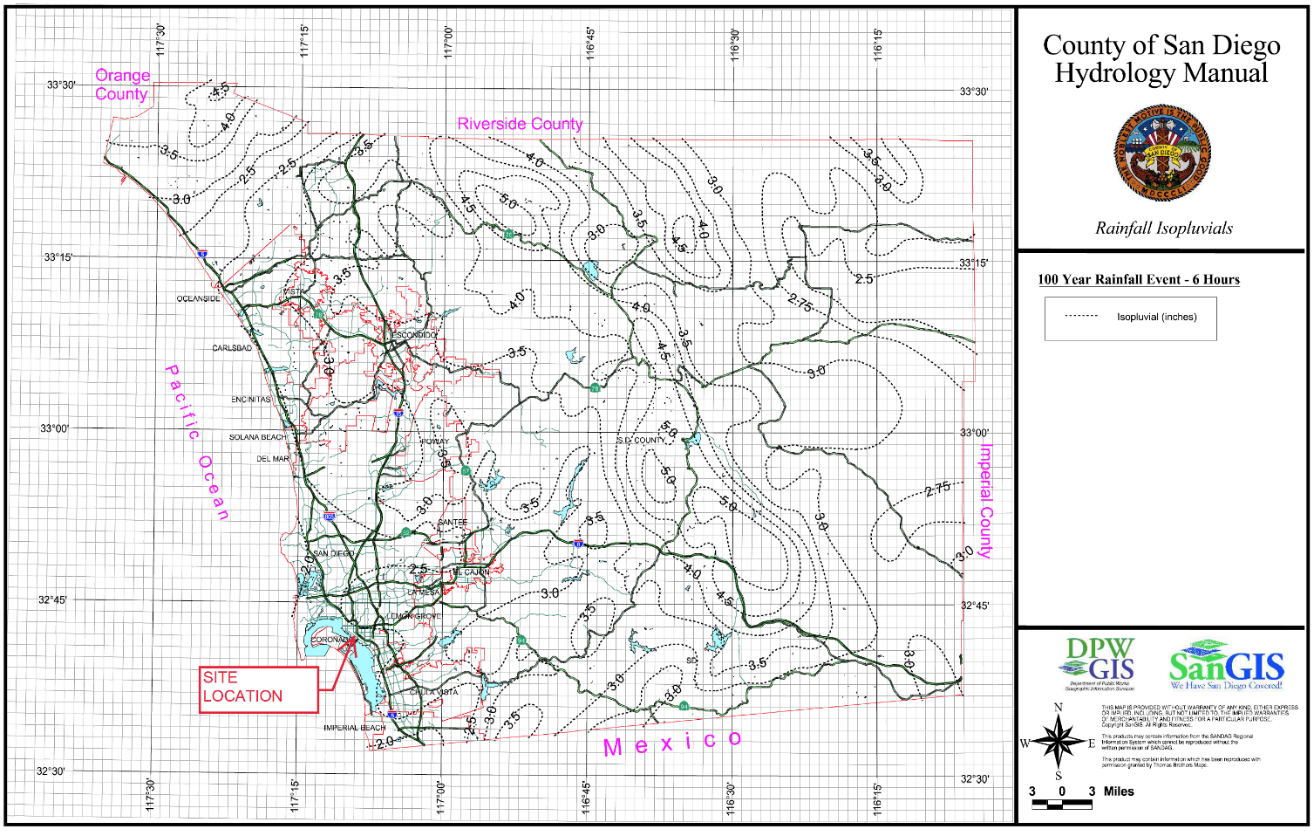
APPENDIX A – ISOPLUVIAL MAPS

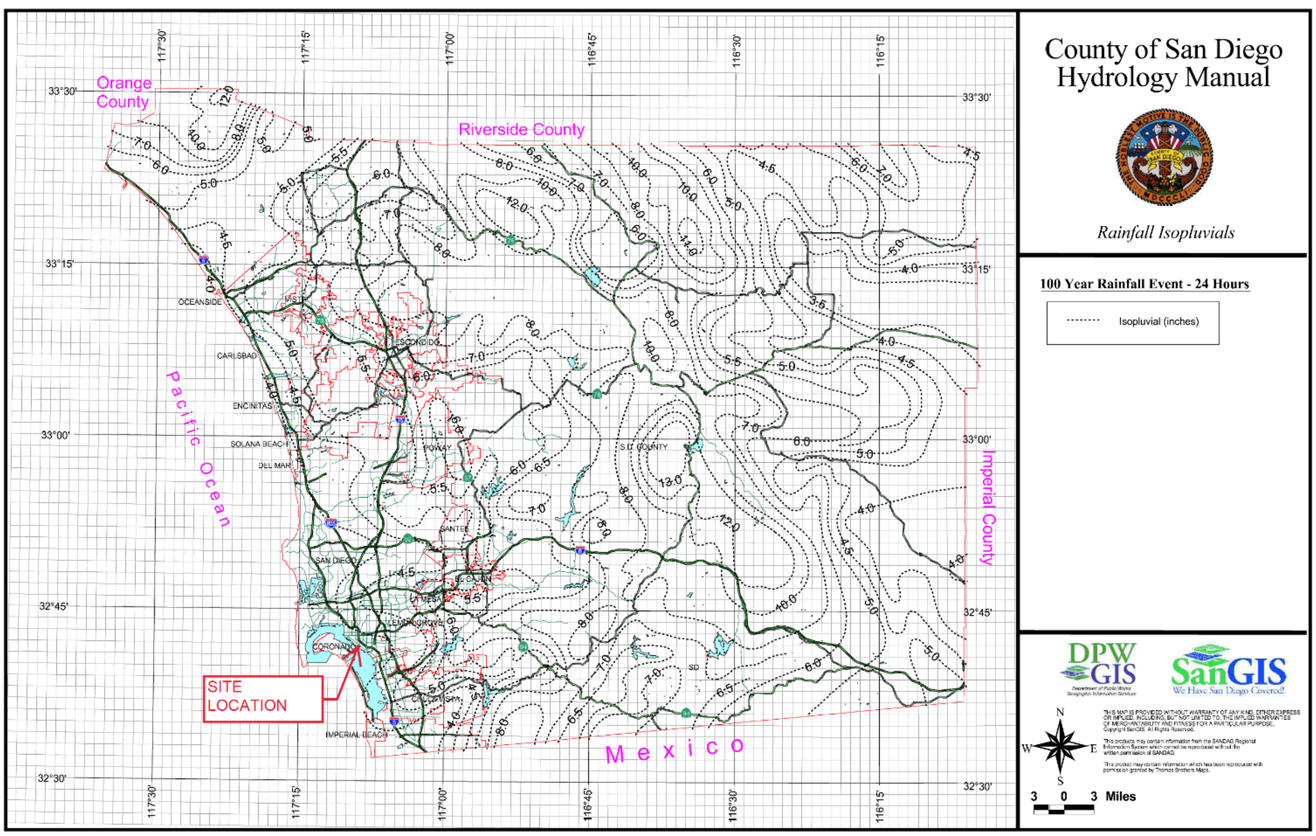
XI. 50 Year Isopluvials





XII. 100 Year Isopluvials





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PRELIMINARY GEOTECHNICAL INVESTIGATION AND FAULT HAZARD EVALUATION
PROPOSED LOGAN LOFTS PROJECT
LOGAN AVENUE AND 26TH STREET
SAN DIEGO, CALIFORNIA

Prepared for:

LOGAN LOFTS
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1.0 EXECUTIVE SUMMARY

CTE has performed this geotechnical and fault hazard investigation to provide site-specific fault hazard information and subsurface geotechnical characterization for the proposed Logan Avenue Project located at Logan Avenue and 26th Street in San Diego, California (Figure 1). The investigations for this report included field exploration, laboratory testing, geologic hazard evaluation, and engineering analysis. Appendix A contains a list of the references utilized for this report. Based on our findings from the excavated trench and literature review, it is our professional opinion that active and potentially active faults do not transect the proposed Logan Lofts site. Specific preliminary geotechnical recommendations for excavations, fill placement, and foundation design for the proposed improvements are presented herein.

2.0 INTRODUCTION AND SCOPE OF SERVICES

2.1 Introduction

This report presents results of the preliminary geotechnical investigation and fault hazard evaluation, performed by Construction Testing and Engineering, Inc. (CTE), and provides conclusions and recommendations for the proposed improvements at the subject site located in San Diego, California. The site is located within the City of San Diego Seismic Safety Hazard Category 13 (Downtown Special Fault Zone), and therefore a site-specific fault investigation was required as part of the overall geotechnical investigation (Figure 2). This work has been performed in general accordance with the terms of CTE proposal no. G-3849 and G-3849B, dated July 28, 2016, and August 5, 2016 respectively.

CTE understands that the proposed improvements consist of an up to four story, at grade, mixed-use structure and associated improvements. Preliminary recommendations for excavations, fill placement, and foundation design for the proposed improvements are presented in this report. Reviewed references are provided in Appendix A.

2.2 Scope of Services

The scope of services provided included:

- Review of readily available geologic reports pertinent to the site and adjacent areas (Appendix A contains a list of references).
- Coordination of USA Dig Alert utility mark-out and location.
- Coordination of Private Geophysical utility survey
- Laboratory testing of selected soil samples (Appendix C).
- Description of geology and evaluation of potential geologic hazards.
- Engineering and geologic analysis.
- Site-specific evaluation of the potential for surface rupture from faulting.
- Preparation of this report detailing the investigation performed, and providing geotechnical recommendations and conclusions and our professional opinion regarding the potential for surface fault rupture at the site.

3.0 SITE DESCRIPTION

The subject site is located at the corner of Logan Avenue and 26th Street in San Diego, California (Figure 1). The proposed improvement area currently includes a used car sales lot with an existing residential structure serving as an office building, paved parking area, and associated improvements including flatwork and utilities. The site is bounded by Logan Avenue to the north, South 26th Street to the east, an alley-way to the south, and single family residential structures to the west. Existing site conditions are illustrated on Figure 3. Based on reconnaissance and review of site topography, the improvement area is generally flat, with approximate elevations ranging from 67 feet above mean sea level (msl) in the northern portion of the site area to approximately 64 feet above msl in the southwestern portion of the site.

4.0 FIELD INVESTIGATION AND LABORATORY TESTING

4.1 Field Investigation

CTE conducted field investigations from October 11, 2016 to October 12, 2016 that included advancement of four exploratory borings for geotechnical purposes and four percolation test borings. Borings were excavated by a CME Hollow Stem Auger drill rig utilizing an eight inch diameter auger. Soils were logged in the field by a CTE geologist and visually classified according to the Unified Soil Classification System. Bulk and relatively undisturbed soil samples were transported to the CTE geotechnical laboratory in Escondido, California for testing.

Exploration logs including descriptions of the soils encountered are provided in Appendix B. The field descriptions shown on the exploration logs have been modified, where appropriate, to reflect laboratory test results. Approximate exploration locations are shown on Figure 3.

CTE conducted additional field investigations from October 20, 2016 to October 21, 2016 that included a visual reconnaissance and the excavation of three exploratory fault trenches (FT-1 through 3). FT-1 was oriented in a general northeast-southwest orientation and FT-2 and FT-3 were oriented in a general northwest to southeast trend. The fault trench locations were located in the best orientations for existing site conditions in order to intercept the prevailing trend of known faulting in the area. The regional trends of the Rose Canyon Fault Zone and subsidiary fault segments range from predominantly north-south to 30 degrees east and west of north in the project area. Exploratory fault trenches FT-1, FT2, and FT-3 were excavated within the existing parking area of the used car sales lot (Figure 3). The trenches were excavated with a rubber tire backhoe utilizing a 30-inch bucket. As described in detail in the subsequent sections of this report, the trenches ranged in depth from approximately six feet below existing grades to approximately eight feet below existing grades.

The soils were logged in the field by a CTE Geologist and were visually classified in general accordance with the Unified Soil Classification System. The exploratory fault trench logs, including descriptions of the soils encountered, are included in Plate 1. The approximate locations of the trenches are presented on Figure 3.

4.2 Laboratory Testing

Laboratory tests were conducted on selected soil samples for classification purposes, and to evaluate physical properties and engineering characteristics. Laboratory tests included: Grain Size Analysis, Maximum Density-Modified Proctor, In Place Moisture and Density, Plasticity Index, Consolidation, Resistance "R"-Value, Expansion Index, Direct Shear, and Chemical Characteristics. Test descriptions and laboratory test results are included in Appendix C.

5.0 GEOLOGY

5.1 General Setting

San Diego is located within the Peninsular Ranges physiographic province that is characterized by its northwest-trending mountain ranges, intervening valleys, and predominantly northwest trending regional faults (Figure 4). The San Diego Region can be further subdivided into the coastal plain area, a central mountain–valley area and the eastern mountain-valley area. The project site lies within the coastal plain area of low relief that slopes gently toward San Diego Bay. The coastal plain is generally characterized by geomorphic landforms known as marine terraces, which are erosion surfaces or abrasion platforms cut by ocean–wave processes along past coastlines. These surfaces are recognized today as the relatively flat-lying mesas and terraces that range in elevation across the coastal plain of San Diego. The elevation differences of these marine terraces are the result of sea level changes that are associated with glacial retreat and advance throughout the Pleistocene Era and uplift associated with activity on the Rose Canyon Fault Zone over the past several million years. The mesas or terraces have been incised by westward flowing drainages that have adjusted to the relative sea level changes in elevation. The combined effect of these processes is that older marine terraces are generally found at progressively higher elevations. Several distinct marine terraces present in the San Diego area include the Linda Vista Mesa (cut approximately 1.3 million years ago), the Nestor Terrace (cut approximately 120,000 years ago), and the Bird Rock Terrace (cut approximately 80,000 years ago). The marine terraces are typically covered with marine sediments covered with non-marine terrestrial deposits.

5.2 Geologic Conditions

Regional geologic mapping by Kennedy (1975); Kennedy and Tan (2005 and 2008), show that the surface geologic units mapped at the site (excluding fill material, colluvium, or other minor or thin surficial deposits) consist of Quaternary Older Paralic Deposits (Map Unit Qop- 6 of Kennedy and Tan, 2008), (Figure 5). As described by Kennedy and Tan, map unit Qop-6 includes undivided interfingering marine and non-marine Quaternary (middle to late Pleistocene) terrace deposits of strandline, beach, estuarine, and colluvial deposits composed of poorly consolidated, fine to medium grained, pale brown to reddish brown siltstone, sandstone and conglomerate. Where present, the unconformable basal conglomerate of this sequence typically consists of a lag deposit of gravel and cobbles. These sedimentary units are interpreted to have been deposited on the approximately 120,000 year old Nestor Terrace. The earlier mapping by Kennedy (1975) referred to these deposits as the Bay Point Formation. This is consistent with the earlier work by Hertlein and Grant 1939, who considered the Bay Point Formation as middle to late Pleistocene sequence of predominately nearshore marine sedimentary deposits. Kern (1977) interpreted that most of the Bay Point Formation was deposited during a major high sea level stand about 125,000 years ago.

As shown on Plate 1, the deposits exposed during this investigation consisted of an interlayered sequence of marine, nearshore sedimentary deposits. The Quaternary Paralic deposits consist of sandy clay to interfingering silty sands to sandy silts. These soils have been locally superimposed by soil formation (Paleosols) and argillic soil development to various degrees, resulting in a sequence comprised of clays, clayey silts, clayey sands, and silty sands. Quaternary Undocumented Fill was encountered in both the geotechnical borings and exploratory fault trenches overlying either the argillic soil horizon, where encountered within FT-2, or the underlying Quaternary Paralic Deposits. The Quaternary paralic deposits were found to be structurally and stratigraphically continuous across the project site. Detailed descriptions of the individual map units are presented on Plate 1.

5.3 Groundwater Conditions

Groundwater was not encountered in any of the exploratory trenches, which were advanced to a maximum explored depth of approximately 20 feet bgs. While groundwater conditions may vary, especially following periods of sustained precipitation or irrigation, it is not anticipated to affect shallow construction activities or the completed improvements, if proper site drainage is designed, installed, and maintained as per the recommendations of the project civil engineer.

5.4 Geologic Hazards

Geologic hazards that were considered to have potential impacts to site development were evaluated based on field observations, literature review, and laboratory test results. It appears that geologic hazards at the site are primarily limited to those caused by shaking from earthquake-generated ground motions. The following paragraphs discuss the geologic hazards considered and their potential risk to the site.

5.4.1 Local and Regional Faulting

As stated, much of downtown San Diego, including the project site, lies within the generally northwest-trending Rose Canyon Fault Zone (RCFZ). The RCFZ generally extends southeastward along the eastern slopes of Mount Soledad and along the eastern shore of Mission Bay. Farther to the south, north of downtown San Diego, the fault appears to diverge into three distinct strands, the Coronado, Spanish Bight, and Silver Strand faults. These strands generally extend to the south and southwest, through San Diego Bay, into Coronado, and eventually to the Pacific Ocean (Figure 6).

Evidence of Holocene (within the last 11,000 years) surface rupture on strands of the RCFZ has been discovered during several recent studies (Woodward-Clyde Consults [WCC], 1985 and 1994; Lindvall and Rockwell, 1995, Rockwell and Murbach, 1996; Leighton and Associates, 1998; Kleinfelder, 1999 and 2001). Therefore, the RCFZ is considered "active."

According to the California Geologic Survey, a fault is considered active if it displays evidence of activity in the last 11,000 years (Hart and Bryant, 2008). A potentially active fault displays evidence of activity prior to 11,000 years before present, but within the last 1.6 million years; or when supporting geologic evidence indicates timing of faulting as potentially active or non-active, but direct geologic evidence is lacking that could unequivocally prove timing of activity.

The site is located within the City of San Diego Seismic Safety Hazard Category 13 (Downtown Special Fault Zone), and therefore a site-specific fault investigation was required as part of the overall geotechnical investigation (Figure 2). A detailed discussion of the site specific fault hazard investigation is presented within Section 6 of this report.

5.4.2 Regional Faulting

The California Geological Survey (CGS) and the United States Geological Survey (USGS) broadly group faults as "Class A" or "Class B" (Cao, 2003; Frankel et al., 2002). Class A faults are identified based upon relatively well-defined paleoseismic activity, and a fault-slip rate of more than 5 millimeters per year (mm/yr). In contrast, Class B faults have comparatively less defined paleoseismic activity and are considered to have a fault-slip rate less than 5 mm/yr. The nearest known Class B fault are segments of the Rose Canyon Fault, which is interpreted to be within 1.0 kilometer to the southwest and west of the site, based on scaling of regional mapping and the United States Geological Survey Quaternary Fault and Fold database as accessed from Google Earth overlays. The nearest known Class A fault is the Julian segment of the Elsinore Fault that is located approximately 67.6 kilometers northeast of the site. Regional faults are presented on Figure 4.

5.4.3 Liquefaction and Seismic Settlement Evaluation

Liquefaction occurs when saturated fine-grained sands or silts lose their physical strengths during earthquake-induced shaking and behave like a liquid. This is due to loss of point-to-point grain contact and transfer of normal stress to the pore water. Liquefaction potential varies with water level, soil type, material gradation, relative density and probable intensity and duration of ground shaking. Seismic settlement can occur with or without liquefaction and results from densification of loose soils.

The site is underlain at shallow depths by dense to very dense, well indurated and locally cemented formational material. Therefore, the potential for liquefaction or significant seismic settlement at the site is considered to be negligible.

5.4.4 Tsunamis and Seiche Evaluation

According to http://www.conservation.ca.gov/cgs/geologic_hazards/Tsunami/Inundation Maps/Pages/Statewide_Maps.aspx the site is not located within a tsunami inundation zone based on its elevation above sea level. Damage resulting from oscillatory waves (seiches) is considered unlikely due the site being located a significant distance from the San Diego Bay.

5.4.5 Landsliding

According to mapping by Tan (1995), the site is considered “Marginally Susceptible” to landsliding. However, no landslides are mapped in the site area and evidence of landsliding was not noted during the recent field explorations. Based on the investigation findings, landsliding is not considered to be a significant geologic hazard at the site.

5.4.6 Compressible and Expansive Soils

Based on observations and testing, the Quaternary undocumented fill and near surface alluvial materials, particularly the AP (A plowed) and Bt horizon map units, encountered at the site are considered to be compressible in their current condition. Therefore, it is recommended that these soils be overexcavated and properly compacted as recommended herein. Based on the field data, site observations, and experience with similar soils in the vicinity of the site, the underlying formational material is not considered to be subject to significant compressibility under the proposed loads.

Based on geologic observation, the near-surface materials generally have low to medium expansion potential (Expansion Index of 51 to 90). The laboratory determined Expansion Index for a sample collected from Boring B-1 at zero to five feet was found to have a low expansion potential with an Expansion Index value of 47.

5.4.7 Corrosive Soils

Testing of representative site soils was performed to evaluate the potential corrosive effects on concrete foundations and buried metallic utilities. Soil environments detrimental to concrete generally have elevated levels of soluble sulfates and/or pH levels less than 5.5. According to the American Concrete Institute (ACI) Table 318 4.3.1, specific guidelines have been provided for concrete where concentrations of soluble sulfate (SO_4) in soil exceed 0.10 percent by weight. These guidelines include low water/cement ratios, increased compressive strength, and specific cement-type requirements. A minimum resistivity value less than approximately 5,000 ohm-cm and/or soluble chloride levels in excess of 200 ppm generally indicate a corrosive environment for buried metallic utilities and untreated conduits.

Chemical test results indicate that near-surface soils at the site present a negligible corrosion potential for Portland cement concrete. Based on resistivity testing, the site soils have been interpreted to have a moderate corrosivity potential to buried metallic improvements. Therefore, as an added precaution, plastic piping and/or conduits could be used, where feasible. However, CTE does not practice corrosion engineering. Therefore, if corrosion of below grade metal improvements is of more significant concern, a qualified corrosion engineer could be consulted.

6.0 PERCOLATION TESTING AND CALCULATED INFILTRATION RATES

CTE has completed an evaluation of infiltration rates at the subject site. The goal of our evaluation was to characterize the infiltration potential across the site in accordance with San Diego County guidelines; " Model BMP Design Manual-San Diego Region For Permanent Site Design, Storm Water Treatment and Hydomodification Management (February 2016)." This information is intended to be used by others, as needed, to facilitate the final storm water design in accordance with the water quality and hydro modification criteria of the MS4 permitting process.

6.1 Site Background and Characterization

Review of the Natural Resources Conservation Service (NCRS) website, accessed on November 8, 2016, indicates that agricultural soil types in the site area are classified as Urban, (Map Unit-Ur). The Ur map unit, as defined by the NCRS, is not assigned as one of four hydrologic soil groups (A-D), in accordance with the United States Department of Agriculture (U.S.D.A). As such, infiltration rates could not be estimated in accordance with NCRS soil type. Percolation test locations were assigned such that the entire site would be accurately characterized in terms of infiltration potential. A total of four percolation tests (P-1 through P-4) were conducted at the designated locations. Percolation test locations are shown on Figure 2, Exploration Location Map. P-1 and P-3 were pre-drilled to approximately three feet below existing grades, while P-2 and P-4 were drilled to approximately four feet below existing grades. The geologic units encountered within the percolation test borings were Quaternary Undocumented Fill and Quaternary Old Paralic Deposits (Map Unit Qop- 6 of Kennedy and Tan, 2008), as described in section 5.2. Quaternary Undocumented Fill was encountered within one to one and a half feet below existing grades within percolation test borings, and was underlain by Quaternary Old Paralic Deposits. As such, all four of the percolation tests were conducted within the Quaternary paralic deposits due to the depth of the percolation test borings.

6.2 Percolation Test Methodology

The shallow borehole percolation methodology was used to establish percolation rates. This is considered an acceptable method of percolation testing, as stated in the Model BMP Design Manual, San Diego Region, Appendix D (February, 2016), and adopted by the County of San Diego. The percolation test procedure was completed in general accordance with the County of San Diego Department of Environmental Health (DEH), Version 2010 guidelines. The percolation rates account for both lateral and vertical flow through the tested section. The derived percolation rates were then converted to infiltration rates following the procedures of the Prochet Method, as recommended by the Model BMP Design Manual, San Diego Region, Appendix D (February, 2016), and adopted by the County of San Diego.

6.3 Percolation Test Results and Calculated Infiltration Rates

Water used to conduct the tests was supplied from an onsite water source. Weather conditions during the test were hot and sunny during both the presoaking and testing days. The percolation testing methodology was determined following the presoak period per the San Diego County guidelines. In summary, Case I conditions are determined by water remaining overnight following an initial four-hour presoak. Case II is considered a fast draining soil in which two columns of 12-14 inches of water percolate in less than 30 minutes during the second presoak period that is conducted after a minimum of 15 hours of the initial presoak period. Case III conditions result when no water remains in the test hole 15-30 hours after the initial four-hour presoak, but does not meet Case II conditions during the second presoak period. Three of the percolation tests met Case I conditions (P-1, P-3, and P-4), and the remaining percolation test met Case III conditions (P-2).

The following table presents a summary of the percolation test results conducted within the subject site, the soil type encountered in each test boring, the depth of each test boring, the derived percolation rate, the calculated infiltration rate, and a recommended design rate derived by applying a safety factor of two to the calculated infiltration rate in accordance with the Model BMP Design Manual, San Diego Region, Appendix D (February, 2016).

TABLE 1
SUMMARY OF PERCOLATION AND INFILTRATION TEST RESULTS

Test Location	Soil Type	San Diego County Percolation Procedure	Depth (inches)	Percolation Rate (inches/hour)	Infiltration Rate (inches/hour)	Recommended Rate for Design* (inches/hour)
P-1	Qop	Case I	38	0.125	0.0156	0.0078
P-2	Qop	Case III	50	0.5	0.0784	0.0392
P-3	Qop	Case I	43.625	0.125	0.0136	0.0068
P-4	Qop	Case I	48.25	0.125	0.0178	0.0089

* A safety factor of two (2) was applied to the calculated infiltration rate
Qop = Quaternary Old Paralic Deposits, (Map Unit Qop- 6 of Kennedy and Tan, 2008)

The calculated infiltration rates within the Quaternary Old Paralic Deposits were consistent at test locations P-1, P-3, and P-4, ranging between 0.0068 to 0.0089 inches per hour with a safety factor of two applied. The test location P-2 produced calculated infiltration rates of 0.0392 inches per hour with a safety factor of two applied. However, the initial infiltration rates, without a safety factor applied indicate that test locations P-1, P-2 and P-4 classify as meeting the minimum infiltration rate (0.01 inches per hour) for partial infiltration, with the fastest observed rate at P-2 test location. The accelerated calculated infiltration rate at test location P-2 is attributed to the nature of the Quaternary paralic deposits within the vicinity of the percolation boring. As previously described, the Quaternary Old Paralic deposits consist of interfingering terrace deposits of strandline, beach, estuarine, and colluvial deposits. Exploratory boring B-4 is located approximately three feet northwest of percolation test location P-2. Locally increased quantities of medium to coarse grained sands were encountered at approximately five feet below existing grades within B-4. The presence of medium to coarse grained sands within the Quaternary paralic deposits near the southern approximate one fourth of the site is interpreted to account for accelerated calculated infiltration rates.

6.4 Infiltration Recommendations

Based on the initial observed infiltration rates, the highest potential for infiltration is along the eastern property boundary, and specifically in the southeast corner of the site (location P-2). We recommend that the infiltration rates with the applied safety factor of two be used for future design purposes, as considered appropriate for the responsible design engineer of record for the site storm water BMPs.

6.5 Infiltration limitations

The percolation test results were obtained in accordance with City and County standards and performed with the standard of care practiced by other professionals practicing in the area. However, percolation test results can significantly vary laterally and vertically due to slight changes in soil type, degree of weathering, secondary mineralization, and other physical and chemical variabilities. As such, the test results are only considered as an estimate of percolation and converted infiltration rates for design purposes. No guarantee is made based on the percolation testing to the actual functionality or longevity of associated infiltration basins or other BMP devices designed from the presented infiltration rates.

7.0 SITE SPECIFIC EARTHQUAKE HAZARD EVALUATIONS

7.1 Site-Specific Fault Analysis

The site-specific fault analysis included review of previously completed fault investigations in the site area and direct observation of exploratory trenches excavated across the site. The entire site is within the City of San Diego Seismic Safety Hazard Category 13 (Downtown Special Fault Zone).

Three exploratory fault trenches were excavated across the site in locations to intercept possible faulting along the known trend of the RCFZ in the project area. Exploratory fault trench FT-1 was excavated along a northeast trend over a distance covering approximately 63 feet. However, due to the presence of utilities approximately 17 feet (between trench stations 26 to 43 feet) could not be directly logged. Correlations of the stratigraphy were interpolated over this distance (Plate 1). Exploratory fault trench FT-2 was excavated along a northwest trend and had two breaks due to utilities between approximate log stations 14 to 22 feet and 37 to 43 feet, and a total length of approximately 54 feet (Plate 1). Exploratory fault trench FT-3 was excavated along a northwest trend with a break due to utilities between approximate log stations 22 and 36 feet, and a total length of approximately 128 feet. Correlations of the stratigraphy were interpolated across these gaps in the trenching in both the exploratory trenches FT-2 and FT-3 (Plate 1).

The exploratory fault trench walls were scraped and logged at a scale of one inch equal to five feet under the direction of a Certified Engineering Geologist practicing in fault hazard evaluations. The trench logs are presented on Plate 1. As shown on Plate 1, the stratigraphy is structurally and stratigraphically continuous within each trench segment and can be correlated over distances ranging from approximately 17 feet in FT-1 and FT-3, and less than 10 feet in FT-2. In addition, no evidence of faulting (such as fracturing, shearing, discontinuous or truncated stratigraphic layers, or structural warping) was observed in any of the three trenches. A vertically oriented fracture approximately one eighth of an inch in width was observed in FT-1 at approximate log station 16 feet. Stratigraphic layers were continuous across the fracture, with no recognizable separation and no additional evidence of faulting was found within the vicinity of the fracture. As such, the stratigraphy was interpreted to be structurally and stratigraphically continuous across FT-1. It is possible that some paleo-liquefaction features are present in the southeastern portion of FT-3.

Lithostratigraphic horizons were found to be continuous within the exploratory fault trenches excavated at the site. The stratigraphic continuity of these horizons across the site and their estimated ages indicate that there is no evidence of faulting across the site. Based on these findings, it is our professional opinion that active faulting does not transect the proposed project site area.

8.0 CONCLUSIONS AND RECOMMENDATIONS

8.1 General

CTE concludes that the proposed development of the site is feasible from a geotechnical standpoint, provided the recommendations in this report are incorporated into the design and construction of the project. Recommendations for the proposed earthwork and improvements are included in the following sections and Appendix D. However, recommendations in the text of this report supersede those presented in Appendix D should conflicts exist. These recommendations should either be confirmed as appropriate or updated during or following any rough grading at the site.

8.2 Site Preparation

Prior to grading, the site should be cleared of any existing debris and deleterious materials. Objectionable materials, such as construction debris and vegetation, not suitable for structural backfill should be properly disposed of offsite. In areas to receive structures or distress-sensitive improvements, existing fills and disturbed soils should be removed to the depth of dense formational material. For proposed shallow improvement areas, such as exterior pavements or flatwork, removals should be conducted to a depth of two feet below grade, or to dense formational materials, whichever is shallower. Overexcavation should extend at least five feet laterally beyond the limits of the proposed improvements, where feasible. Localized deeper removals may be necessary if roots or otherwise loose or disturbed materials are encountered at the bottom of excavations.

An engineer or geologist from CTE should observe the exposed ground surface or footing excavations prior to placement of compacted fill or concrete to document and verify the competency of exposed subgrade materials. After approval by this office, exposed subgrades to receive fill should be scarified a minimum of six inches, moisture conditioned, and properly compacted prior to fill placement.

8.3 Site Excavation

Based on site observations and anticipated subsurface conditions, shallow excavations at the site should generally be feasible using well-maintained heavy-duty construction equipment run by experienced operators. Locally cemented soils could be encountered, which could require additional handling or specialized equipment.

8.4 Fill Placement and Compaction

Following recommended removals of loose or disturbed soils, areas to receive fills should be scarified a minimum of six inches, moisture conditioned, and properly compacted. Fill and backfill should be compacted to a minimum relative compaction of 90 percent at a moisture content of at least two percent above optimum, as evaluated by ASTM D 1557. The optimum lift thickness for fill soil will depend on the type of compaction equipment used. Backfill should be placed in uniform, horizontal lifts not exceeding eight inches in loose thickness. Fill placement and compaction should be conducted in conformance with local ordinances.

8.5 Fill Materials

Medium expansion potential soils derived from the on-site materials are considered suitable for reuse on the site as compacted fill. If used, these materials should be screened of organics and materials generally greater than three inches in maximum dimension. Irreducible materials greater than three inches in maximum dimension generally should not be used in shallow fills (within three feet of proposed grades). In utility trenches, adequate bedding should surround pipes.

Imported fill beneath structures, pavements, and walks should have an Expansion Index of 20 or less (ASTM D 4829). Imported fill soils for use in structural or slope areas should be evaluated by the soils engineer before being imported to the site.

If proposed, retaining wall backfill located within a 45-degree wedge extending up from the bottom of the foundation at the heel of the wall should consist of soil having an Expansion Index of 20 or less (ASTM D 4829) with less than 30 percent passing the No. 200 sieve. The upper 12 to 18 inches of wall backfill should consist of lower permeability soils, in order to reduce surface water infiltration behind walls. The project structural engineer and/or architect should detail proper wall backdrains, including gravel drain zones, fills, filter fabric and perforated drain pipes.

8.6 Temporary Construction Slopes

Recommendations for unshored temporary excavations without seepage are provided herein. The recommended slopes should be relatively stable against deep-seated failure, but may experience localized sloughing. Temporary slopes should not be excavated below a 1:1 plane extending downward from the outer bottom edge of foundations to remain, property lines, or traffic areas present at the time of excavation. On-site soils are considered Type B and Type C soils with recommended slope ratios as set forth in the table below.

TABLE 5.6
RECOMMENDED TEMPORARY SLOPE RATIOS

SOIL TYPE	SLOPE RATIO (Horizontal: vertical)	MAXIMUM HEIGHT
B (Old Paralic Deposits)	1:1 (OR FLATTER)	10 Feet
C (Undocumented Fill)	2:1 (OR FLATTER)	5 Feet

Actual field conditions and soil type designations must be documented by a "competent person" while excavations exist, according to Cal-OSHA regulations. In addition, the above sloping recommendations do not allow for surcharge loading at the top of slopes by spoils, vehicular traffic, equipment or materials. Appropriate surcharge setbacks must be maintained from the top of unshored slopes.

In general, excavations are not to extend below a 1:1 plane projected downward from the nearest bottom edge of existing footings to remain. Based on the anticipated relatively shallow excavations, temporary and/or permanent shoring installation or underpinning is not anticipated to be necessary. If shoring is required, it should be designed based on the recommendations herein for retaining walls; however, the recommended active or at-rest earth pressures may be reduced by 25% if the shoring is for temporary purposes only. If shoring is to be installed, the contractor should be experienced in the design and construction of similar shoring systems and demonstrate proven competence on projects of similar size and magnitude.

8.7 Foundations and Slab Recommendations

The following recommendations are for preliminary design purposes only. These recommendations should be reviewed as project plans further develop and after completion of earthwork to document that conditions exposed are as anticipated and that the recommended structure design parameters are appropriate.

8.7.1 Foundations

Following the preparatory grading recommended herein, continuous and isolated spread footings are anticipated to be suitable for use at this site. Footings are anticipated to be founded entirely in dense native materials. Footings should be embedded a minimum depth of 24 inches below lowest adjacent subgrade. Footings should not straddle transitions from cut to fill materials. Therefore, localized deepening of excavations may be required in order for all proposed footings to bear entirely upon dense native materials.

Foundation dimensions and reinforcement should be based on an allowable bearing value of 2,500 pounds per square foot for footings founded entirely in dense native material. All footings should be embedded a minimum of 24 inches below the lowest adjacent subgrade elevation as recommended above. Continuous footings should be at least 18 inches wide; isolated footings should be at least 24 inches in least dimension. If deepened footings are proposed, the bearing value may be increased by 250 psf for each additional six inches of embedment up to a maximum static value of 3,500 psf. The above bearing values may be increased by one third for short duration loading which includes the effects of wind or seismic forces. If elastic foundation design is utilized, an uncorrected subgrade modulus of 150 pounds per square inch per inch (pci) is considered suitable.

Minimum reinforcement for continuous footings should consist of four No. 5 reinforcing bars; two placed near the top and two placed near the bottom or as per the project structural engineer. The structural engineer should design isolated footing reinforcement. Footing excavations should generally be maintained at above optimum moisture content until concrete placement.

8.7.2 Foundation Settlement

The maximum total static settlement is expected to be on the order of one inch and the maximum differential settlement is expected to be on the order of ½ inch over a distance of approximately 40 feet. Due to the absence of a shallow groundwater table and the generally dense nature of underlying materials, dynamic settlement is not expected to adversely affect the proposed improvements.

8.7.3 Foundation Setback

Footings for structures should be designed such that the horizontal distance from the face of adjacent slopes to the outer edge of the footing is at least 10 feet. In addition, footings should bear beneath a 1:1 plane extended up from the nearest bottom edge of adjacent trenches and/or excavations. Deepening of affected footings may be a suitable means of attaining the prescribed setbacks.

8.7.4 Interior Concrete Slabs

Lightly loaded concrete slabs should be a minimum of 5.0 inches in thickness, assuming they are not subject to vehicular or forklift traffic. Minimum slab reinforcement should consist of #4 reinforcing bars placed on 18-inch centers each way, at above mid-slab height, but with proper concrete cover.

Slabs subjected to heavier loads may require thicker slab sections and/or increased reinforcement. A 125 pci subgrade modulus is considered suitable for elastic design of minimally embedded improvements such as slabs-on-grade six inches thick or less. Subgrade materials should generally be maintained above optimum moisture content until slab underlayment or concrete are placed.

In moisture-sensitive floor areas, a suitable vapor retarder of at least 15-mil thickness (with all laps or penetrations sealed or taped) overlying a four-inch layer of consolidated crushed aggregate or gravel (with SE of 30 or more) should be installed, as per the 2013 CBC/Green Building Code. An optional maximum two-inch layer of similar material may be placed above the vapor retarder to help protect the membrane during steel and concrete placement. This recommended protection is generally considered typical in the industry. If proposed floor areas or coverings are considered especially sensitive to moisture emissions, additional recommendations from a specialty consultant could be obtained. CTE is not an expert at preventing moisture penetration through slabs. A qualified architect or other experienced professional should be contacted if moisture penetration is a more significant concern.

8.8 Seismic Design Criteria

The seismic ground motion values listed in the table below were derived in accordance with the ASCE 7-10 Standard. This was accomplished by establishing the Site Class based on the soil properties at the site, and then calculating the site coefficients and parameters using the United States Geological Survey Seismic Design Maps application using the site coordinates of 32.6970 degrees latitude and -117.1384 degrees longitude. These values are intended for the design of structures to resist the effects of earthquake ground motions.

TABLE 8.8 SEISMIC GROUND MOTION VALUES		
PARAMETER	VALUE	IBC REFERENCE (2012)
Site Class	D	ASCE 7, Chapter 20
Mapped Spectral Response Acceleration Parameter, S_S	1.204	Figure 1613.3.1 (1)
Mapped Spectral Response Acceleration Parameter, S_1	0.463	Figure 1613.3.1 (2)
Seismic Coefficient, F_a	1.018	Table 1613.3.3 (1)
Seismic Coefficient, F_v	1.537	Table 1613.3.3 (2)
MCE Spectral Response Acceleration Parameter, S_{MS}	1.226	Section 1613.3.3
MCE Spectral Response Acceleration Parameter, S_{M1}	0.712	Section 1613.3.3
Design Spectral Response Acceleration, Parameter S_{DS}	0.817	Section 1613.3.4
Design Spectral Response Acceleration, Parameter S_{D1}	0.475	Section 1613.3.4
PGA_M	0.538	ASCE 7, Equation 11.8-1

8.9 Lateral Resistance and Earth Pressures

Lateral loads acting against structures may be resisted by friction between the footings and the supporting soil or passive pressure acting against structures. If frictional resistance is used, CTE recommends an allowable friction coefficient of 0.30 (total frictional resistance equals the coefficient of friction multiplied by the dead load) for concrete cast directly against site soils. A design passive resistance value of 250 pounds per square foot per foot of depth (with a maximum value of 2,000 pounds per square foot) may be used. The allowable lateral resistance can be taken as the sum of the frictional resistance and the passive resistance, provided the passive resistance does not exceed two-thirds of the total allowable resistance.

The anticipated retaining walls backfilled using very low expansion granular soils may be designed using the equivalent fluid unit weights given in Table 8.9 below.

TABLE 8.9
EQUIVALENT FLUID UNIT WEIGHTS (G_h)
(pounds per cubic foot)

WALL TYPE	LEVEL BACKFILL	SLOPE BACKFILL 2:1 (HORIZONTAL: VERTICAL)
CANTILEVER WALL (YIELDING)	35	55
RESTRAINED WALL	55	65

Lateral pressures on cantilever retaining walls (yielding walls) over six feet high due to earthquake motions may be calculated based on work by Seed and Whitman (1970). The total lateral earth pressure against a properly drained and backfilled cantilever retaining wall above the groundwater level can be expressed as:

$$P_{AE} = P_A + \Delta P_{AE}$$

For non-yielding (or "restrained") walls, the total lateral earth pressure may be similarly calculated based on work by Wood (1973):

$$P_{KE} = P_K + \Delta P_{KE}$$

Where P_A = Static Active Thrust (given previously)
P_K = Static Restrained Wall Thrust (given previously)
ΔP_{AE} = Dynamic Active Thrust Increment = $(3/8)\ k_h\ \gamma H^2$
ΔP_{KE} = Dynamic Restrained Thrust Increment = $k_h\ \gamma H^2$
k_h = 2/3 Peak Ground Acceleration = 2/3 (PGA_M)
H = Total Height of the Wall
γ = Total Unit Weight of Soil ≈ 135 pounds per cubic foot

The static and increment of dynamic earth pressure in both cases may be applied with a line of action located at H/3 above the bottom of the wall (SEAOC, 2013).

These values assume non-expansive backfill and free-draining conditions. Measures should be taken to prevent moisture buildup behind all retaining walls. Drainage measures should include free-draining backfill materials and sloped, perforated drains. These drains should discharge to an appropriate off-site location. However, the project structural engineer and/or architect should design the appropriate retaining wall drainage detail. Waterproofing should be as specified by the project architect or the waterproofing specialty consultant.

8.10 Exterior Flatwork

To reduce the potential for cracking in exterior flatwork caused by minor movement of subgrade soils and concrete shrinkage, lightly loaded flatwork (not subject to vehicular or forklift traffic) should measure a minimum 4.5 inches in thickness and be installed with crack-control joints at appropriate spacing as designed by the project architect. Minimum flatwork reinforcement should consist of minimum #3 rebar installed on 18-inch centers, each way, at above mid-height of slab, but with proper concrete cover, or as designed by the structural engineer. Subgrades should be prepared according to the earthwork recommendations previously given before placing concrete. Positive drainage should be established and maintained next to flatwork. Subgrade materials shall be maintained at, or be elevated to, above optimum moisture content until just prior to concrete placement.

8.11 Drainage

Surface runoff should be collected and directed away from improvements by means of appropriate erosion-reducing devices and positive drainage should be established around the proposed improvements. Positive drainage should be directed away from improvements at a gradient of at least two percent for a distance of at least five feet. However, the project civil engineer or architect should evaluate the on-site drainage and make necessary provisions to keep surface water from affecting the site.

Generally, CTE recommends against allowing water to infiltrate building pads or adjacent to slopes. We understand that some agencies are encouraging the use of storm-water infiltration devices. Use of such devices tends to increase the possibility of high groundwater and slope instability. If storm water cleansing devices must be used in the improvement areas, it is recommended that they be underlain by an impervious barrier and that the filtered storm water be collected via subsurface piping and discharged off site.

8.12 Slopes

Based on anticipated soil strength characteristics, cut and fill slopes should be constructed at slope ratios of 2:1 (horizontal: vertical) or flatter. These fill slope inclinations should exhibit factors of safety greater than 1.5.

Although properly constructed slopes on this site should be grossly stable, the soils will be somewhat erodible. Therefore, runoff water should not be permitted to drain over the edges of slopes unless that water is confined to properly designed and constructed drainage facilities. Erosion-resistant vegetation should be maintained on the face of all slopes. Typically, soils along the top portion of a fill slope face will creep laterally. CTE recommends against building distress-sensitive hardscape improvements within five feet of slope crests.

8.13 Construction Observation

The recommendations provided in this report are based on preliminary design information for the proposed construction and the subsurface conditions observed in the exploratory borings. The interpolated subsurface conditions should be checked in the field during construction to document that conditions are as anticipated. Upon completion of precise grading, soil samples may be collected to evaluate as-built Expansion Index and soluble-sulfate content of at-grade soils. Foundation recommendations may be revised upon completion of grading, and as-built laboratory tests results.

Recommendations provided in this report are based on the understanding and assumption that CTE will provide the observation and testing services for the project. Earthwork should be observed and tested to document that grading activity has been performed according to the recommendations contained within this report. The project engineer should evaluate all footing trenches before reinforcing steel placement.

8.14 Plan Review

CTE should be authorized to review the project grading and foundation plans before commencement of earthwork to identify potential conflicts with the intent of the recommendations provided.

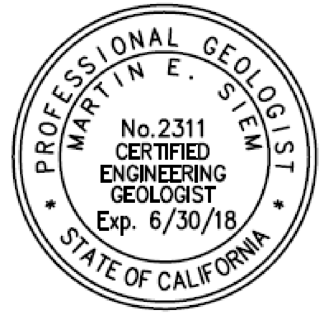
9.0 LIMITATIONS OF INVESTIGATION

The field evaluation, laboratory testing, and geotechnical analysis presented in this report have been conducted according to current engineering practice and the standard of care exercised by reputable geotechnical consultants performing similar tasks in this area. No other warranty, expressed or implied, is made regarding the conclusions, recommendations and opinions expressed in this report. Variations may exist and conditions not observed or described in this report may be encountered during construction.

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.

CTE's conclusions and recommendations are based on an analysis of the observed conditions. If conditions different from those described in this report are encountered, our office should be notified and additional recommendations, if required, will be provided.

We appreciate this opportunity to be of service on this project. If you have any questions regarding this report, please do not hesitate to contact the undersigned.



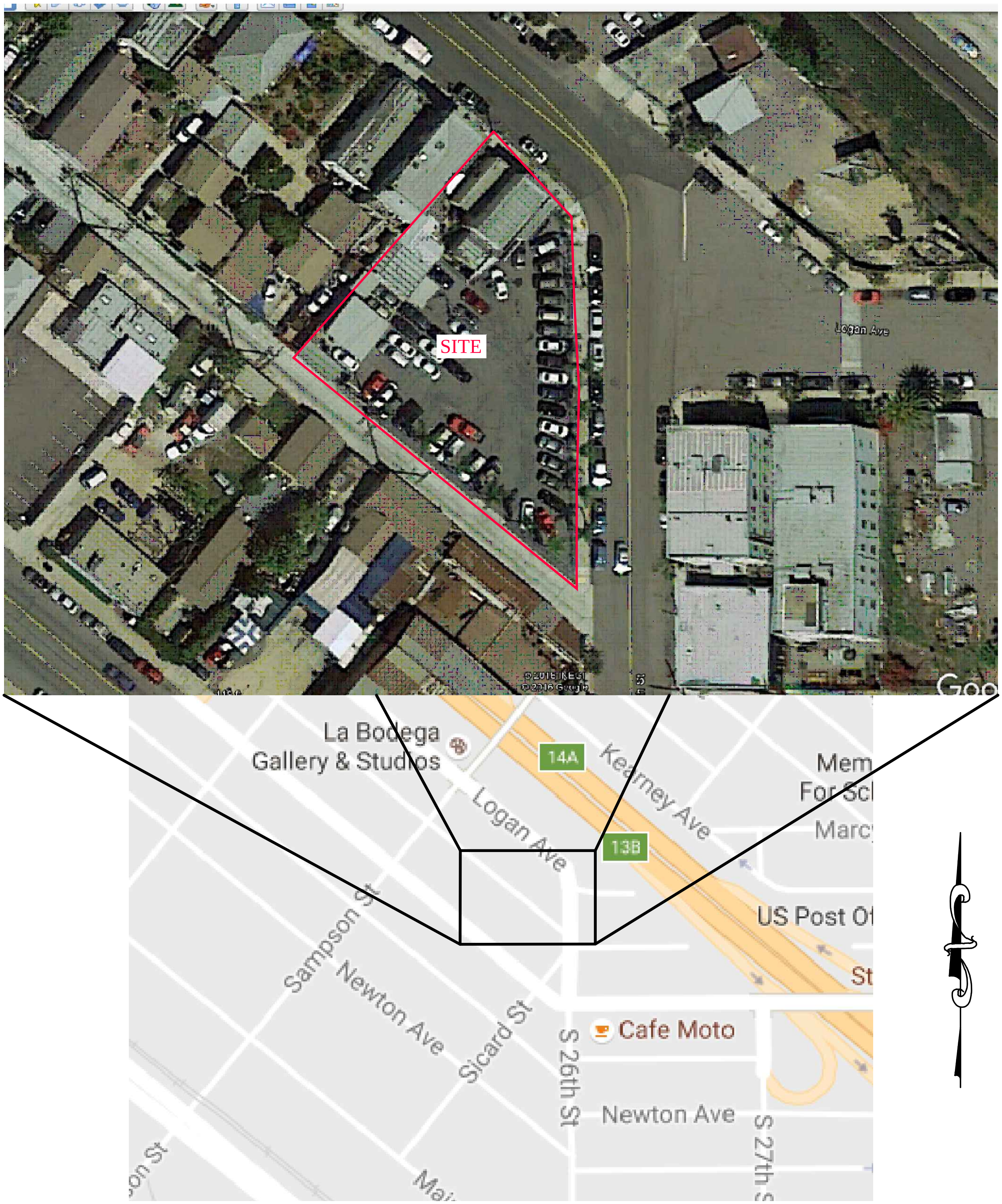
Respectfully submitted,
CONSTRUCTION TESTING & ENGINEERING, INC.

Dan. T Math, GE #2665
Principal Engineer

Martin E. Siem, CEG #2311
Certified Engineering Geologist

Aaron J. Beeby, CEG #2603
Certified Engineering Geologist

AJB/MES/DTM:nri



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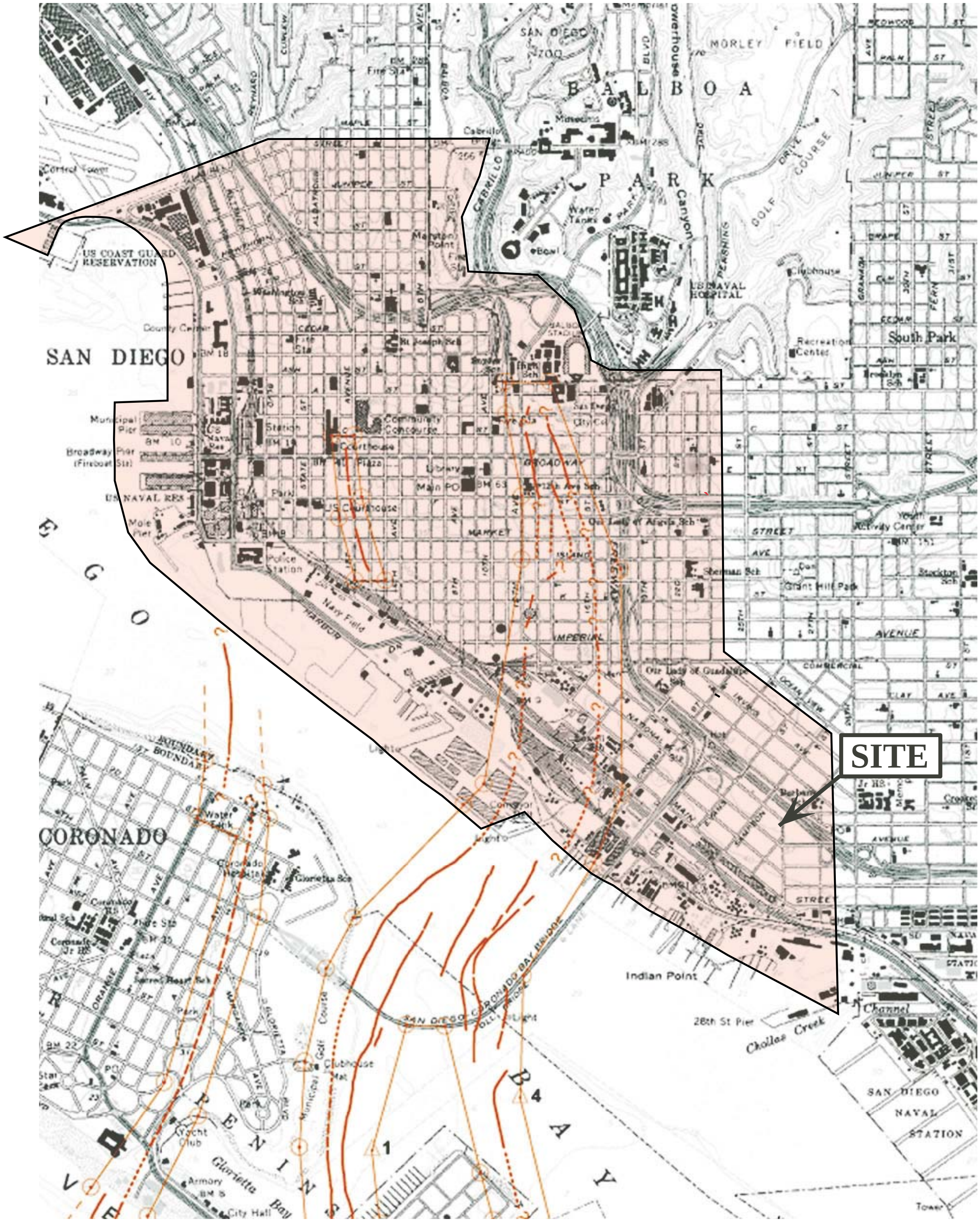
SITE INDEX MAP PROPOSED LOGAN LOFTS LOGAN AVENUE AND 26TH STREET SAN DIEGO, CALIFORNIA	SCALE: AS SHOWN	DATE: 11/16
	CTE JOB NO.: 10-13336G	FIGURE: 1



DOWNTOWN SAN DIEGO SPECIAL STUDIES ZONE

ALQUIST-PRIOLO EARTHQUAKE FAULT ZONE BOUNDARY

REFERENCE: STATE OF CALIFORNIA EARTHQUAKE FAULT ZONES, POINT LOMA QUADRANGLE, MAY, 2003.

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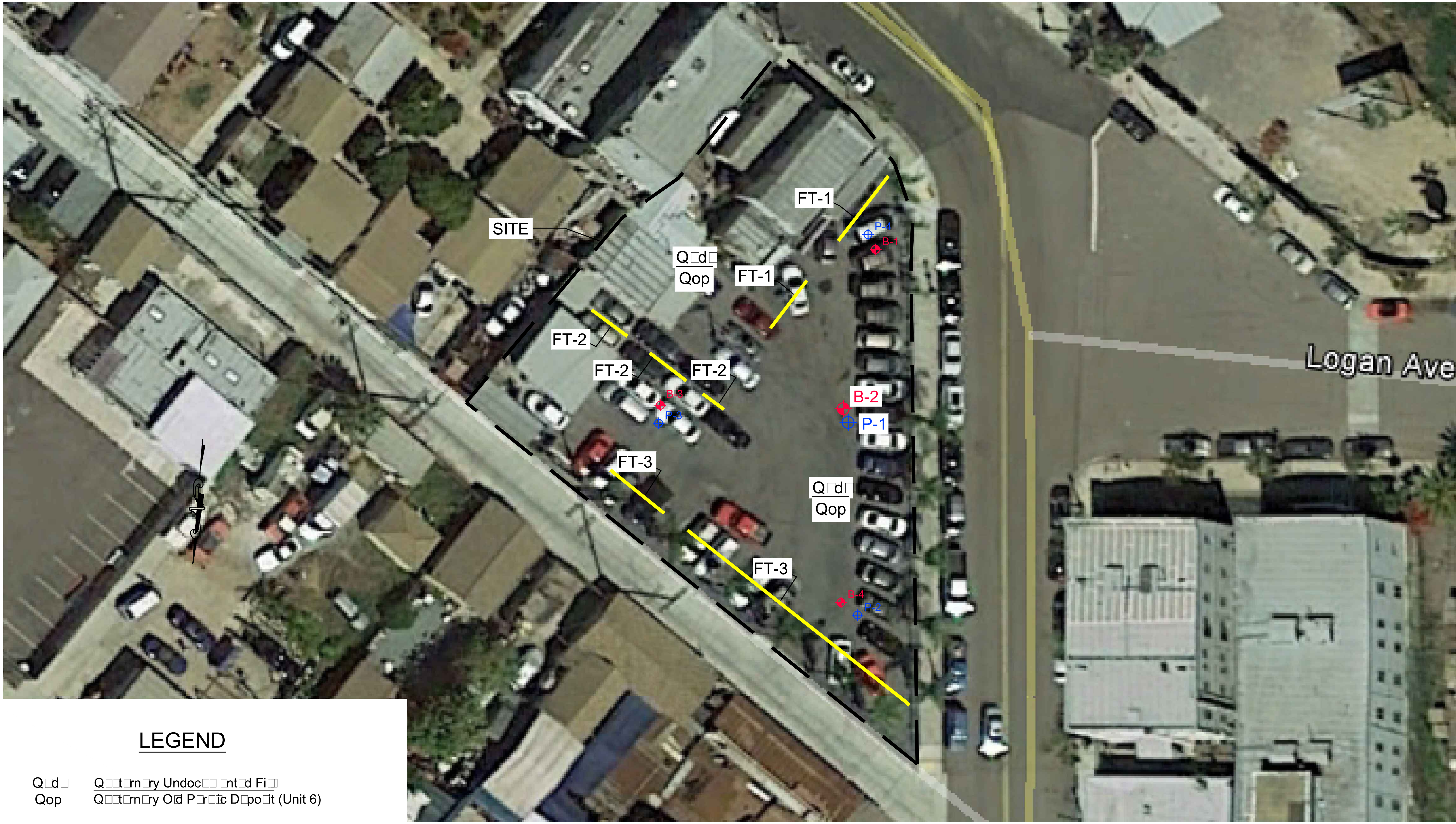
SPECIAL STUDIES ZONE MAP

PROPOSED LOGAN LOFTS
LOGAN AVENUE AND 26TH STREET
SAN DIEGO, CALIFORNIA

CTE JOB NO: 10-13336G	
SCALE: NONE	
DATE: 11/16	FIGURE: 2



LEGEND

Q□d□ Q□□t□rn□ry Undoc□□ □nt□d Fi□
Qop Q□□t□rn□ry O□d P□r□ic D□po□it (Unit 6)

FT-1 Appro□i□ □t□ F□□t Tr□nch Loc□tion

B-1 Appro□i□ □t□ Boring Loc□tion

P-1 Appro□i□ □t□ P□rco□tion T□□t Loc□tion

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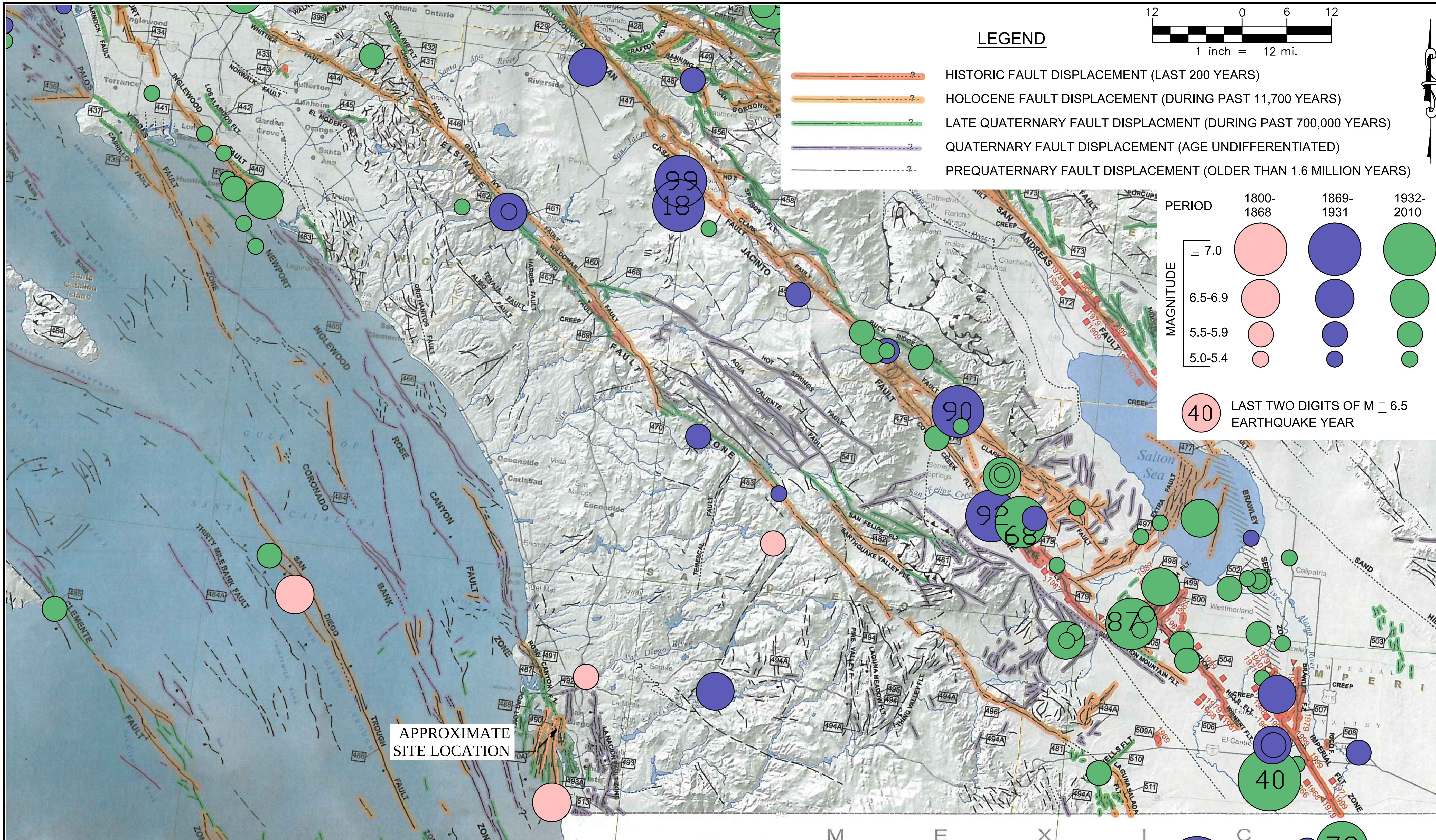
EXPLORATION LOCATION MAP
LOGAN LOFTS
LOGAN AVENUE AND 26TH STREET
SAN DIEGO, CALIFORNIA

CTE JOB NO:	10-13336G
SCALE:	1" = 30'
DATE: 11/16	FIGURE: 3



NOTES: FAULT ACTIVITY MAP OF CALIFORNIA, 2010, CALIFORNIA GEOLOGIC DATA MAP SERIES MAP NO. 6;
EPICENTERS OF AND AREAS DAMAGED BY $M \geq 5$ CALIFORNIA EARTHQUAKES, 1800–1999 ADAPTED AFTER TOPPOZADA, BRANUM, PETERSEN, HALLSTORM, CRAMER, AND REICHLE, 2000, CDMG MAP SHEET 49
REFERENCE FOR ADDITIONAL EXPLANATION; MODIFIED WITH CISN AND USGS SEISMIC MAPS

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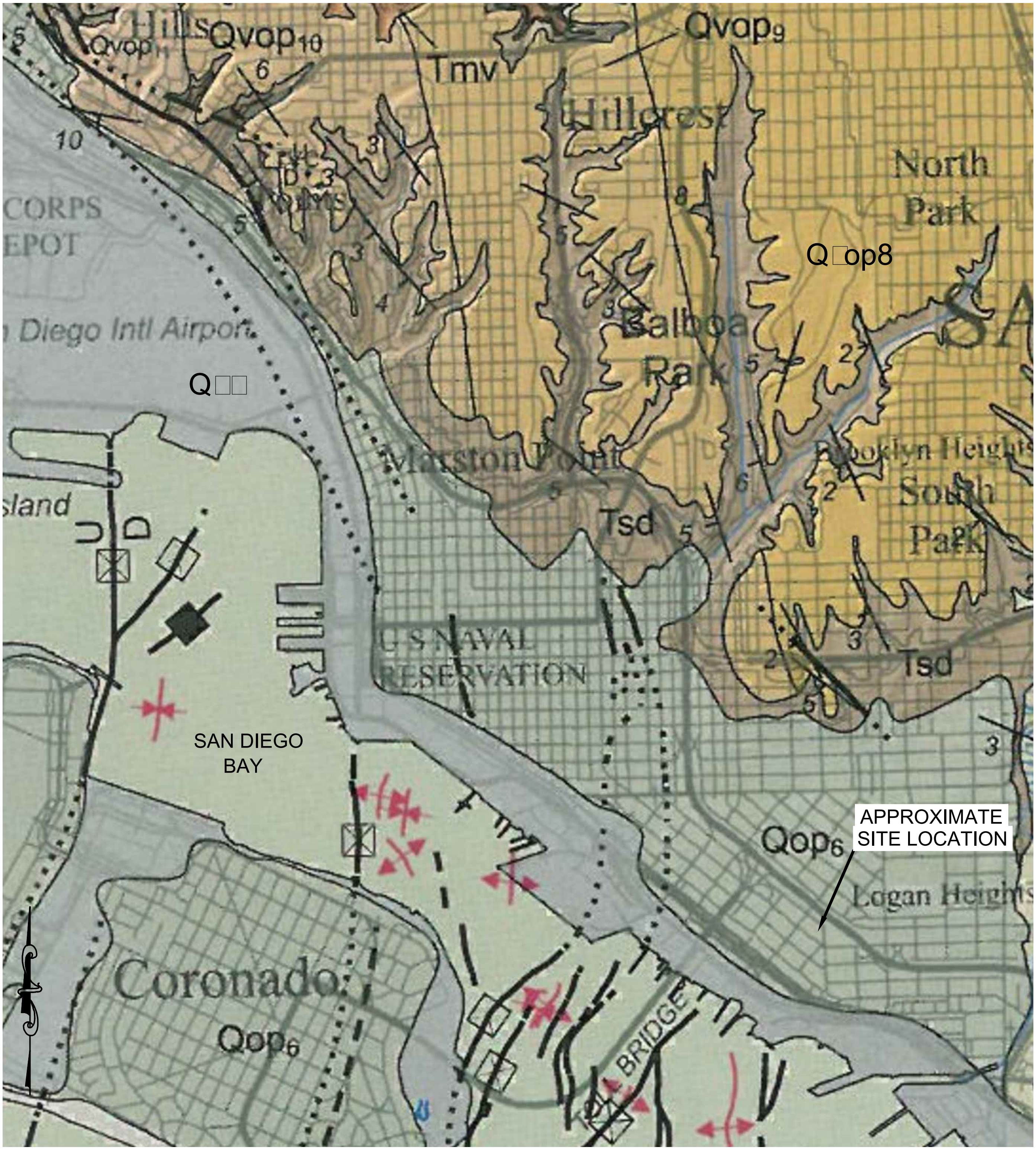
REGIONAL FAULT AND SEISMICITY MAP
PROPOSED LOGAN LOFTS
LOGAN AVENUE AND 26TH STREET
SAN DIEGO, CALIFORNIA

CTE JOB NO:	10-13336G
SCALE:	1 inch = 12 miles
DATE: 11/16	FIGURE: 4



LEGEND

Q□□	ARTIFICIAL FILL
Qop6	OLD PARALIC DEPOSITS
Q□op8	VERY OLD PARALIC DEPOSITS
Q□op10	VERY OLD PARALIC DEPOSITS
Q□op11	VERY OLD PARALIC DEPOSITS
T□d	SAN DIEGO FORMATION
T□□	MISSION VALLEY FORMATION

NOTE□ B□□□ M□p by K□nn□dy □nd T□n, 2008, G□o□ogic M□p o□th□ S□n Di□go 30' □60' Q□□dr□ng□□, C□i□orni□.

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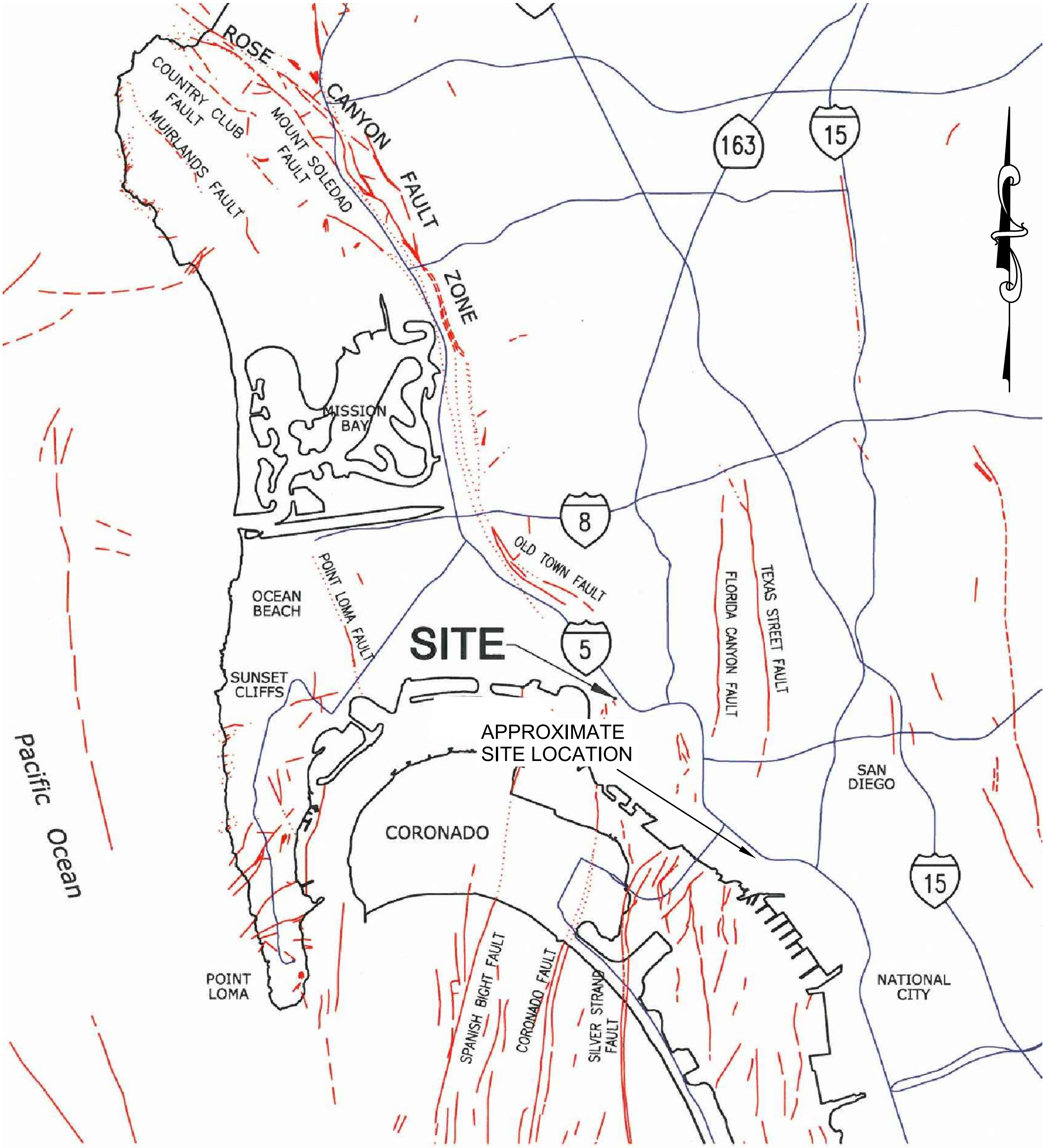
REGIONAL GEOLOGIC MAP
PROPOSED LOGAN LOFTS
LOGAN AVENUE AND 26TH STREET
SAN DIEGO, CALIFORNIA

SCALE:	DATE:
1"~3,000'	11/16
CTE JOB NO.:	FIGURE:
10-13336G	5



NOTE: Base Map from Treiman, J.A., 1993; City of San Diego Seismic Study, 1995; Kennedy, M.P. and Clarke, S.H., 1999.

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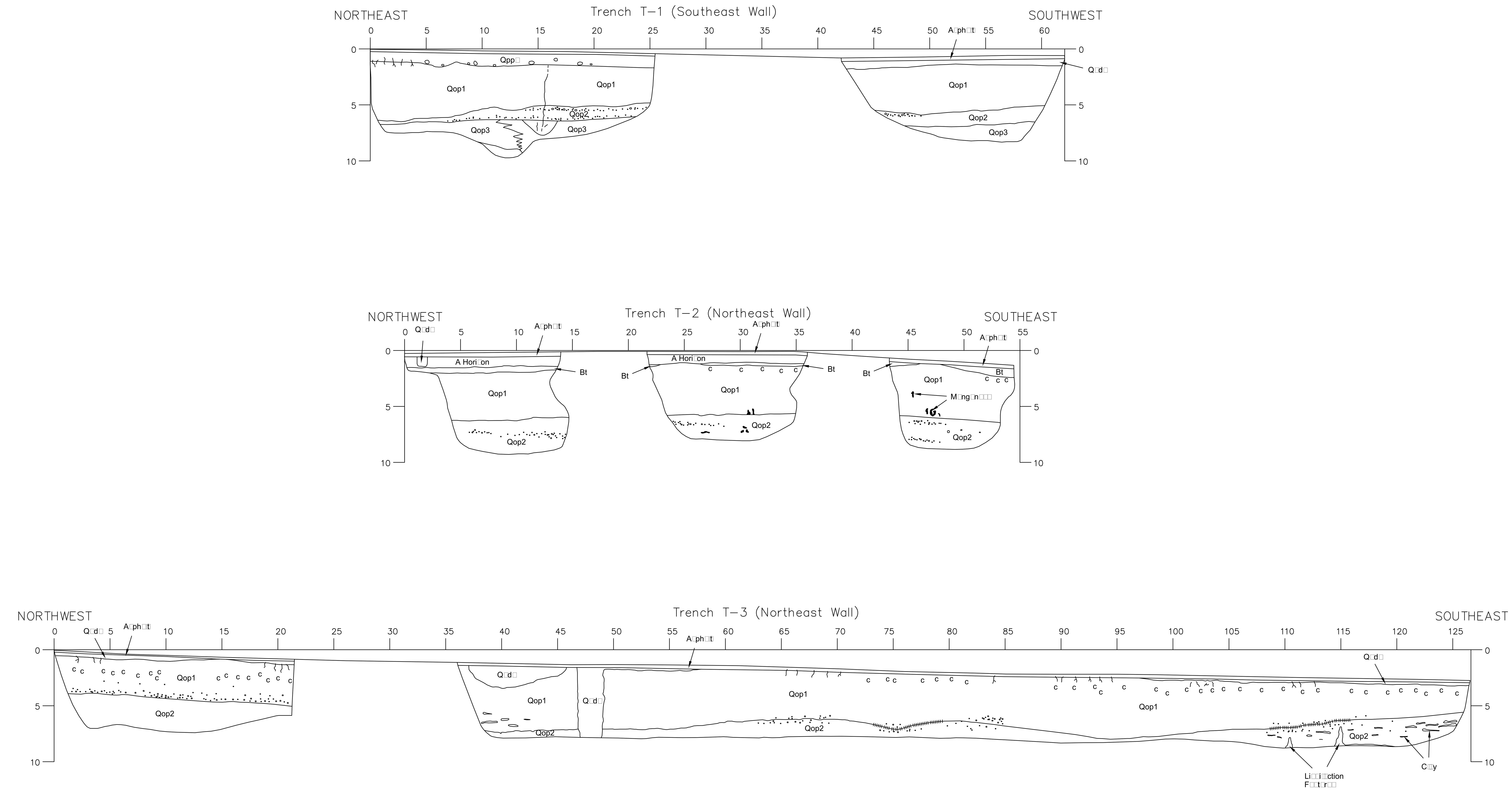
LOCAL FAULT MAP PROPOSED LOGAN LOFTS LOGAN AVENUE AND 26TH STREET SAN DIEGO, CALIFORNIA	SCALE: NO SCALE	DATE: 11/16
	CTE JOB NO.: 10-13336G	FIGURE: 6

\\Esc_server\projects\10-13336G\Figures\Fig 6 (Local Fault Map).dwg



LEGEND

Q□d□ (Q□□t□rn□ry Undoc□□ □nt□d Fi□)□ Loo□□ to □ □di□□ d□n□□, dry to □ightly □oi□t, bro□n to d□r□r□ddi□h bro□n, □ity to c□y□y □in□ to □ □di□□ gr□in□d SAND □ith tr□c□ gr□□□, root□, □□ph□t □nd concr□t□ d□bri□.

A Hori□on Loo□□, □oi□t, d□r□r□ddi□h bro□n, □ity □in□ gr□in□d SAND, o□idi□□d, □ri□b□□, □ □ng□n□□□ nod□□□□, □pp□□r□ po□□□d in i□o□□t□d □oc□tion□.

Bt (Argi□ic Soi□ Hori□on)□ V□ry □ti□, □oi□t, d□r□r□ddi□h bro□n, □in□ gr□in□d □□ndy CLAY, o□idi□□d, high p□□ticity, poi□h□d □□r□c□□.

Qop1 (Q□□t□rn□ry O□d P□r□□ic D□po□it□)□ M□di□□ d□n□□ to d□n□□, □ightly □oi□t, r□ddi□h bro□n, c□y□y □in□ to □ □di□□ gr□in□d SANDSTONE □ith tr□c□ □in□ gr□□□□□nd co□r□□ □□nd, o□idi□□d, □ □□□i□□, b□oc□y, □ □ng□n□□□ nod□□□□.

Qop2 (Q□□t□rn□ry O□d P□r□□ic D□po□it□)□ M□di□□ d□n□□ to d□n□□, □ightly □oi□t, □ight r□ddi□h bro□n, □ity □in□ to □ □di□□ gr□in□d SANDSTONE □ith tr□c□ □in□ gr□□□□□nd co□r□□ □□nd, o□idi□□d, □ □□□i□□, □ri□b□□, □ □ng□n□□□ nod□□□□.

Qop3 (Q□□t□rn□ry O□d P□r□□ic D□po□it□)□ H□rd, □ightly □oi□t, r□ddi□h o□i□□, □in□ gr□in□d □□ndy SILTSTONE, o□idi□□d □ott□ing, □ □ng□n□□□ thro□gho□t.

c C□rbon□t□

Gr□d□d G□o□ogic Cont□ct

Appro□i□ □t□ G□o□ogic Cont□ct

CTE INC. Construction Testing & Engineering, Inc. 1441 Montiel Rd Ste 115, Escondido, CA 92026 Ph (760) 746-4955	FAULT TRENCH LOGS FOR T-1, T-2 and T-3 LOGAN LOFTS DEVELOPMENT LOGAN AVENUE AND 26TH STREET SAN DIEGO, CALIFORNIA	SCALE: 1"=5' CTE Job No.: 10-13336G	DATE: 11/16 PLATE: 1

\\Esc_server\projects\10-13336G\Figures\Plate 1 (Trench Logs).dwg

APPENDIX A

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REFERENCES

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APPENDIX B

EXPLORATION LOGS

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DEFINITION OF TERMS

PRIMARY DIVISIONS			SYMBOLS	SECONDARY DIVISIONS
COARSE GRAINED SOILS MORE THAN HALF OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	**GRAVELS** MORE THAN HALF OF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS < 5% FINES	GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES LITTLE OR NO FINES
			GP	POORLY GRADED GRAVELS OR GRAVEL SAND MIXTURES, LITTLE OF NO FINES
		GRAVELS WITH FINES	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES, NON-PLASTIC FINES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES, PLASTIC FINES
	SANDS MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS < 5% FINES	SW	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SP	POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES	SM	SILTY SANDS, SAND-SILT MIXTURES, NON-PLASTIC FINES
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES, PLASTIC FINES
FINE GRAINED SOILS MORE THAN HALF OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	**SILTS AND CLAYS** LIQUID LIMIT IS LESS THAN 50		ML	INORGANIC SILTS, VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS, SLIGHTLY PLASTIC CLAYEY SILTS
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY, SANDY, SILTS OR LEAN CLAYS
			OL	ORGANIC SILTS AND ORGANIC CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT IS GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTY CLAYS
HIGHLY ORGANIC SOILS			PT	PEAT AND OTHER HIGHLY ORGANIC SOILS

GRAIN SIZES

BOULDERS	COBBLES	GRAVEL		SAND			SILTS AND CLAYS
		COARSE	FINE	COARSE	MEDIUM	FINE	

12" 3" 3/4" 4 10 40 200

CLEAR SQUARE SIEVE OPENING U.S. STANDARD SIEVE SIZE

ADDITIONAL TESTS

(OTHER THAN TEST PIT AND BORING LOG COLUMN HEADINGS)

MAX- Maximum Dry Density
GS- Grain Size Distribution
SE- Sand Equivalent
EI- Expansion Index
CHM- Sulfate and Chloride
Content , pH, Resistivity
COR - Corrosivity
SD- Sample Disturbed

PM- Permeability
SG- Specific Gravity
HA- Hydrometer Analysis
AL- Atterberg Limits
RV- R-Value
CN- Consolidation
CP- Collapse Potential
HC- Hydrocollapse
REM- Remolded

PP- Pocket Penetrometer
WA- Wash Analysis
DS- Direct Shear
UC- Unconfined Compression
MD- Moisture/Density
M- Moisture
SC- Swell Compression
OI- Organic Impurities

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PROJECT: | DRILLER: | SHEET: of
CTE JOB NO: | DRILL METHOD: | DRILLING DATE:
LOGGED BY: | SAMPLE METHOD: | ELEVATION:

BORING LEGEND

Depth (Feet)	Bulk Sample	Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0								Block or Chunk Sample	
								Bulk Sample	
5									
								Standard Penetration Test	
10								Modified Split-Barrel Drive Sampler (Cal Sampler)	
								Thin Walled Army Corp. of Engineers Sample	
15								Groundwater Table	
								Soil Type or Classification Change	
20								? ——— ? ——— ? ——— ? ——— ? ——— ? ——— ? —	
								Formation Change [(Approximate boundaries queried (?)]	
25						"SM"		Quotes are placed around classifications where the soils exist in situ as bedrock	

FIGURE: BL2

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PROJECT:	LOGAN LOFTS	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13336G	DRILL METHOD:	HOLLOW-STEM AUGER	DRILLING DATE:	10/11/2016
LOGGED BY:	DK	SAMPLE METHOD:	RING, SPT	ELEVATION:	~ 68'

BORING: B-1

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						CL/SC		0 to 3": Asphalt. **QUATERNARY UNDOCUMENTED FILL**: Very stiff, dark reddish brown, fine sandy CLAY to medium dense clayey SAND.	
				118.9	11.9			**QUATERNARY OLD PARALIC DEPOSIT (UNIT 6)**:	MAX, EI
			17 30 20			SC		Dense, slightly moist, brown to orangeish brown, clayey fine SAND, trace medium sand.	GS
5			9 13 17					Becomes fine to medium grained.	MD, CN
								Difficult drilling.	
10			50/6"					Becomes very dense, locally cemented.	
15			13 42 28			SM		Very dense, slightly moist, brown to grayish brown, silty fine SAND with trace medium SAND, locally friable.	
			10 18 20					Becomes dense.	
20								Total Depth: 18.5' No groundwater encountered. Backfilled with cuttings.	
25									

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PROJECT:	LOGAN LOFTS	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13336G	DRILL METHOD:	HOLLOW-STEM AUGER	DRILLING DATE:	10/11/2016
LOGGED BY:	DK	SAMPLE METHOD:	RING, SPT	ELEVATION:	~ 67'

BORING: B-2

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SC		0-3": Asphalt. **QUATERNARY UNDOCUMENTED FILL**: Medium dense, slightly moist, brown, clayey fine SAND.	
						SC/CL		**QUATERNARY OLD PARALIC DEPOSIT (UNIT 6)**: Dense, slightly moist, dark brown, clayey fine SAND to sandy CLAY.	
			11 27 40			SC		Dense to very dense, slightly moist, brown to orangeish brown, brown, clayey fine to medium SAND with trace coarse SAND.	DS
5			12 11 13						
10			10 11 12					Becomes medium dense to dense, fine to coarse grained.	AL
15			20 31 43			SM		Very dense, slightly moist, brown to grayish brown, silty fine SAND, trace medium sand, trace clay.	
								Total Depth: 16.5' No groundwater encountered. Backfilled with cuttings.	
20									
25									

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PROJECT:	LOGAN LOFTS	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13336G	DRILL METHOD:	HOLLOW-STEM AUGER	DRILLING DATE:	10/11/2016
LOGGED BY:	DK	SAMPLE METHOD:	RING, SPT, AND BULK.	ELEVATION:	~ 68'

BORING: B-3

Depth (Feet)	Bulk Sample	Driven Sample Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0	X					SC		0 to 2.5": Asphalt. **QUATERNARY UNDOCUMENTED FILL**: Medium dense, slightly moist, brown clayey fine SAND.	
	X					SC		**QAUATERNARY OLD PARALIC DEPOSIT (UNIT 6)**: Medium dense, slightly moist, brown to light brown, clayey fine SAND.	CHM
5		X	11 25 22			SM		Dense, slightly moist, brown with oxidized mottling, silty fine grained SAND, trace clay.	GS
10		X	25 45 50/5"					Becomes very dense, trace coarse SAND, micaceous.	MD
								Total Depth: 11.5' No groundwater encountered. Backfilled with cuttings.	
15									
20									
25									

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PROJECT:	LOGAN LOFTS	DRILLER:	BAJA EXPLORATION	SHEET:	1 of 1
CTE JOB NO:	10-13336G	DRILL METHOD:	HOLLOW-STEM AUGER	DRILLING DATE:	10/11/2016
LOGGED BY:	DK	SAMPLE METHOD:	RING, SPT, AND BULK	ELEVATION:	~ 65'

BORING: B-4

Depth (Feet)	Bulk Sample	Driven Type	Blows/6"	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0	X					SC		0 to 2.5": Asphalt. **QUATERNARY UNDOCUMENTED FILL**: Medium dense, slightly moist, brown to dark brown, clayey fine SAND.	
	X					SC		**QUATERNARY OLD PARALIC DEPOSIT (UNIT 6)**: Medium dense to dense, dry to slightly moist, light brown to orangeish brown, clayey fine SAND.	RV
	X					SM		Very dense, slightly moist, brown to reddish brown, clayey fine to medium SAND, trace coarse SAND.	
5		X	18 27 30						
10		X	7 9 11			SP/SM		Medium dense, slightly moist, brown to orangeish brown, poorly graded fine to coarse SAND with silt.	GS
15								Total Depth: 15' No groundwater encountered. Backfilled with cuttings.	
20									
25									

APPENDIX C

LABORATORY METHODS AND RESULTS

APPENDIX C
LABORATORY METHODS AND RESULTS

Laboratory Testing Program
Laboratory tests were performed on representative soil samples to detect their relative engineering properties. Tests were performed following test methods of the American Society for Testing Materials or other accepted standards. The following presents a brief description of the various test methods used.

Classification
Soils were classified visually according to the Unified Soil Classification System. Visual classifications were supplemented by laboratory testing of selected samples according to ASTM D 2487.

Particle-Size Analysis
Particle-size analyses were performed on selected representative samples according to ASTM D 422.

Expansion Index
Expansion testing was performed on selected samples of the matrix of the on-site soils according to ASTM D 4829.

In-Place Moisture/Density
The in-place moisture content and dry unit weight of selected samples were determined using relatively undisturbed chunk soil samples.

Direct Shear
Direct shear tests were performed on either samples direct from the field or on samples recompacted to a specific density. Direct shear testing was performed in accordance with ASTM D 3080. The samples were inundated during shearing to represent adverse field conditions.

Resistance “R” Value
The resistance “R”-value was measured by the California Test. 301. The graphically determined “R” value at an exudation pressure of 300 pounds per square inch is the value used for pavement section calculation.

Modified Proctor
Laboratory maximum dry density and optimum moisture content were evaluated according to ASTM D 1557, Method A. A mechanically operated rammer was used during the compaction process.

Atterberg Limits

The procedure of ASTM D 4518 was used to measure the liquid limit, plastic limit and plasticity index.

Chemical Analysis

Soil materials were collected and tested for Sulfate and Chloride content, pH, Corrosivity, and Resistivity.

Consolidation

To assess their compressibility and volume change behavior when loaded and wetted, relatively undisturbed samples of representative samples from the investigation were subject to consolidation tests in accordance with ASTM D 2435.

EXPANSION INDEX TEST

ASTM D 4829

LOCATION	DEPTH (feet)	EXPANSION INDEX	EXPANSION POTENTIAL
B-1	0-5	47	LOW

IN-PLACE MOISTURE AND DENSITY

LOCATION	DEPTH (feet)	% MOISTURE	DRY DENSITY
B-1	5	3.9	104.4
B-2	3	5.9	129.1
B-3	10	8.1	121.4

RESISTANCE "R"-VALUE

CALTEST 301

LOCATION	DEPTH (feet)	R-VALUE
B-4	0-5	8

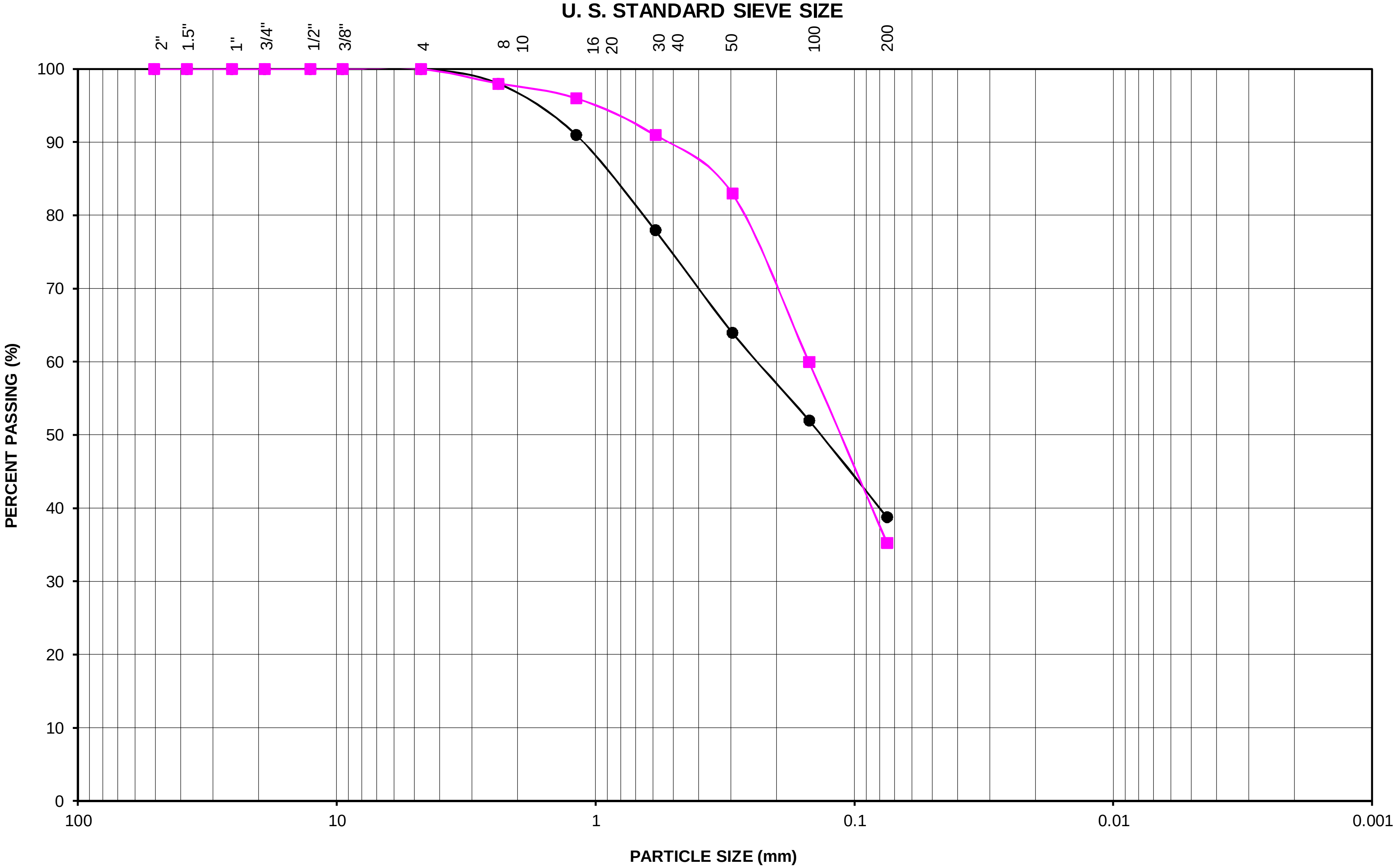
ATTERBERG LIMITS

LOCATION	DEPTH (feet)	LIQUID LIMIT	PLASTICITY INDEX	CLASSIFICATION
B-2	10	28	14	CL

MODIFIED PROCTOR

ASTM D 1557

LOCATION	DEPTH (feet)	MAXIUM DRY DENSITY (PCF)	OPTIMUM MOISTURE (%)
B-1	0-5	118.9	11.9



PARTICLE SIZE ANALYSIS

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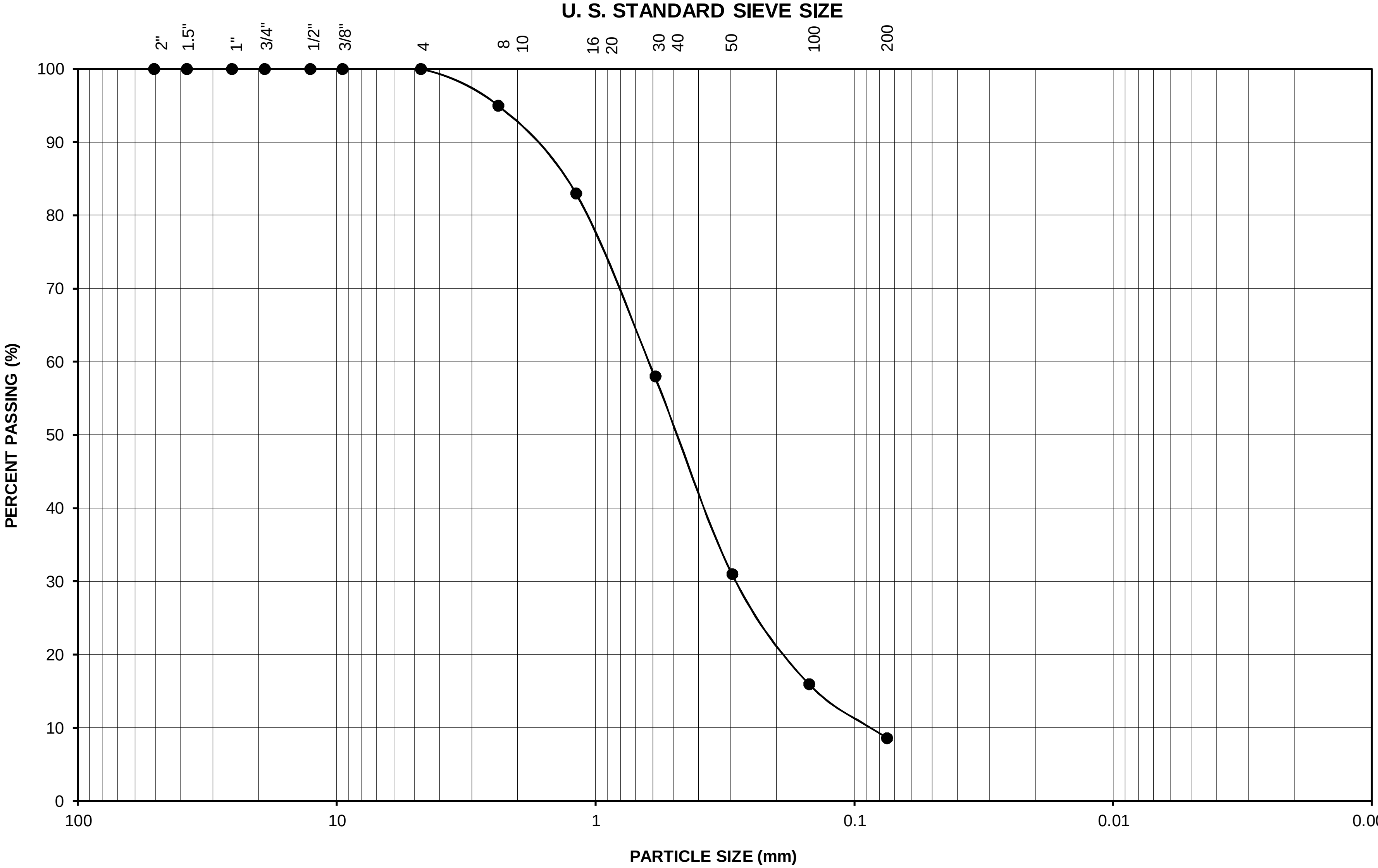
Sample Designation	Sample Depth (feet)	Symbol	Liquid Limit (%)	Plasticity Index	Classification
B-1	3	●	-	-	SC
B-3	5	■	-	-	SC/SM
CTE JOB NUMBER:		10-13336G	FIGURE:		C-1



PARTICLE SIZE ANALYSIS

CTE INC.
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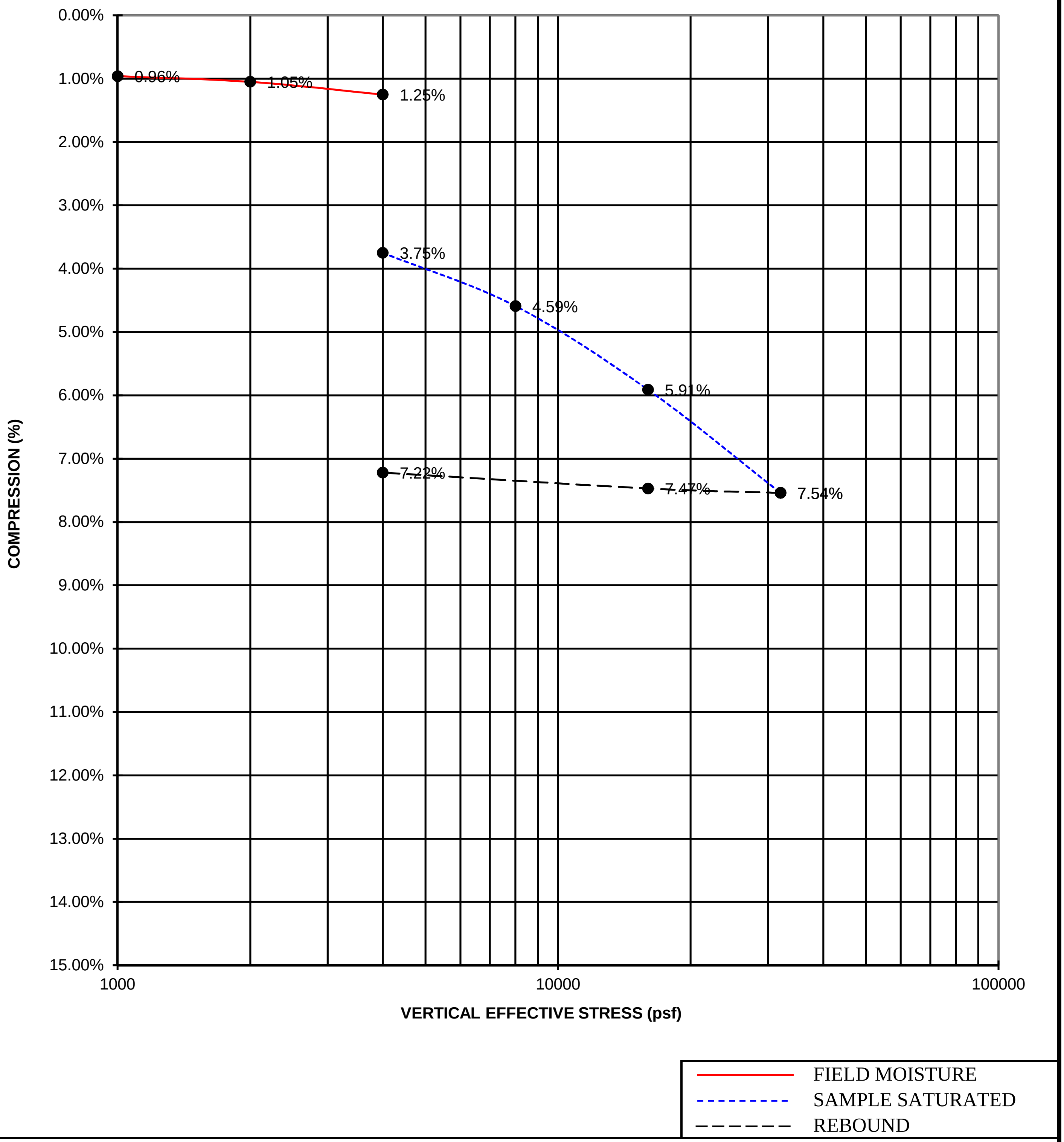
Sample Designation	Sample Depth (feet)	Symbol	Liquid Limit (%)	Plasticity Index	Classification
B-4	10	●	-	-	SP/SM
CTE JOB NUMBER:		10-13336G		FIGURE:	C-2

CTE INC.

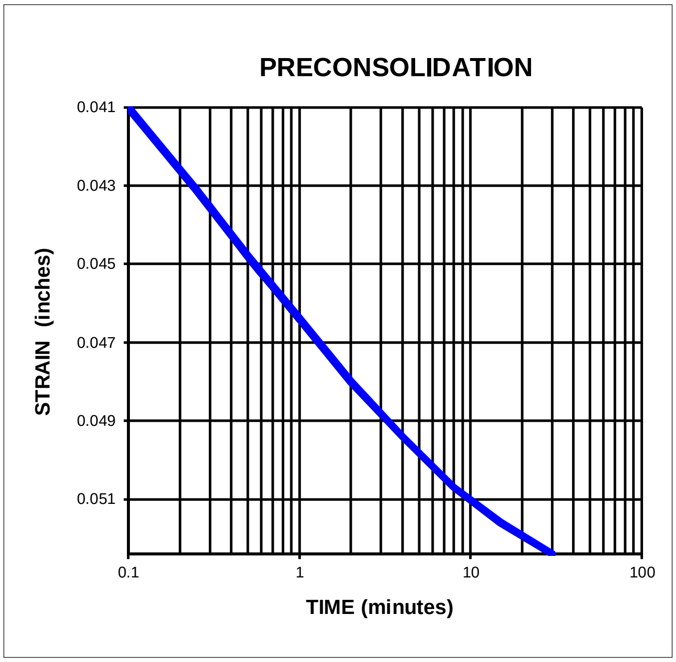
Construction Testing & Engineering, Inc.

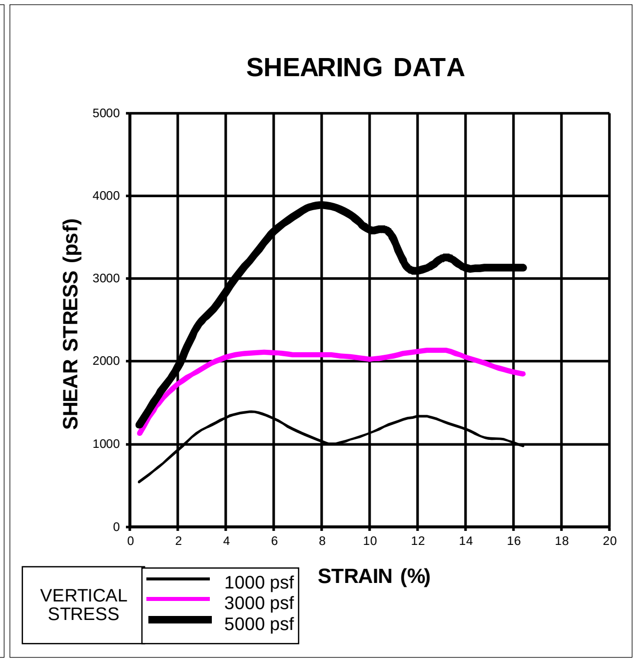
Inspection | Testing | Geotechnical | Environmental & Construction Engineering | Civil Engineering | Surveying

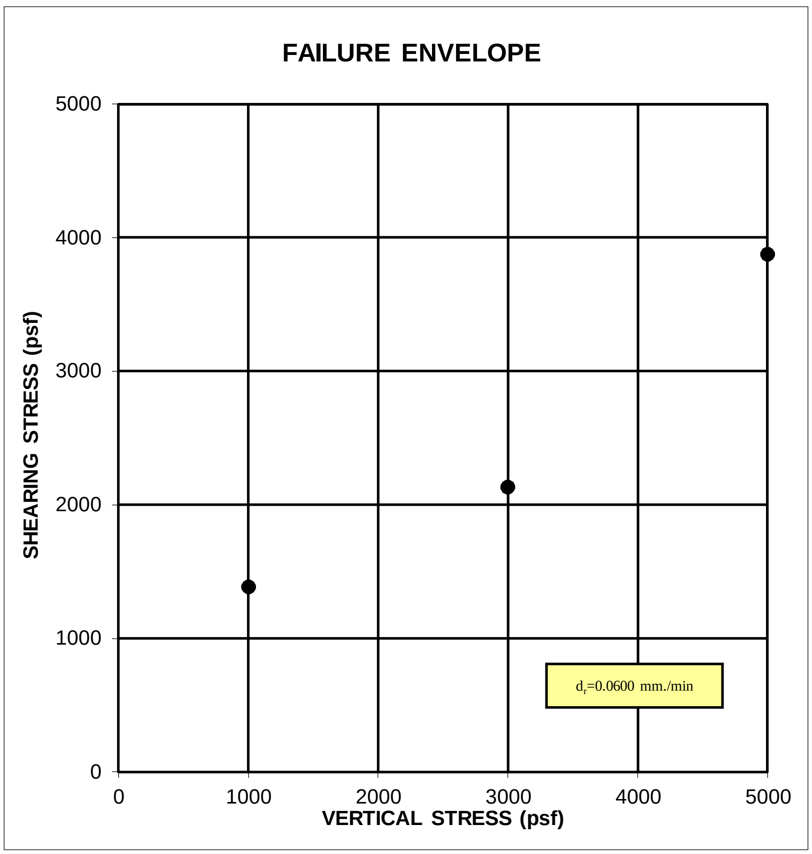


Swell/Consolidation Test ASTM D2435

Project Name:	Logan Lofts				
Project Number:	10-13336	Sample Date:	10/12/2016	Initial Moisture (%):	3.9
Lab Number:	26717	Test Date:	10/21/2016	Final Moisture (%):	16.3
Sample Location:	B-1 @ 5'	Tested By:	JNC	Initial Dry Density (PCF):	104.4
Sample Description:	Moderate Brown (SM)			Final Dry Density (PCF):	112.5







SHEAR STRENGTH TEST - ASTM D3080

Job Name:	Logan Lofts			Initial Dry Density (pcf):	129.1
Project Number:	10-13336G	Sample Date:	10/12/2016	Initial Moisture (%):	5.9
Lab Number:	26717	Test Date:	10/24/2016	Final Moisture (%):	15.4
Sample Location:	B-2 @ 3'	Tested by:	Julian Carmona	Cohesion:	600 psf
Sample Description:	Reddish Brown CL			Angle Of Friction:	31.9
Note:	3rd point contained more sand than other two points				

APPENDIX D

STANDARD SPECIFICATIONS FOR GRADING

Section 1 - General

Construction Testing & Engineering, Inc. presents the following standard recommendations for grading and other associated operations on construction projects. These guidelines should be considered a portion of the project specifications. Recommendations contained in the body of the previously presented soils report shall supersede the recommendations and or requirements as specified herein. The project geotechnical consultant shall interpret disputes arising out of interpretation of the recommendations contained in the soils report or specifications contained herein.

Section 2 - Responsibilities of Project Personnel

The geotechnical consultant should provide observation and testing services sufficient to general conformance with project specifications and standard grading practices. The geotechnical consultant should report any deviations to the client or his authorized representative.

The Client should be chiefly responsible for all aspects of the project. He or his authorized representative has the responsibility of reviewing the findings and recommendations of the geotechnical consultant. He shall authorize or cause to have authorized the Contractor and/or other consultants to perform work and/or provide services. During grading the Client or his authorized representative should remain on-site or should remain reasonably accessible to all concerned parties in order to make decisions necessary to maintain the flow of the project.

The Contractor is responsible for the safety of the project and satisfactory completion of all grading and other associated operations on construction projects, including, but not limited to, earth work in accordance with the project plans, specifications and controlling agency requirements.

Section 3 - Preconstruction Meeting

A preconstruction site meeting should be arranged by the owner and/or client and should include the grading contractor, design engineer, geotechnical consultant, owner's representative and representatives of the appropriate governing authorities.

Section 4 - Site Preparation

The client or contractor should obtain the required approvals from the controlling authorities for the project prior, during and/or after demolition, site preparation and removals, etc. The appropriate approvals should be obtained prior to proceeding with grading operations.

Clearing and grubbing should consist of the removal of vegetation such as brush, grass, woods, stumps, trees, root of trees and otherwise deleterious natural materials from the areas to be graded. Clearing and grubbing should extend to the outside of all proposed excavation and fill areas.

Demolition should include removal of buildings, structures, foundations, reservoirs, utilities (including underground pipelines, septic tanks, leach fields, seepage pits, cisterns, mining shafts, tunnels, etc.) and other man-made surface and subsurface improvements from the areas to be graded. Demolition of utilities should include proper capping and/or rerouting pipelines at the project perimeter and cutoff and capping of wells in accordance with the requirements of the governing authorities and the recommendations of the geotechnical consultant at the time of demolition.

Trees, plants or man-made improvements not planned to be removed or demolished should be protected by the contractor from damage or injury.

Debris generated during clearing, grubbing and/or demolition operations should be wasted from areas to be graded and disposed off-site. Clearing, grubbing and demolition operations should be performed under the observation of the geotechnical consultant.

Section 5 - Site Protection

Protection of the site during the period of grading should be the responsibility of the contractor. Unless other provisions are made in writing and agreed upon among the concerned parties, completion of a portion of the project should not be considered to preclude that portion or adjacent areas from the requirements for site protection until such time as the entire project is complete as identified by the geotechnical consultant, the client and the regulating agencies.

Precautions should be taken during the performance of site clearing, excavations and grading to protect the work site from flooding, ponding or inundation by poor or improper surface drainage. Temporary provisions should be made during the rainy season to adequately direct surface drainage away from and off the work site. Where low areas cannot be avoided, pumps should be kept on hand to continually remove water during periods of rainfall.

Rain related damage should be considered to include, but may not be limited to, erosion, silting, saturation, swelling, structural distress and other adverse conditions as determined by the geotechnical consultant. Soil adversely affected should be classified as unsuitable materials and should be subject to overexcavation and replacement with compacted fill or other remedial grading as recommended by the geotechnical consultant.

The contractor should be responsible for the stability of all temporary excavations. Recommendations by the geotechnical consultant pertaining to temporary excavations (e.g., backcuts) are made in consideration of stability of the completed project and, therefore, should not be considered to preclude the responsibilities of the contractor. Recommendations by the geotechnical consultant should not be considered to preclude requirements that are more restrictive by the regulating agencies. The contractor should provide during periods of extensive rainfall plastic sheeting to prevent unprotected slopes from becoming saturated and unstable. When deemed appropriate by the geotechnical consultant or governing agencies the contractor shall install checkdams, desilting basins, sand bags or other drainage control measures.

In relatively level areas and/or slope areas, where saturated soil and/or erosion gullies exist to depths of greater than 1.0 foot; they should be overexcavated and replaced as compacted fill in accordance with the applicable specifications. Where affected materials exist to depths of 1.0 foot or less below proposed finished grade, remedial grading by moisture conditioning in-place, followed by thorough recompaction in accordance with the applicable grading guidelines herein may be attempted. If the desired results are not achieved, all affected materials should be overexcavated and replaced as compacted fill in accordance with the slope repair recommendations herein. If field conditions dictate, the geotechnical consultant may recommend other slope repair procedures.

Section 6 - Excavations

6.1 Unsuitable Materials

Materials that are unsuitable should be excavated under observation and recommendations of the geotechnical consultant. Unsuitable materials include, but may not be limited to, dry, loose, soft, wet, organic compressible natural soils and fractured, weathered, soft bedrock and nonengineered or otherwise deleterious fill materials.

Material identified by the geotechnical consultant as unsatisfactory due to its moisture conditions should be overexcavated; moisture conditioned as needed, to a uniform at or above optimum moisture condition before placement as compacted fill.

If during the course of grading adverse geotechnical conditions are exposed which were not anticipated in the preliminary soil report as determined by the geotechnical consultant additional exploration, analysis, and treatment of these problems may be recommended.

6.2 Cut Slopes

Unless otherwise recommended by the geotechnical consultant and approved by the regulating agencies, permanent cut slopes should not be steeper than 2:1 (horizontal: vertical).

The geotechnical consultant should observe cut slope excavation and if these excavations expose loose cohesionless, significantly fractured or otherwise unsuitable material, the materials should be overexcavated and replaced with a compacted stabilization fill. If encountered specific cross section details should be obtained from the Geotechnical Consultant.

When extensive cut slopes are excavated or these cut slopes are made in the direction of the prevailing drainage, a non-erodible diversion swale (brow ditch) should be provided at the top of the slope.

6.3 Pad Areas

All lot pad areas, including side yard terrace containing both cut and fill materials, transitions, located less than 3 feet deep should be overexcavated to a depth of 3 feet and replaced with a uniform compacted fill blanket of 3 feet. Actual depth of overexcavation may vary and should be delineated by the geotechnical consultant during grading, especially where deep or drastic transitions are present.

For pad areas created above cut or natural slopes, positive drainage should be established away from the top-of-slope. This may be accomplished utilizing a berm drainage swale and/or an appropriate pad gradient. A gradient in soil areas away from the top-of-slopes of 2 percent or greater is recommended.

Section 7 - Compacted Fill

All fill materials should have fill quality, placement, conditioning and compaction as specified below or as approved by the geotechnical consultant.

7.1 Fill Material Quality

Excavated on-site or import materials which are acceptable to the geotechnical consultant may be utilized as compacted fill, provided trash, vegetation and other deleterious materials are removed prior to placement. All import materials anticipated for use on-site should be sampled tested and approved prior to and placement is in conformance with the requirements outlined.

Rocks 12 inches in maximum and smaller may be utilized within compacted fill provided sufficient fill material is placed and thoroughly compacted over and around all rock to effectively fill rock voids. The amount of rock should not exceed 40 percent by dry weight passing the 3/4-inch sieve. The geotechnical consultant may vary those requirements as field conditions dictate.

Where rocks greater than 12 inches but less than four feet of maximum dimension are generated during grading, or otherwise desired to be placed within an engineered fill, special handling in accordance with the recommendations below. Rocks greater than four feet should be broken down or disposed off-site.

7.2 Placement of Fill

Prior to placement of fill material, the geotechnical consultant should observe and approve the area to receive fill. After observation and approval, the exposed ground surface should be scarified to a depth of 6 to 8 inches. The scarified material should be conditioned (i.e. moisture added or air dried by continued discing) to achieve a moisture content at or slightly above optimum moisture conditions and compacted to a minimum of 90 percent of the maximum density or as otherwise recommended in the soils report or by appropriate government agencies.

Compacted fill should then be placed in thin horizontal lifts not exceeding eight inches in loose thickness prior to compaction. Each lift should be moisture conditioned as needed, thoroughly blended to achieve a consistent moisture content at or slightly above optimum and thoroughly compacted by mechanical methods to a minimum of 90 percent of laboratory maximum dry density. Each lift should be treated in a like manner until the desired finished grades are achieved.

The contractor should have suitable and sufficient mechanical compaction equipment and watering apparatus on the job site to handle the amount of fill being placed in consideration of moisture retention properties of the materials and weather conditions.

When placing fill in horizontal lifts adjacent to areas sloping steeper than 5:1 (horizontal: vertical), horizontal keys and vertical benches should be excavated into the adjacent slope area. Keying and benching should be sufficient to provide at least six-foot wide benches and a minimum of four feet of vertical bench height within the firm natural ground, firm bedrock or engineered compacted fill. No compacted fill should be placed in an area after keying and benching until the geotechnical consultant has reviewed the area. Material generated by the benching operation should be moved sufficiently away from the bench area to allow for the recommended review of the horizontal bench prior to placement of fill.

Within a single fill area where grading procedures dictate two or more separate fills, temporary slopes (false slopes) may be created. When placing fill adjacent to a false slope, benching should be conducted in the same manner as above described. At least a 3-foot vertical bench should be established within the firm core of adjacent approved compacted fill prior to placement of additional fill. Benching should proceed in at least 3-foot vertical increments until the desired finished grades are achieved.

Prior to placement of additional compacted fill following an overnight or other grading delay, the exposed surface or previously compacted fill should be processed by scarification, moisture conditioning as needed to at or slightly above optimum moisture content, thoroughly blended and recompacted to a minimum of 90 percent of laboratory maximum dry density. Where unsuitable materials exist to depths of greater than one foot, the unsuitable materials should be over-excavated.

Following a period of flooding, rainfall or overwatering by other means, no additional fill should be placed until damage assessments have been made and remedial grading performed as described herein.

Rocks 12 inch in maximum dimension and smaller may be utilized in the compacted fill provided the fill is placed and thoroughly compacted over and around all rock. No oversize material should be used within 3 feet of finished pad grade and within 1 foot of other compacted fill areas. Rocks 12 inches up to four feet maximum dimension should be placed below the upper 10 feet of any fill and should not be closer than 15 feet to any slope face. These recommendations could vary as locations of improvements dictate. Where practical, oversized material should not be placed below areas where structures or deep utilities are proposed. Oversized material should be placed in windrows on a clean, overexcavated or unyielding compacted fill or firm natural ground surface. Select native or imported granular soil (S.E. 30 or higher) should be placed and thoroughly flooded over and around all windrowed rock, such that voids are filled. Windrows of oversized material should be staggered so those successive strata of oversized material are not in the same vertical plane.

It may be possible to dispose of individual larger rock as field conditions dictate and as recommended by the geotechnical consultant at the time of placement.

The contractor should assist the geotechnical consultant and/or his representative by digging test pits for removal determinations and/or for testing compacted fill. The contractor should provide this work at no additional cost to the owner or contractor's client.

Fill should be tested by the geotechnical consultant for compliance with the recommended relative compaction and moisture conditions. Field density testing should conform to ASTM Method of Test D 1556-00, D 2922-04. Tests should be conducted at a minimum of approximately two vertical feet or approximately 1,000 to 2,000 cubic yards of fill placed. Actual test intervals may vary as field conditions dictate. Fill found not to be in conformance with the grading recommendations should be removed or otherwise handled as recommended by the geotechnical consultant.

7.3 Fill Slopes

Unless otherwise recommended by the geotechnical consultant and approved by the regulating agencies, permanent fill slopes should not be steeper than 2:1 (horizontal: vertical).

Except as specifically recommended in these grading guidelines compacted fill slopes should be over-built two to five feet and cut back to grade, exposing the firm, compacted fill inner core. The actual amount of overbuilding may vary as field conditions dictate. If the desired results are not achieved, the existing slopes should be overexcavated and reconstructed under the guidelines of the geotechnical consultant. The degree of overbuilding shall be increased until the desired compacted slope surface condition is achieved. Care should be taken by the contractor to provide thorough mechanical compaction to the outer edge of the overbuilt slope surface.

At the discretion of the geotechnical consultant, slope face compaction may be attempted by conventional construction procedures including backrolling. The procedure must create a firmly compacted material throughout the entire depth of the slope face to the surface of the previously compacted firm fill intercore.

During grading operations, care should be taken to extend compactive effort to the outer edge of the slope. Each lift should extend horizontally to the desired finished slope surface or more as needed to ultimately established desired grades. Grade during construction should not be allowed to roll off at the edge of the slope. It may be helpful to elevate slightly the outer edge of the slope. Slough resulting from the placement of individual lifts should not be allowed to drift down over previous lifts. At intervals not exceeding four feet in vertical slope height or the capability of available equipment, whichever is less, fill slopes should be thoroughly dozer trackrolled.

For pad areas above fill slopes, positive drainage should be established away from the top-of-slope. This may be accomplished using a berm and pad gradient of at least two percent.

Section 8 - Trench Backfill

Utility and/or other excavation of trench backfill should, unless otherwise recommended, be compacted by mechanical means. Unless otherwise recommended, the degree of compaction should be a minimum of 90 percent of the laboratory maximum density.

Within slab areas, but outside the influence of foundations, trenches up to one foot wide and two feet deep may be backfilled with sand and consolidated by jetting, flooding or by mechanical means. If on-site materials are utilized, they should be wheel-rolled, tamped or otherwise compacted to a firm condition. For minor interior trenches, density testing may be deleted or spot testing may be elected if deemed necessary, based on review of backfill operations during construction.

If utility contractors indicate that it is undesirable to use compaction equipment in close proximity to a buried conduit, the contractor may elect the utilization of light weight mechanical compaction equipment and/or shading of the conduit with clean, granular material, which should be thoroughly jetted in-place above the conduit, prior to initiating mechanical compaction procedures. Other methods of utility trench compaction may also be appropriate, upon review of the geotechnical consultant at the time of construction.

In cases where clean granular materials are proposed for use in lieu of native materials or where flooding or jetting is proposed, the procedures should be considered subject to review by the geotechnical consultant. Clean granular backfill and/or bedding are not recommended in slope areas.

Section 9 - Drainage

Where deemed appropriate by the geotechnical consultant, canyon subdrain systems should be installed in accordance with CTE's recommendations during grading.

Typical subdrains for compacted fill buttresses, slope stabilization or sidehill masses, should be installed in accordance with the specifications.

Roof, pad and slope drainage should be directed away from slopes and areas of structures to suitable disposal areas via non-erodible devices (i.e., gutters, downspouts, and concrete swales).

For drainage in extensively landscaped areas near structures, (i.e., within four feet) a minimum of 5 percent gradient away from the structure should be maintained. Pad drainage of at least 2 percent should be maintained over the remainder of the site.

Drainage patterns established at the time of fine grading should be maintained throughout the life of the project. Property owners should be made aware that altering drainage patterns could be detrimental to slope stability and foundation performance.

Section 10 - Slope Maintenance

10.1 - Landscape Plants

To enhance surficial slope stability, slope planting should be accomplished at the completion of grading. Slope planting should consist of deep-rooting vegetation requiring little watering. Plants native to the southern California area and plants relative to native plants are generally desirable. Plants native to other semi-arid and arid areas may also be appropriate. A Landscape Architect should be the best party to consult regarding actual types of plants and planting configuration.

10.2 - Irrigation

Irrigation pipes should be anchored to slope faces, not placed in trenches excavated into slope faces.

Slope irrigation should be minimized. If automatic timing devices are utilized on irrigation systems, provisions should be made for interrupting normal irrigation during periods of rainfall.

10.3 - Repair

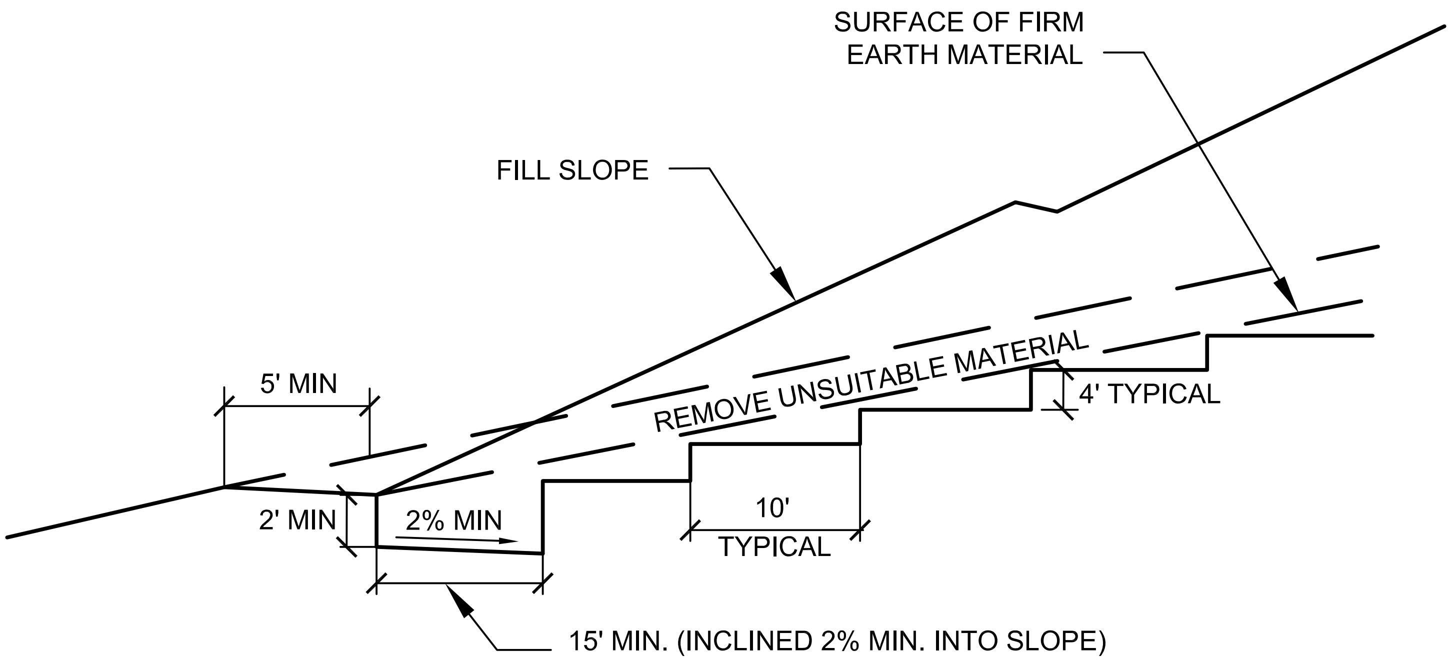
As a precautionary measure, plastic sheeting should be readily available, or kept on hand, to protect all slope areas from saturation by periods of heavy or prolonged rainfall. This measure is strongly recommended, beginning with the period prior to landscape planting.

If slope failures occur, the geotechnical consultant should be contacted for a field review of site conditions and development of recommendations for evaluation and repair.

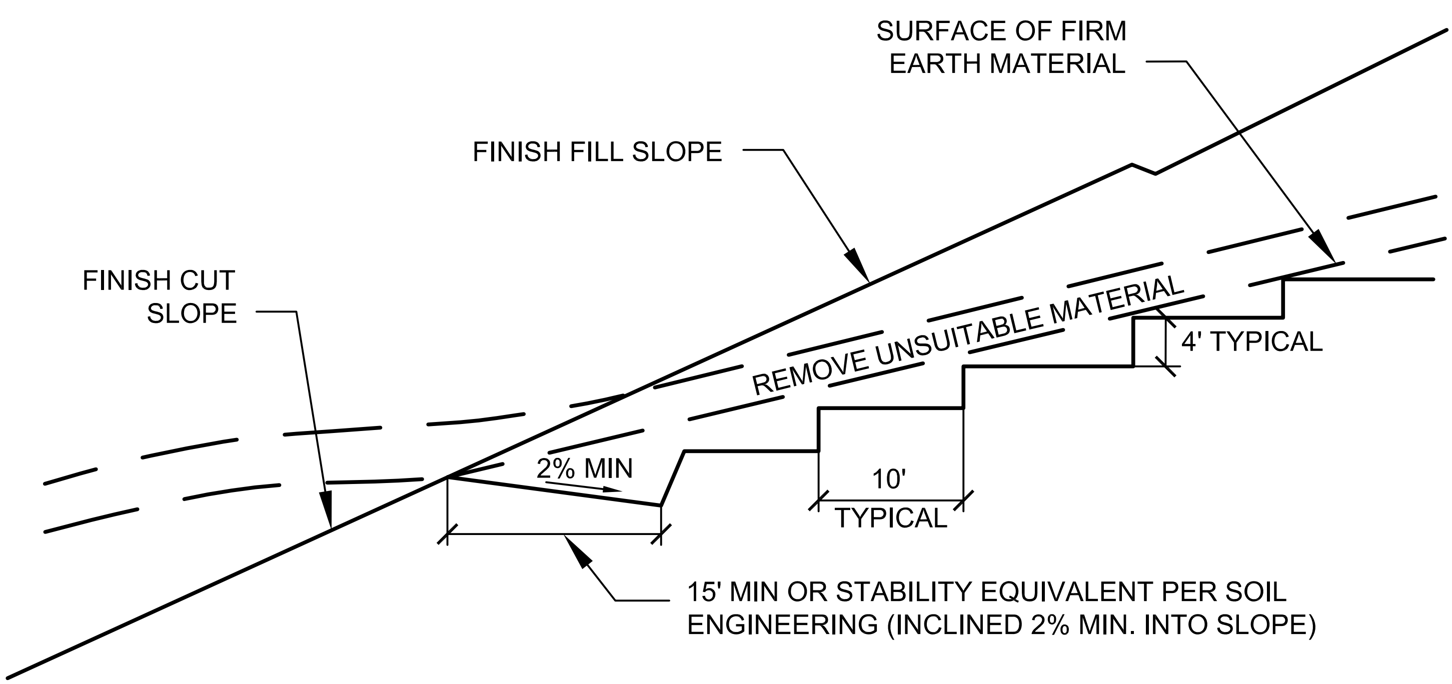
If slope failures occur as a result of exposure to period of heavy rainfall, the failure areas and currently unaffected areas should be covered with plastic sheeting to protect against additional saturation.

In the accompanying Standard Details, appropriate repair procedures are illustrated for superficial slope failures (i.e., occurring typically within the outer one foot to three feet of a slope face).

BENCHING FILL OVER NATURAL

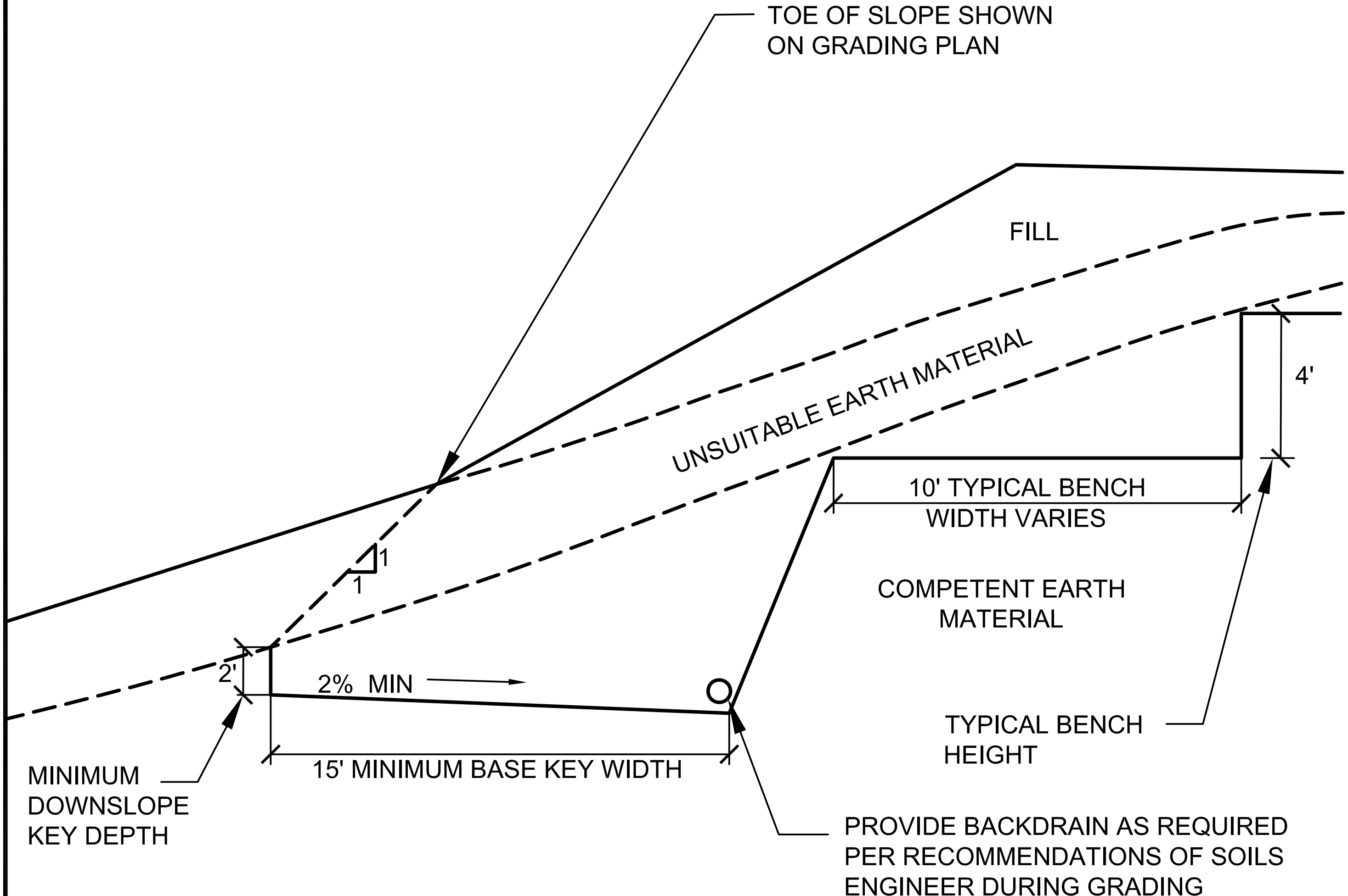


BENCHING FILL OVER CUT



NOT TO SCALE

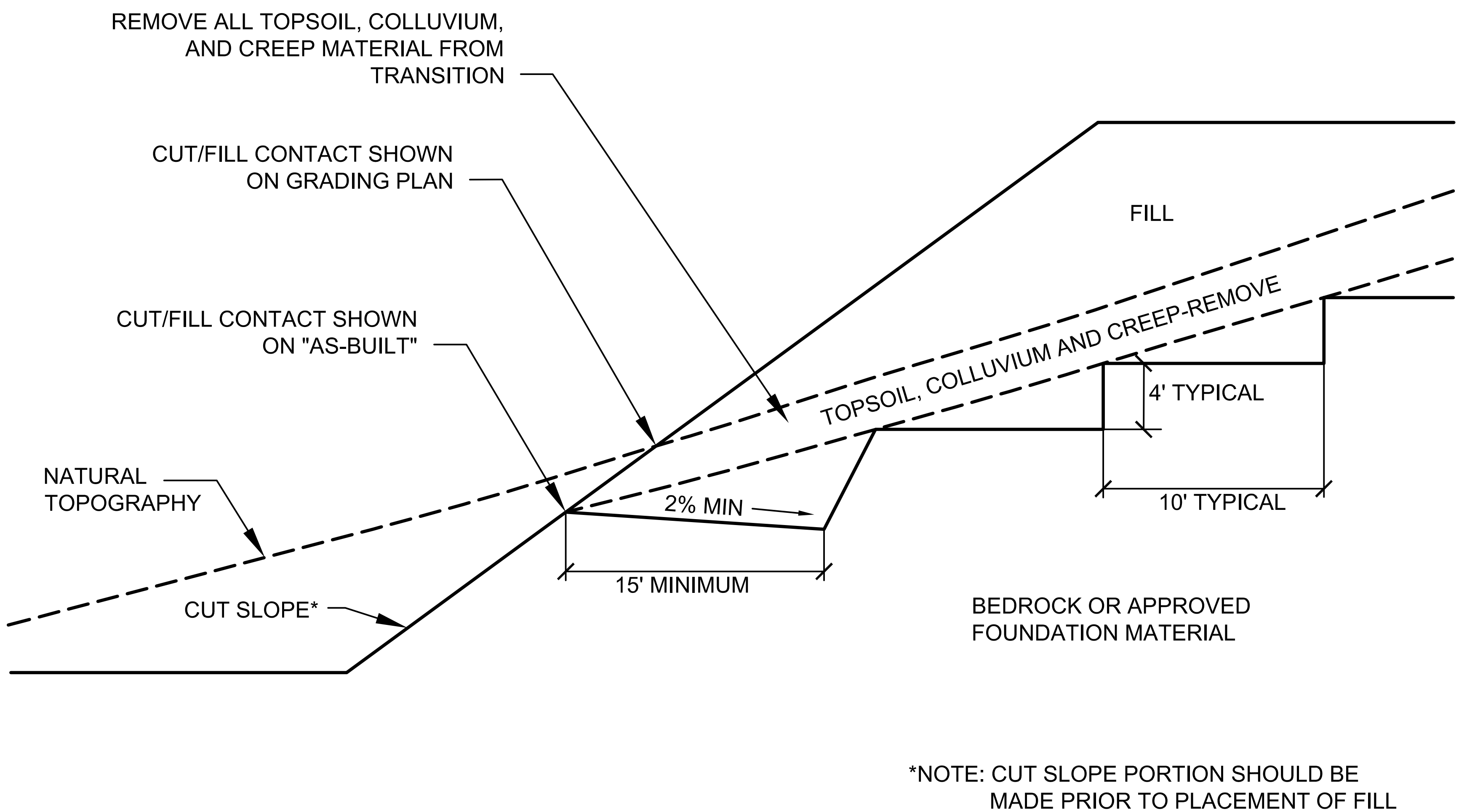
BENCHING FOR COMPACTED FILL DETAIL



WHERE NATURAL SLOPE GRADIENT IS 5:1 OR LESS, BENCHING IS NOT NECESSARY. FILL IS NOT TO BE PLACED ON COMPRESSIBLE OR UNSUITABLE MATERIAL.

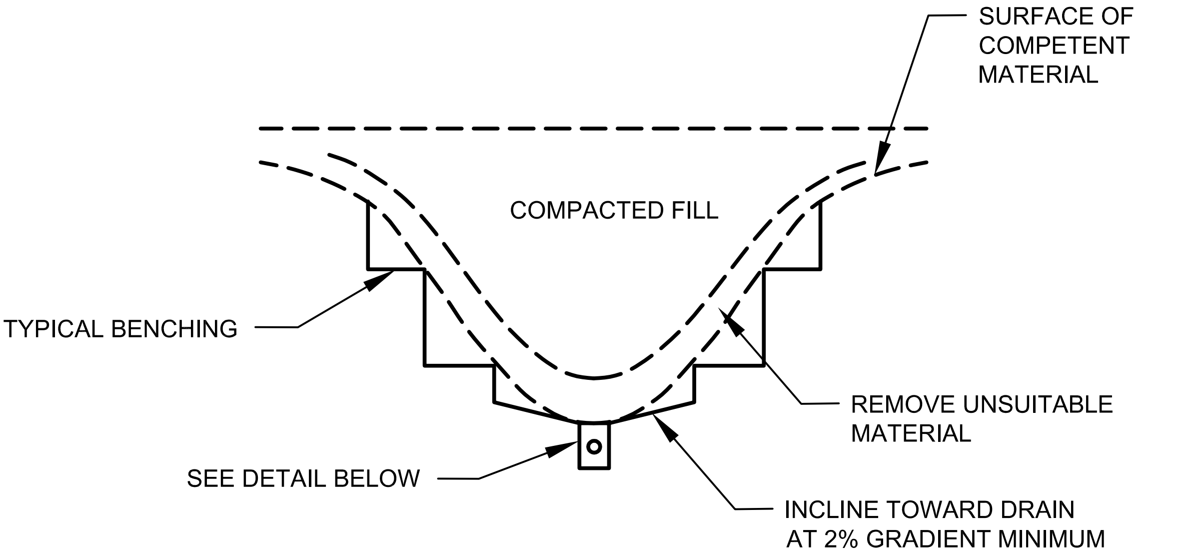
NOT TO SCALE

FILL SLOPE ABOVE NATURAL GROUND DETAIL

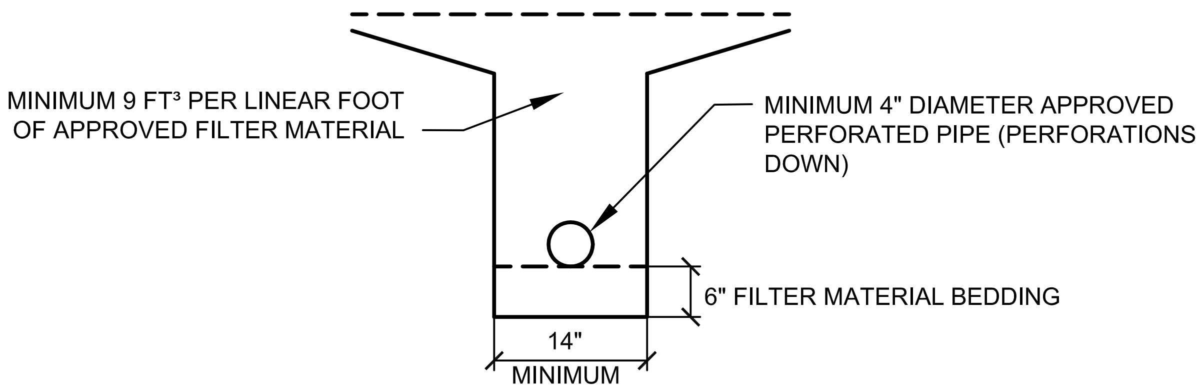


NOT TO SCALE

FILL SLOPE ABOVE CUT SLOPE DETAIL



DETAIL



CALTRANS CLASS 2 PERMEABLE MATERIAL FILTER MATERIAL TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUAL:

SIEVE SIZE	PERCENTAGE PASSING
1"	100
¾"	90-100
⅜"	40-100
NO. 4	25-40
NO. 8	18-33
NO. 30	5-15
NO. 50	0-7
NO. 200	0-3

APPROVED PIPE TO BE SCHEDULE 40 POLY-VINYL-CHLORIDE (P.V.C.) OR APPROVED EQUAL. MINIMUM CRUSH STRENGTH 1000 psi

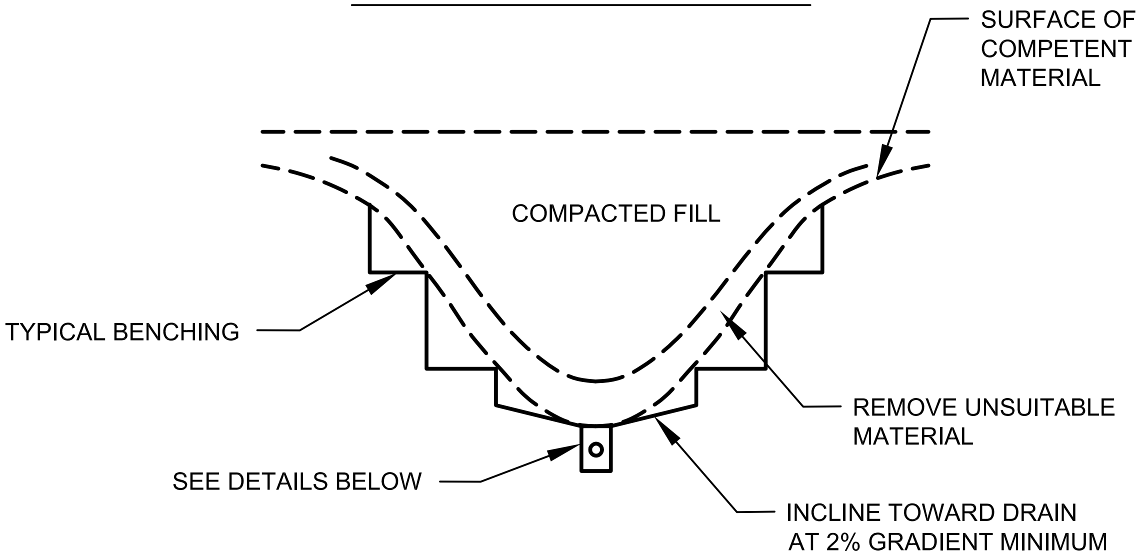
PIPE DIAMETER TO MEET THE FOLLOWING CRITERIA, SUBJECT TO FIELD REVIEW BASED ON ACTUAL GEOTECHNICAL CONDITIONS ENCOUNTERED DURING GRADING

LENGTH OF RUN	PIPE DIAMETER
INITIAL 500'	4"
500' TO 1500'	6"
> 1500'	8"

NOT TO SCALE

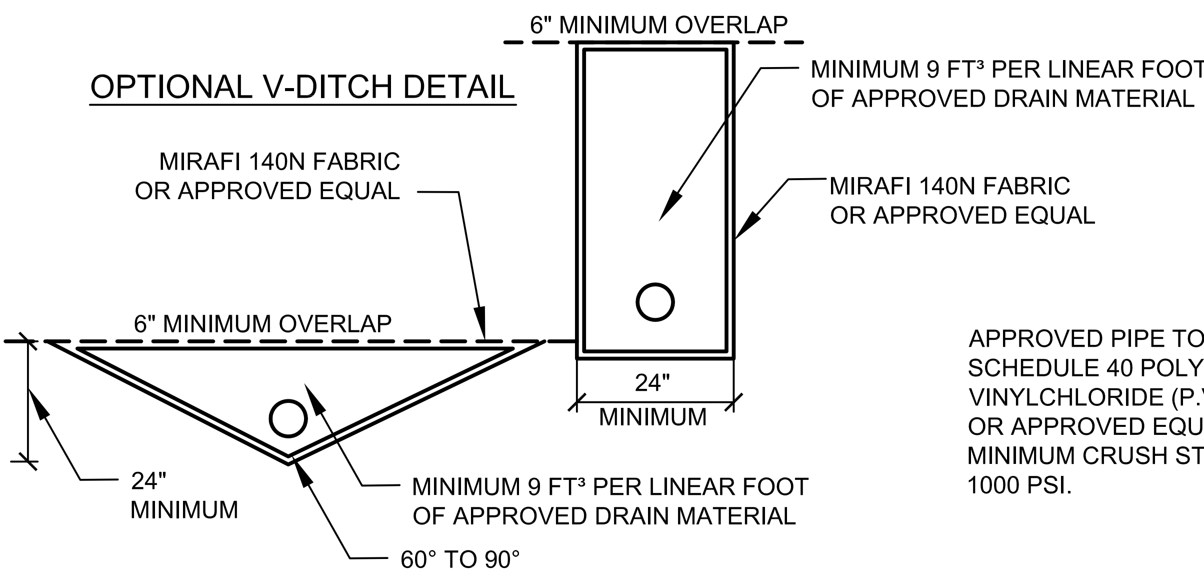
TYPICAL CANYON SUBDRAIN DETAIL

CANYON SUBDRAIN DETAILS



TRENCH DETAILS

OPTIONAL V-DITCH DETAIL



APPROVED PIPE TO BE SCHEDULE 40 POLY-VINYLCHLORIDE (P.V.C.) OR APPROVED EQUAL. MINIMUM CRUSH STRENGTH 1000 PSI.

DRAIN MATERIAL TO MEET FOLLOWING SPECIFICATION OR APPROVED EQUAL:

SIEVE SIZE	PERCENTAGE PASSING
1 ½"	88-100
1"	5-40
¾"	0-17
⅜"	0-7
NO. 200	0-3

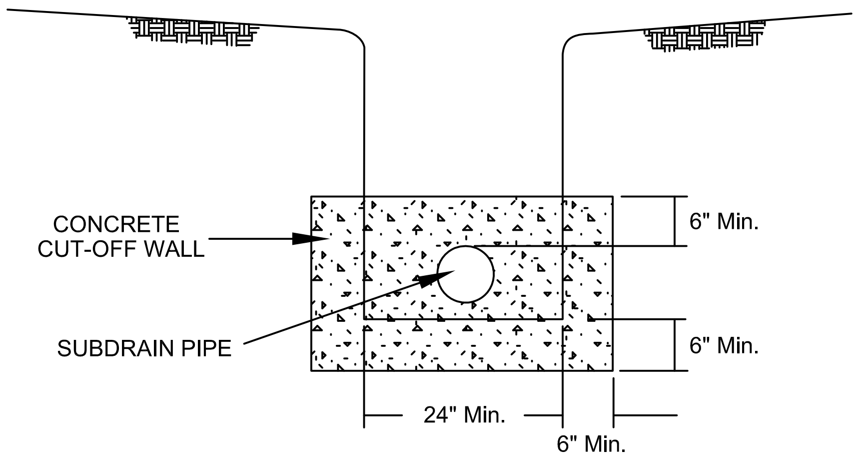
PIPE DIAMETER TO MEET THE FOLLOWING CRITERIA, SUBJECT TO FIELD REVIEW BASED ON ACTUAL GEOTECHNICAL CONDITIONS ENCOUNTERED DURING GRADING

LENGTH OF RUN	PIPE DIAMETER
INITIAL 500'	4"
500' TO 1500'	6"
> 1500'	8"

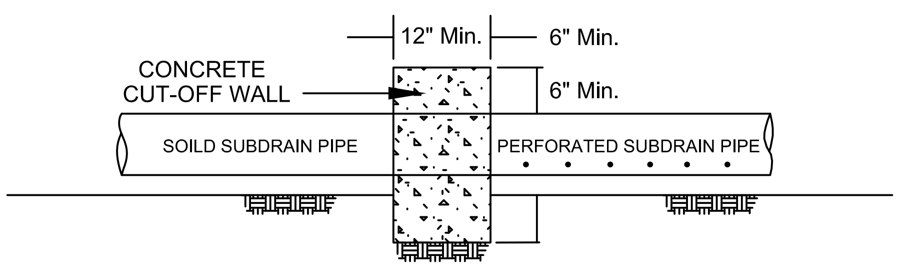
NOT TO SCALE

GEOFABRIC SUBDRAIN

FRONT VIEW



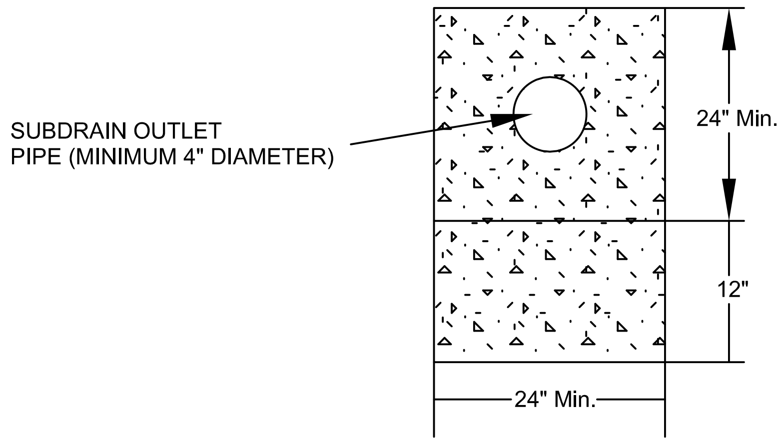
SIDE VIEW



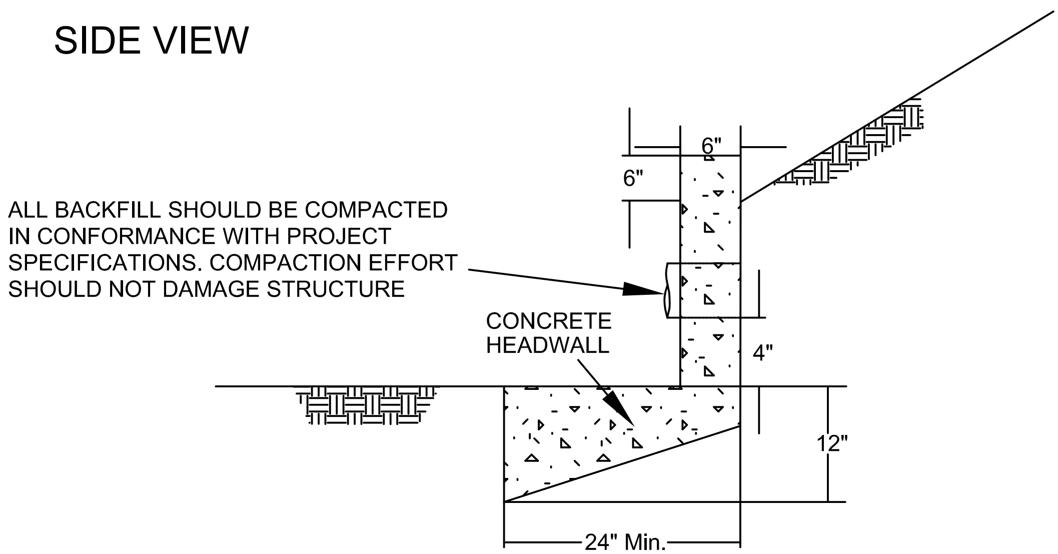
NOT TO SCALE

RECOMMENDED SUBDRAIN CUT-OFF WALL

FRONT VIEW



SIDE VIEW



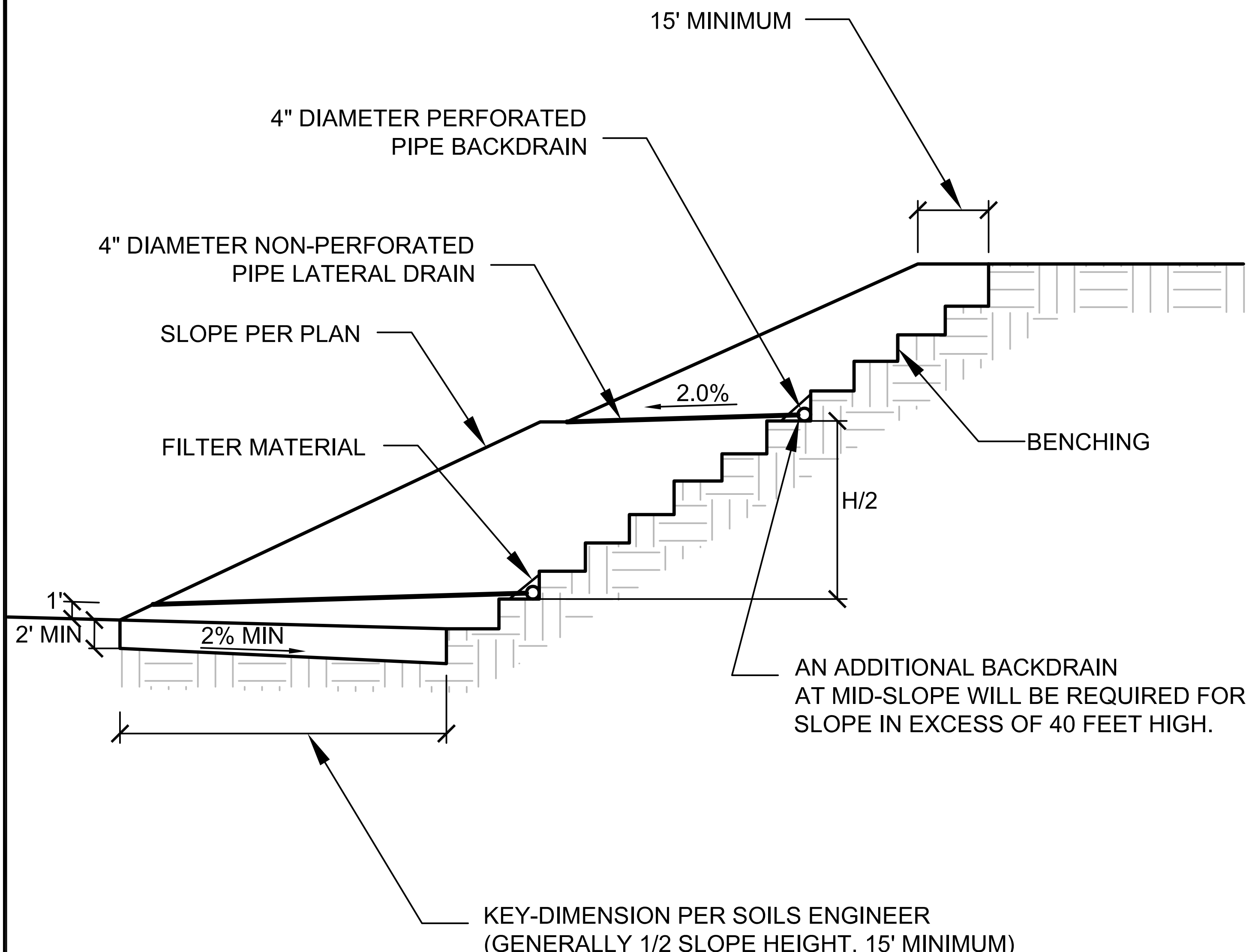
NOTE: HEADWALL SHOULD OUTLET AT TOE OF SLOPE OR INTO CONTROLLED SURFACE DRAINAGE DEVICE

ALL DISCHARGE SHOULD BE CONTROLLED

THIS DETAIL IS A MINIMUM DESIGN AND MAY BE MODIFIED DEPENDING UPON ENCOUNTERED CONDITIONS AND LOCAL REQUIREMENTS

NOT TO SCALE

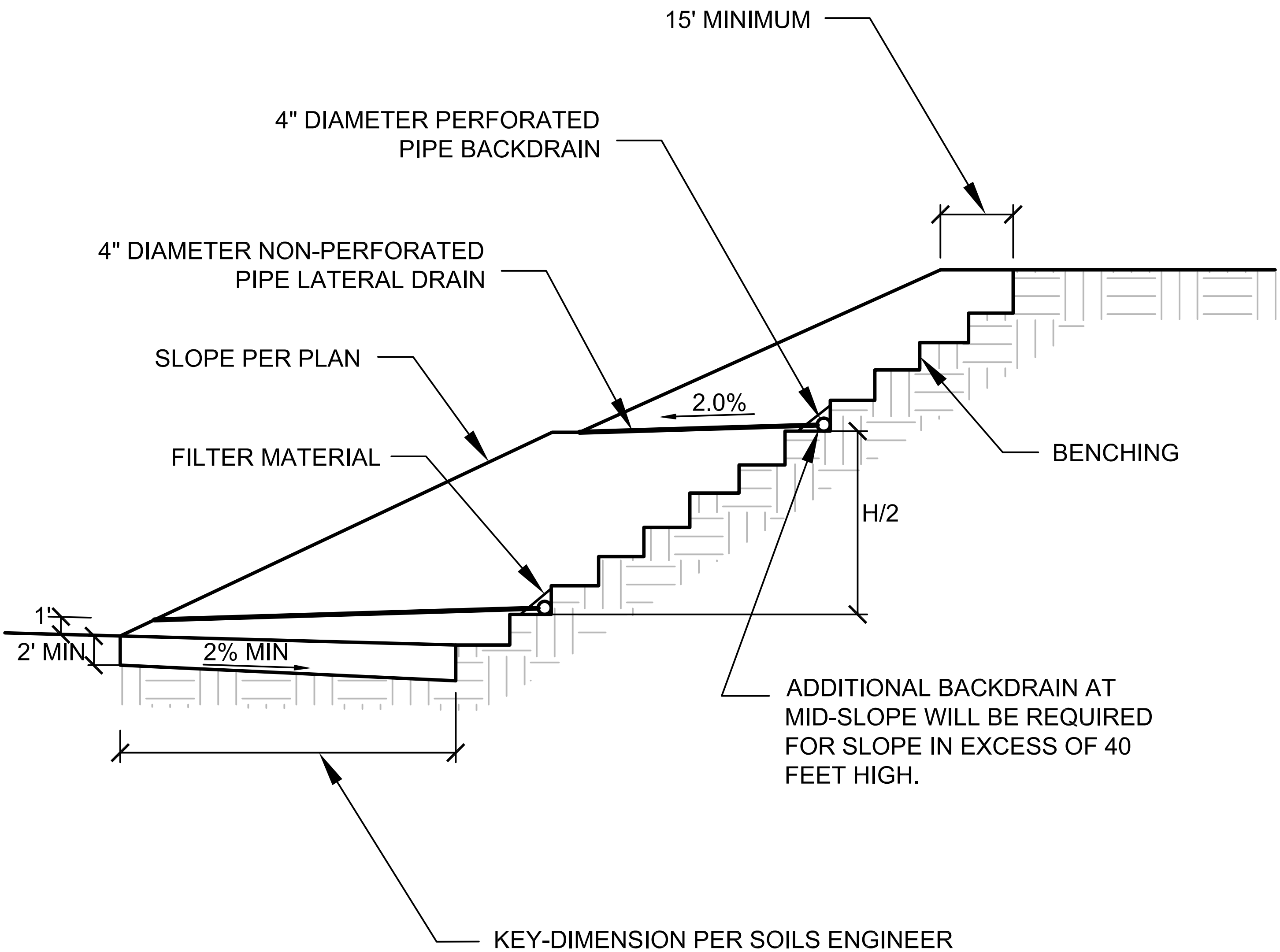
TYPICAL SUBDRAIN OUTLET HEADWALL DETAIL



DIMENSIONS ARE MINIMUM RECOMMENDED

NOT TO SCALE

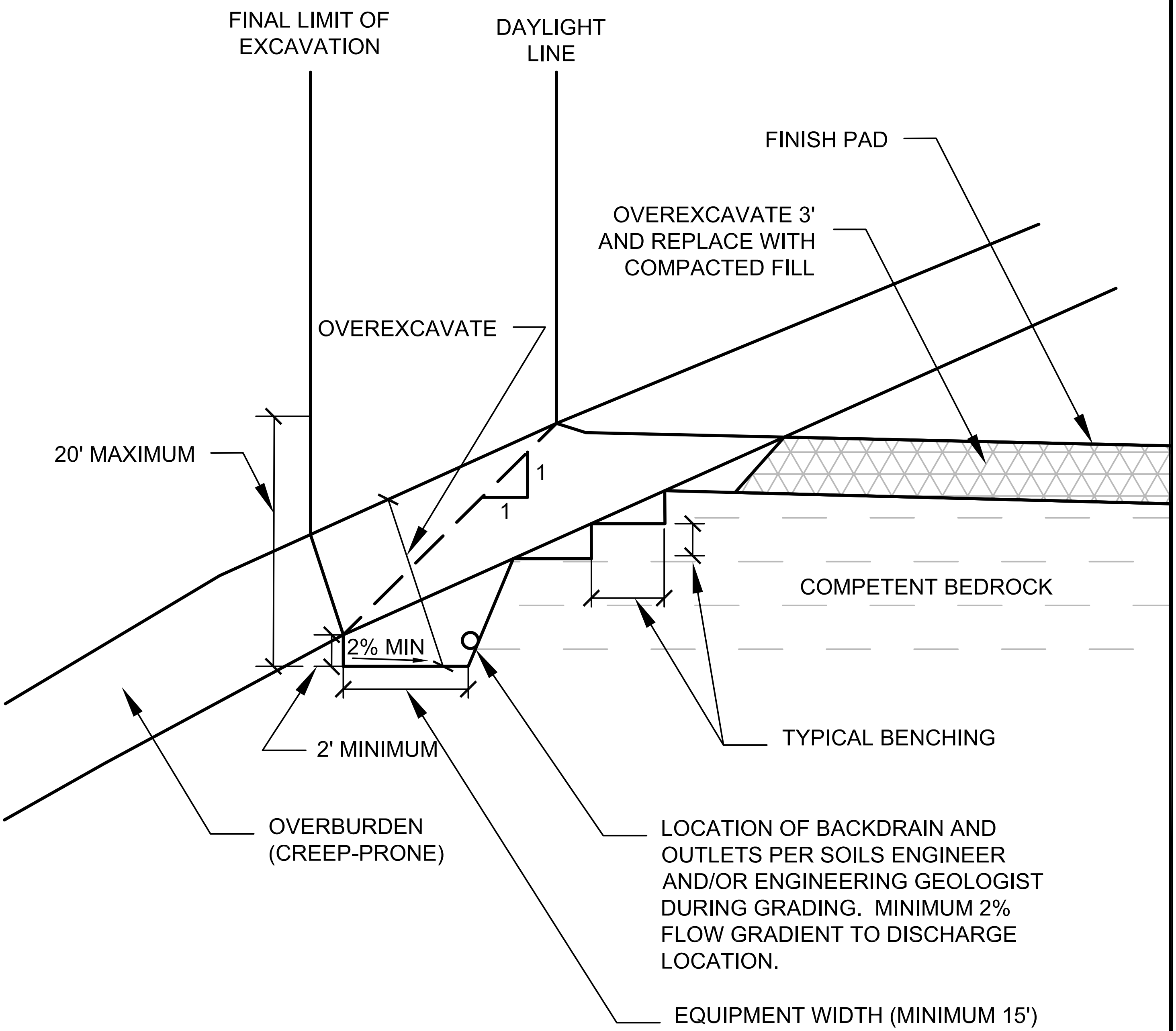
TYPICAL SLOPE STABILIZATION FILL DETAIL



DIMENSIONS ARE MINIMUM RECOMMENDED

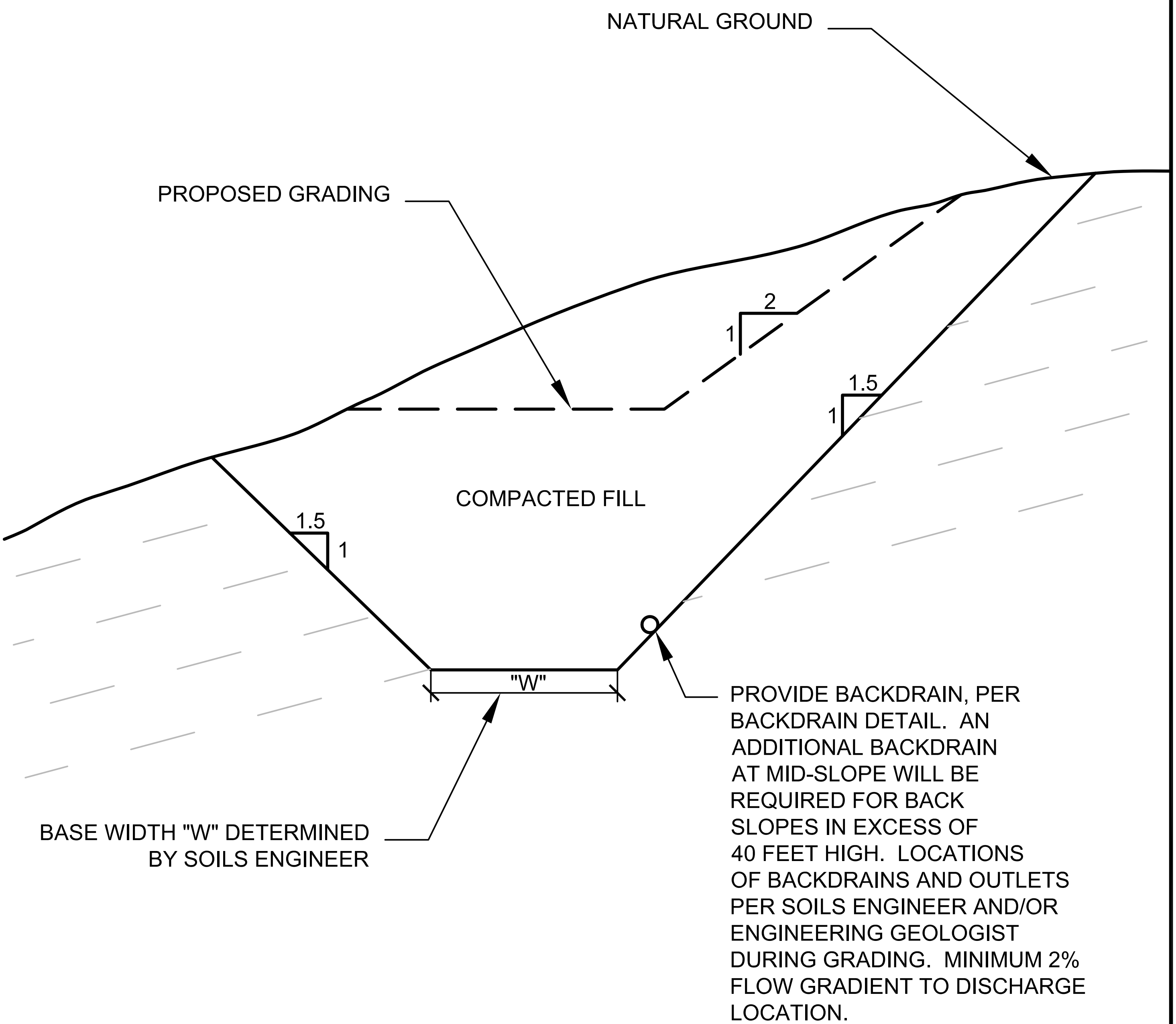
NOT TO SCALE

TYPICAL BUTTRESS FILL DETAIL



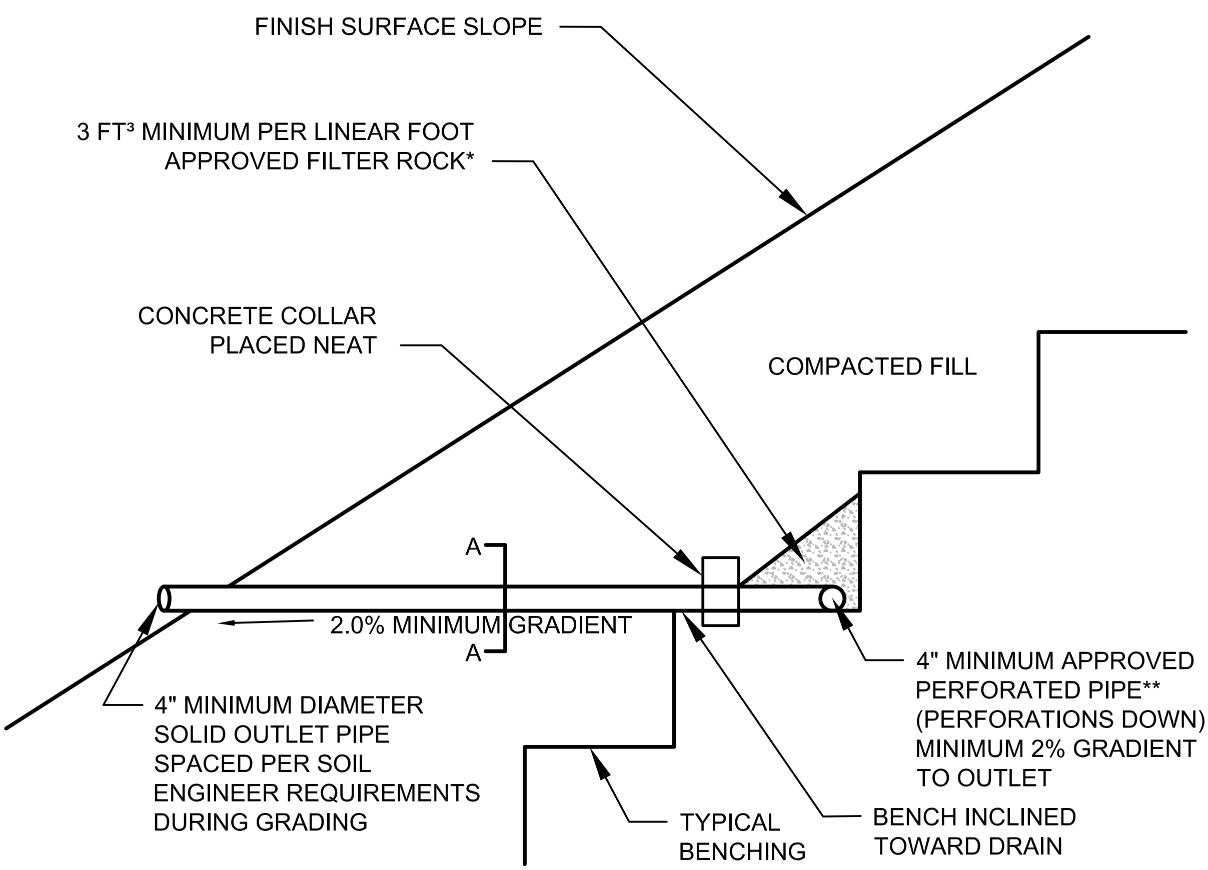
NOT TO SCALE

DAYLIGHT SHEAR KEY DETAIL

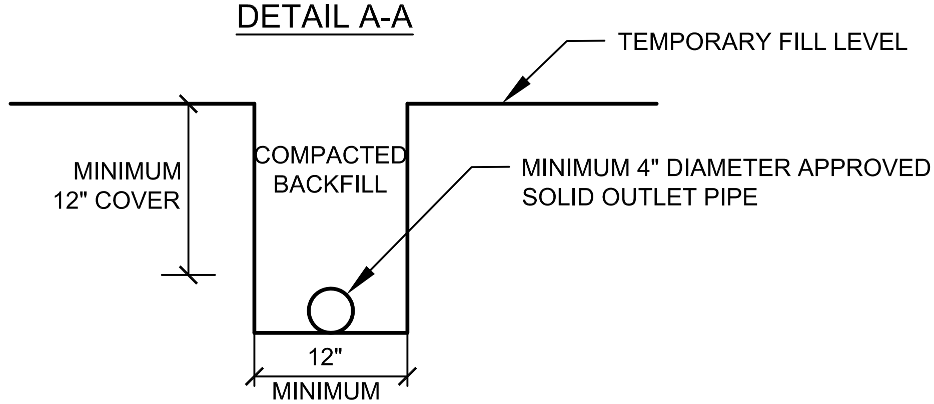


NOT TO SCALE

TYPICAL SHEAR KEY DETAIL



DETAIL A-A



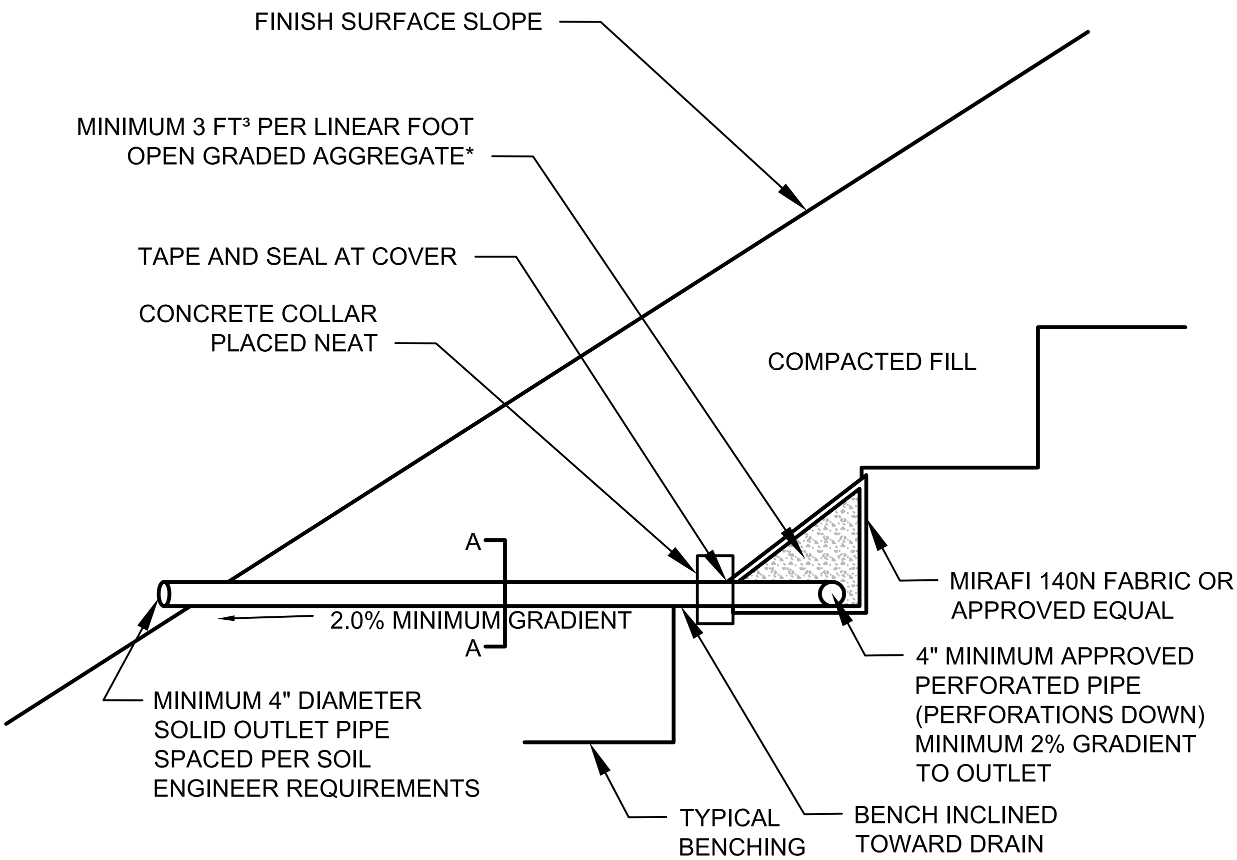
**APPROVED PIPE TYPE:
SCHEDULE 40 POLYVINYL CHLORIDE
(P.V.C.) OR APPROVED EQUAL.
MINIMUM CRUSH STRENGTH 1000 PSI

*FILTER ROCK TO MEET FOLLOWING
SPECIFICATIONS OR APPROVED EQUAL:

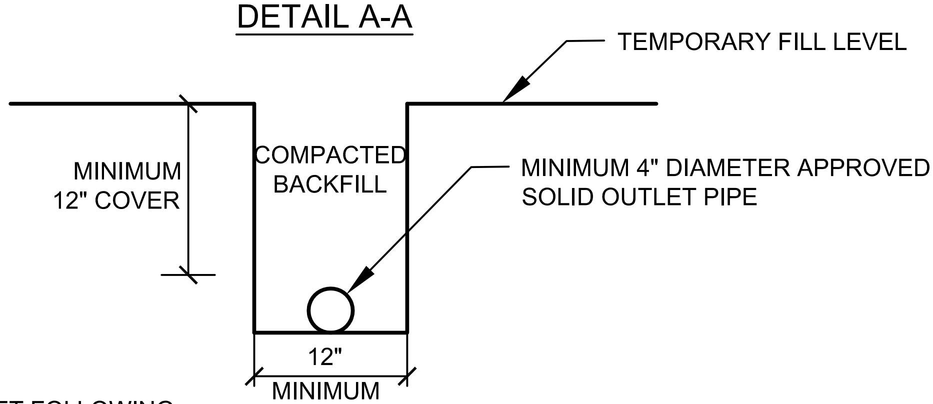
SIEVE SIZE	PERCENTAGE PASSING
1"	100
¾"	90-100
⅜"	40-100
NO. 4	25-40
NO. 30	5-15
NO. 50	0-7
NO. 200	0-3

NOT TO SCALE

TYPICAL BACKDRAIN DETAIL



DETAIL A-A

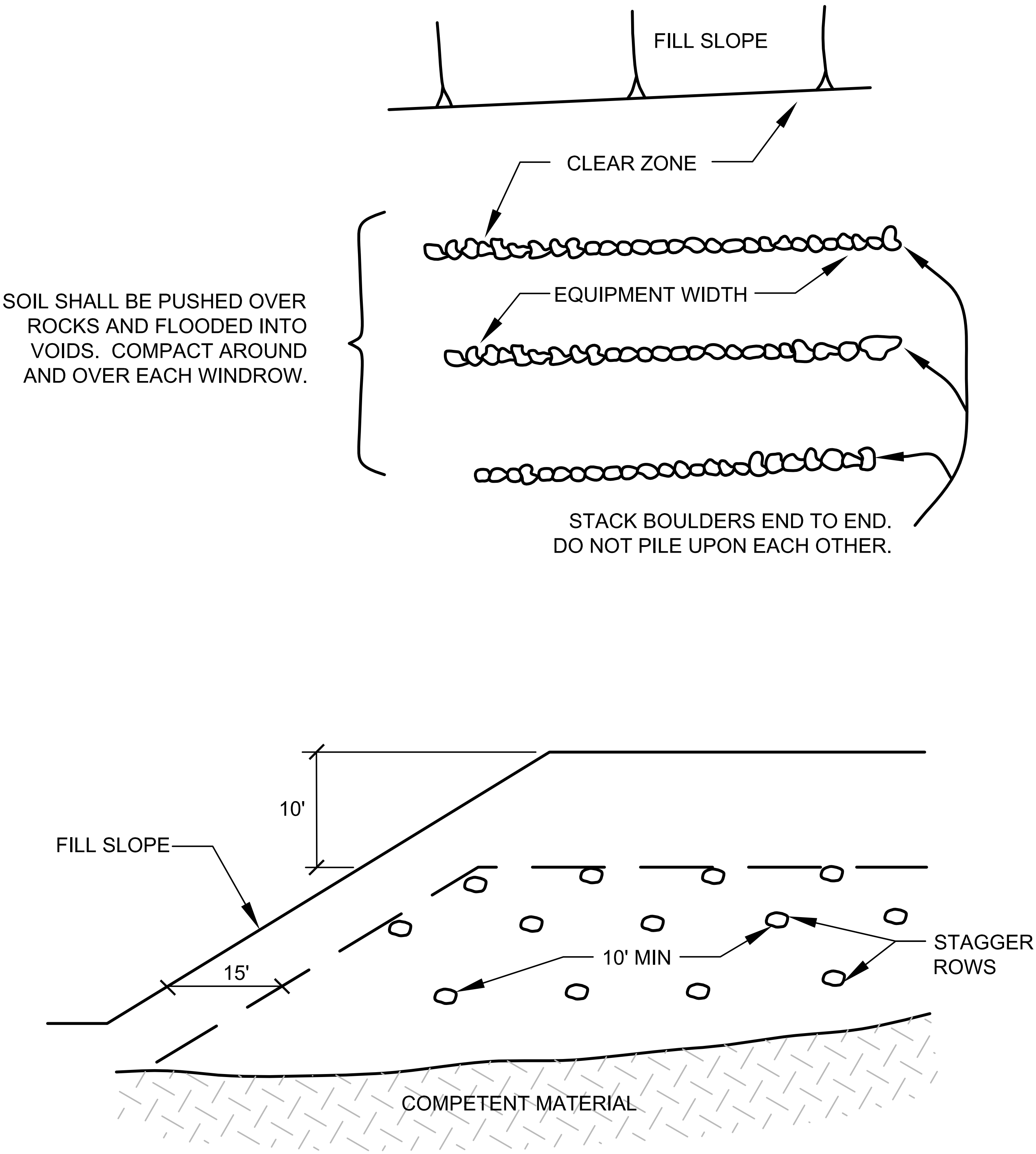


*NOTE: AGGREGATE TO MEET FOLLOWING
SPECIFICATIONS OR APPROVED EQUAL:

SIEVE SIZE	PERCENTAGE PASSING
1 ½"	100
1"	5-40
¾"	0-17
⅜"	0-7
NO. 200	0-3

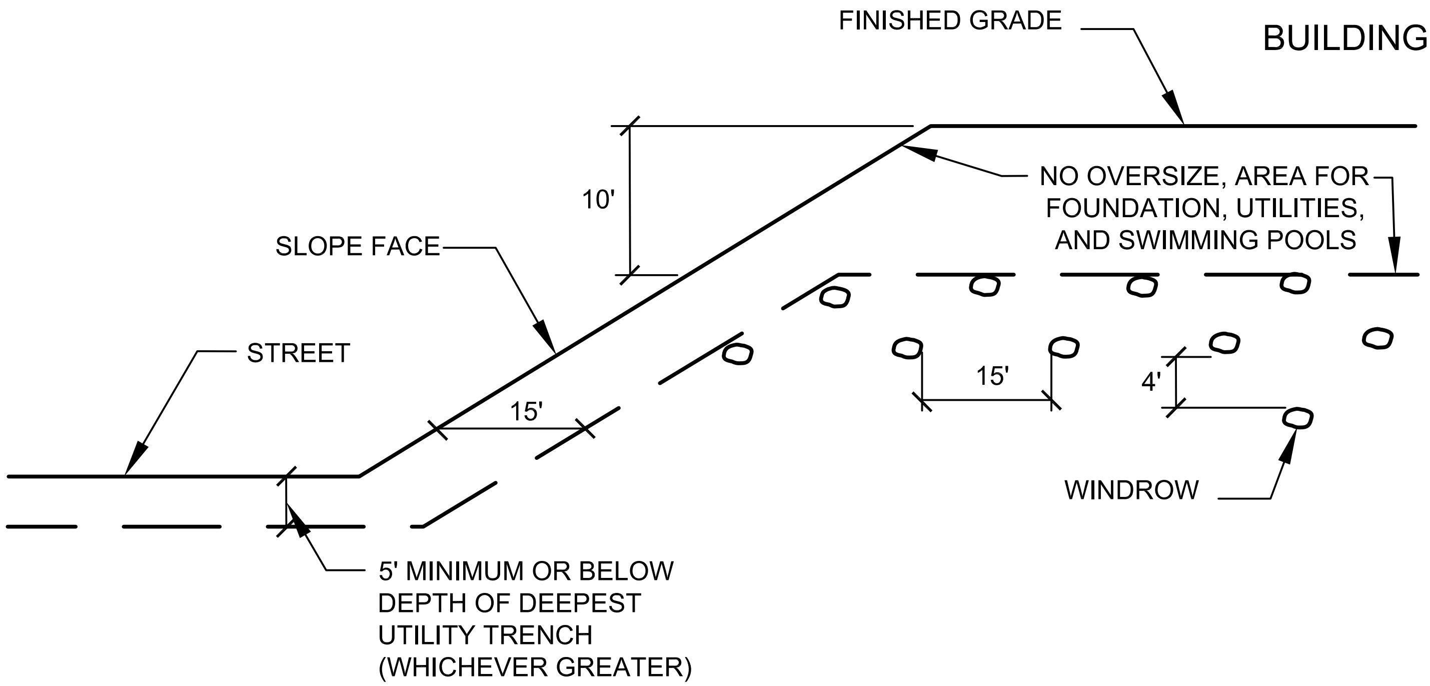
NOT TO SCALE

BACKDRAIN DETAIL (GEOFRABIC)

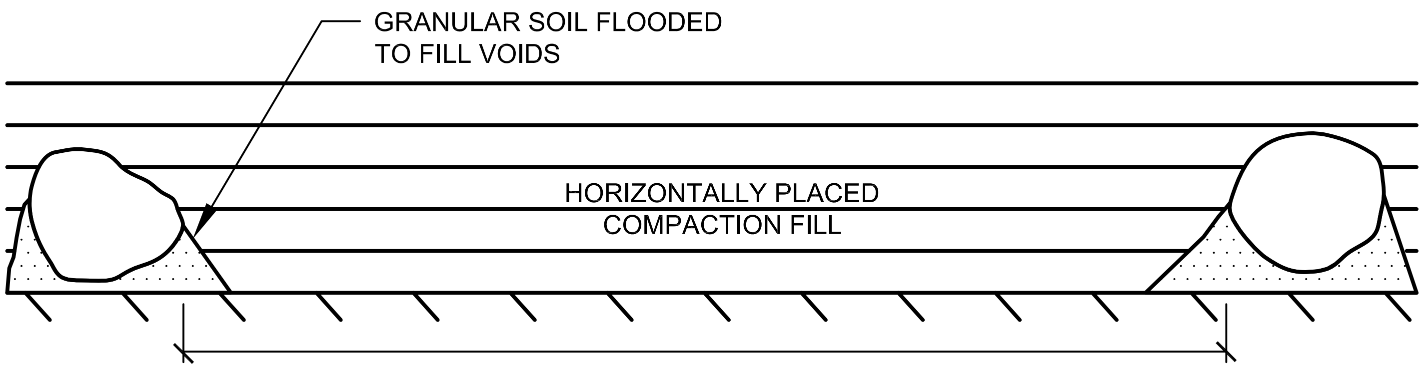


NOT TO SCALE

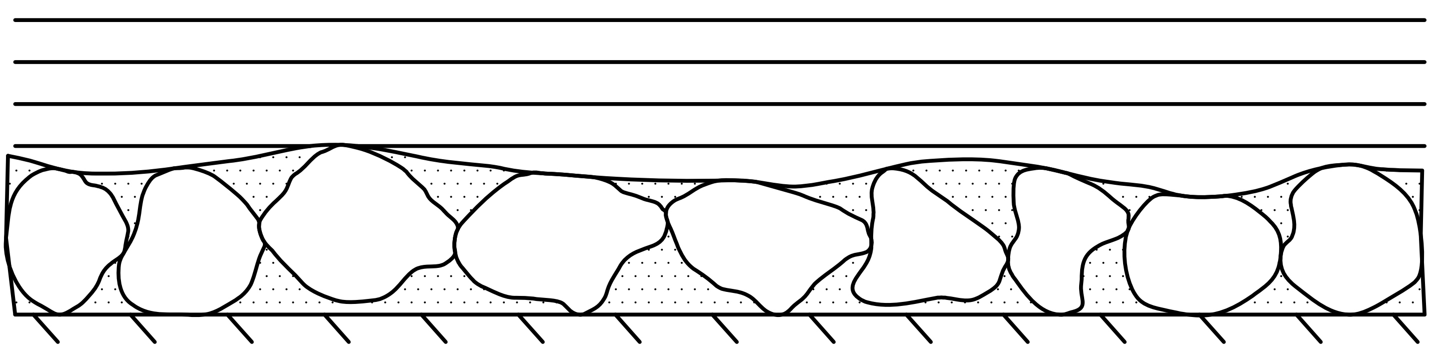
ROCK DISPOSAL DETAIL



TYPICAL WINDROW DETAIL (EDGE VIEW)



PROFILE VIEW

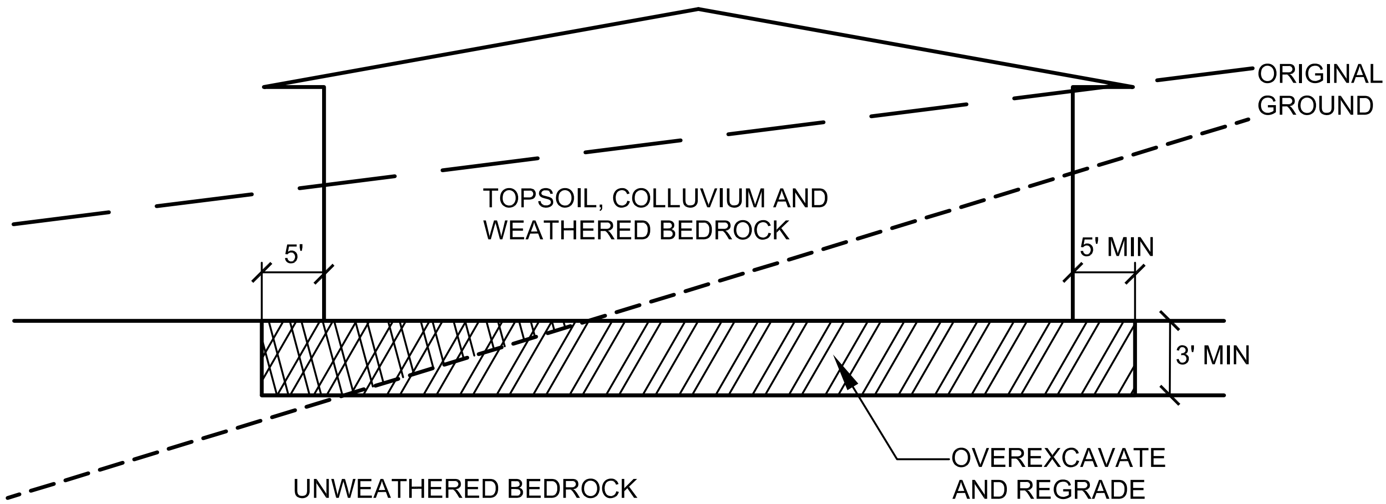


NOT TO SCALE

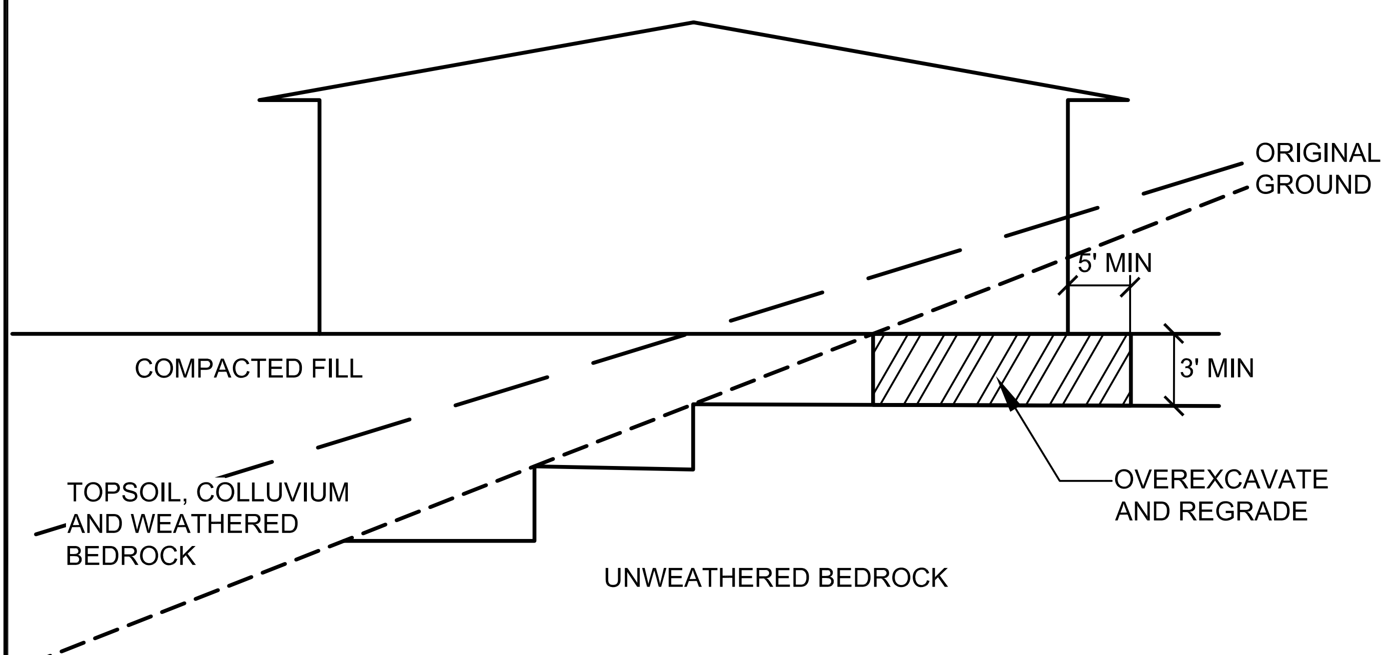
ROCK DISPOSAL DETAIL

GENERAL GRADING RECOMMENDATIONS

CUT LOT

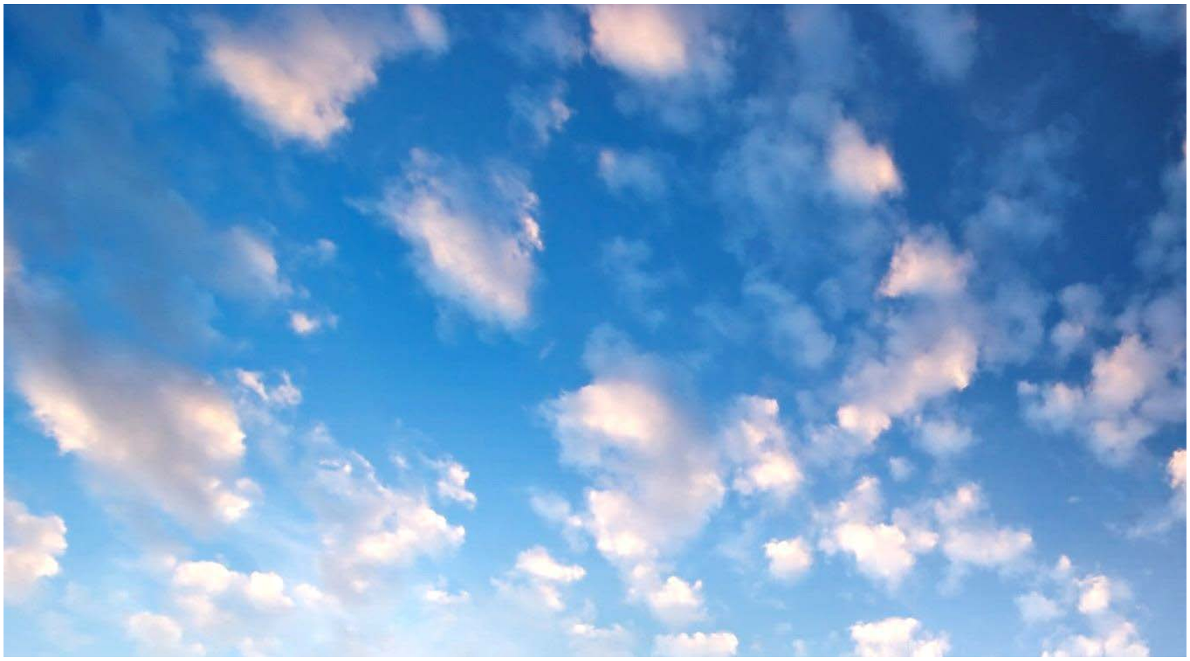


CUT/FILL LOT (TRANSITION)



NOT TO SCALE

TRANSITION LOT DETAIL



Barrio Flats Mixed-Use Project

Health Risk Assessment

prepared for
Logan Holdings, LLC
861 Sixth Avenue, Suite 130
San Diego, California 92101

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

October 2017

Rincon Consultants, Inc.
Environmental Scientists Planners Engineers
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1 Project Description

1.1 Introduction

This Health Risk Assessment (HRA) analyzes the possible health effects associated with toxic air contaminant (TAC) emissions from Interstate 5 (I-5) for the proposed Barrio Flats Mixed-Use Project, located in the Barrio Logan neighborhood in San Diego, California. The report has been prepared under contract to Logan Holdings, LLC. The following describes the project background and the proposed project, as well as the analytical approach taken to complete the health risk assessment.

1.2 Executive Summary

The 0.4 acre (17,860 square-foot) project site is located at 2257 Logan Avenue in the Barrio Logan neighborhood in San Diego, California. The project site is bounded by Logan Avenue to the north, South 26th Street to the east, and a service alley along the southwest site boundary. I-5 runs northeast of the project site, approximately 200 feet from the northern site boundary. The surrounding area has a mix of commercial, residential, and industrial uses. Adjacent to the project site are an auto repair shop to the north across Logan Avenue, apartment buildings to the east across South 26th Street, and a steel and metal processing facility to the south across the service alley. Lucky's Market, located at 2259 Logan Avenue, is part of the project site but lies northwest of the proposed development and would remain in place.

As part of the HRA, site-specific air dispersion modeling was completed to determine whether health risks to future site residents from the I-5 mainline and associated ramps would exceed the San Diego Air Pollution Control District's (SDAPCD) health risk criteria for residences. SDAPCD has health risk criteria for cancer, chronic, and acute health risks. Cancer risk is expressed as the maximum number of new cancer cases projected to occur in a population of one million people due to exposure to a cancer-causing substance. Potential acute health risks include severe symptoms that develop rapidly and lead quickly to a health crisis due to exposure to a harmful substance; whereas, chronic health risks include health crises, such as lung inflammation, immune suppression, and immune sensitization, which develop due to exposure to low levels of a harmful substance over a long period of time.

The California Air Resources Board's (ARB) Air Quality and Land Use Handbook: A Community Health Perspective recommends that local agencies avoid siting new, sensitive land uses within specific distances of potential sources of toxic air contaminants (TACs), such as freeways, high-traffic roads, distribution centers, railroads, and ports (ARB 2005). In particular, ARB recommends that local agencies avoid siting new, sensitive land uses within 500 feet of a freeway. The primary concern is the effect of diesel exhaust particulate, a TAC, on sensitive uses. Near the project site, the primary source of diesel exhaust particulates is truck traffic traveling on the I-5 mainline and associated ramps. In addition to diesel exhaust particulates from the I-5, this analysis also examined five other vehicle exhaust pollutants of concern that are emitted from both diesel and gasoline-fueled vehicles: acrolein, acetaldehyde, formaldehyde, benzene, and 1,3-butadiene; this is consistent with UC Davis-Caltrans Air Quality Project, Estimating Mobile Source Air Toxics Emissions [MSAT]: A Step-By-Step Project Analysis Methodology (2006). The analysis conservatively assumes that residents would have the home windows open sufficiently to equalize the concentration of pollutants between the indoor and outdoor environment and does not take into account any project design features that may reduce the health effects of TACs. This simplifying assumption results in a calculated risk that is likely to be nearly an order of magnitude higher than actual indoor risk.

Typically, cancer risk is analyzed over a specific exposure duration, such as the average residency (50-percentile) of nine year residency or high-end residency (95-percentile) of 30 years (SDAPCD 2015). For example, a cancer risk of one in one million means that in a population of one million people, not more than one additional person would be expected to develop cancer as the result of the exposure to the substance causing that risk. Thirty years is the exposure duration scenario recommended by SDAPCD for residential receptors in *Supplemental Guidelines for Submission of Rule 1200 Health Risk Assessments* (SDAPCD 2015).

An analysis using the U.S. Environmental Protection Agency's (U.S. EPA) AERMOD dispersion model and ARB's Hotspots Analysis and Reporting Program Version 2 (HARP 2) risk analysis tool determined that the maximum exposed individual receptor (MEIR) on the project site would be exposed to a high end (95-percentile), 30-year excess cancer risk of approximately 10.8 in one million. This exceeds the SDAPCD significance threshold of one excess case of cancer in one million individuals without application of Toxics-Best Available Control Technology (T-BACT) (County of San Diego 2007). The excess cancer risk for the average (50-percentile) residency of nine years would be approximately 7.7 in one million, which also exceeds SDAPCD's significance threshold for projects without application of T-BACT. Potential acute and chronic health risks for on-site residential units were determined to be below the SDAPCD hazard index of 1.0 for either acute or chronic effects.

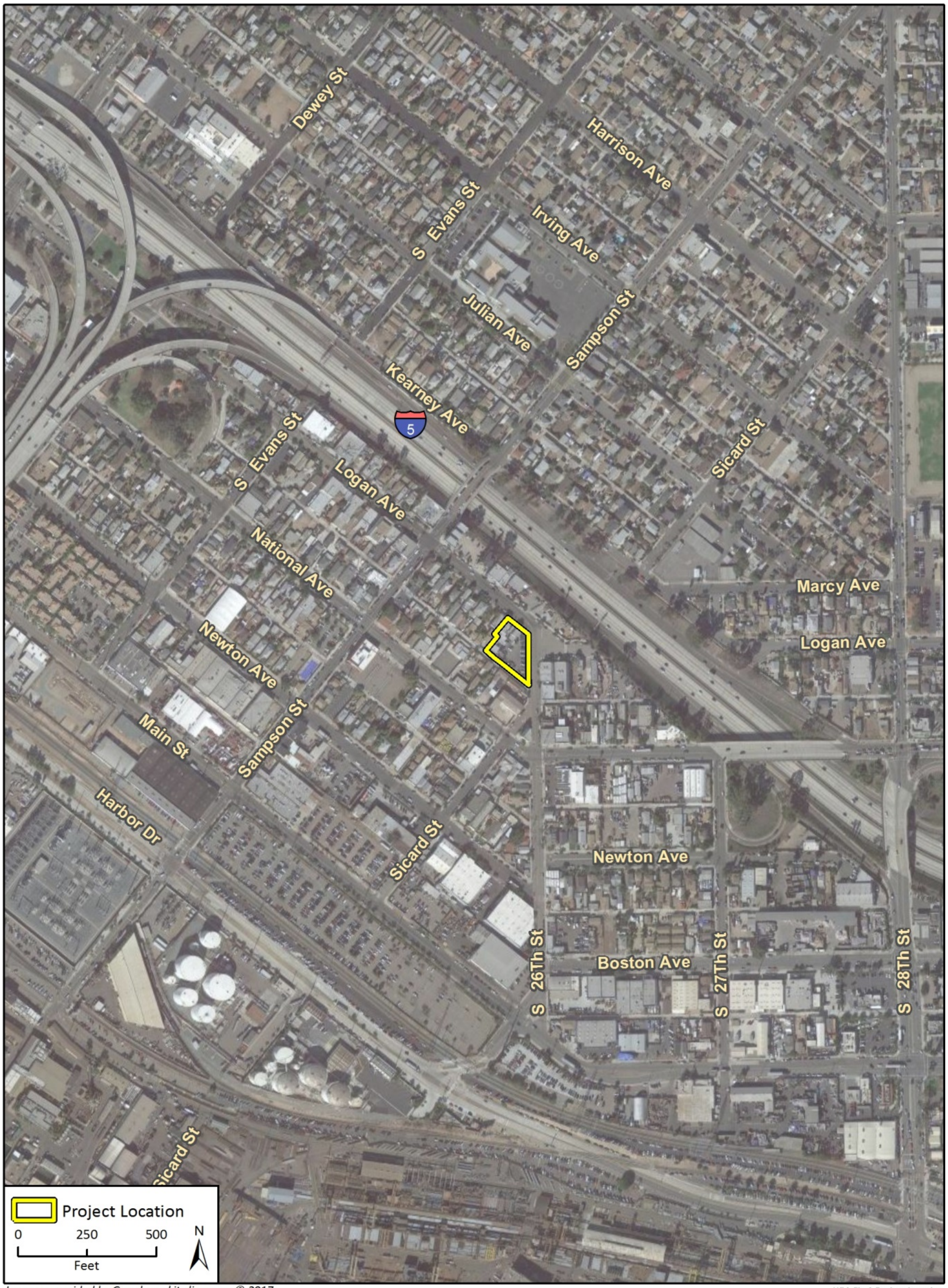
This analysis is based on outdoor air concentrations and conservatively assumes that interior concentrations would be the same. However, U.S. EPA activity factors show that, on average, people in a residential environment spend only a small portion of the day outdoors. Therefore, reducing indoor exposure to diesel exhaust particulates can substantially reduce the overall cancer risk. As such, inclusion of forced air ventilation with filter screens with a Minimum Efficiency Reporting Value (MERV) 10 rating on outside air intake ducts on all residential units is required. MERV 10 filter screens are capable of removing at least 50% of the particulate matter, including fine particulate matter. Diesel particulate filters such as these are considered T-BACT under SDAPCD guidelines (County of San Diego 2007), and would reduce the future residents' cancer risk to below the SDAPCD's cancer risk threshold of ten in one million with application of T-BACT for the high-end estimate for residency time (95-percentile) of 30 years and the average (50-percentile) of nine years.

1.3 Project Description

The project entails demolition of a two-story building (totaling 3,812 square feet), a one-story building (1,954 square feet), a carport (144 square feet), and the removal of a 250 square-foot trailer. A new 38,940 square-foot four-story mixed-use building would be constructed on the project site, that contains 24 residential units (totaling 26,655 square feet), four hotel rooms (totaling 4,385 square feet), and five retail spaces (totaling 5,850 square feet). Four of the 24 residential units would be affordable units for very low income. Parking at the project site would consist of 24 parking spaces, one van accessible stall, two carpool/low emission stalls, one EV parking and charging stall, four motorcycle spaces, and seventeen bicycle spaces (fifteen long-term and two short-term). The project includes the planting of eight street trees along Logan Avenue and South 26th Street, a landscaped courtyard, and a bioretention area on-site, designed to conform to the City of San Diego's land development code and standards..

I-5 runs northeast of the project site within approximately 200 feet of the northern site boundary. Additionally, a shared exit ramp off southbound I-5 to either South 27th Street/National Avenue or South 28th Street begins within 500 feet east of the site, and an on-ramp from westbound National Avenue to northbound I-5 is located within 1,000 feet of the proposed project. Figure 1 is a map of the proposed project's location. Figure 2 shows the project site plan and configuration of the site.

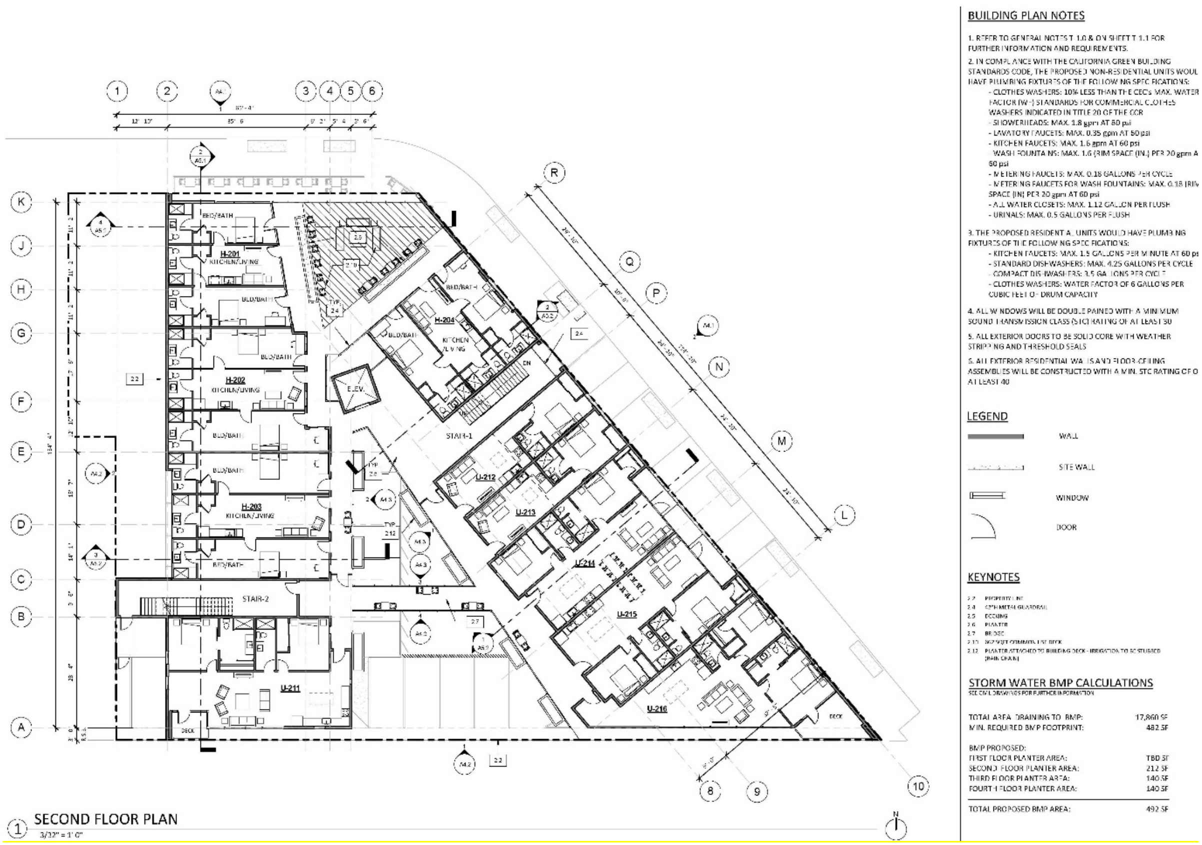
Figure 1 Project Location



Imagery provided by Google and its licensors © 2017.

HRA Fig 1 Project Location

Figure 2 Project Site Plan



Source: OBR Architecture, Inc. 2018

2 Air Quality Background

2.1 Local Climate and Meteorology

The project site is within the San Diego Air Basin (SDAB), which includes all of San Diego County. Geographically, the SDAB is generally bounded by the Pacific Ocean to the west, the Laguna Mountains to the east, the San Diego-Orange County line to the north, and the Mexico-United States border to the south. The regional climate within the SDAB varies greatly from the coastal regions in west to the mountainous and desert regions in the east, but is largely characterized by warm summers, mild winters, infrequent seasonal rainfall, moderate daytime onshore breezes, and moderate humidity. The air quality within the SDAB is primarily influenced by meteorology and a wide range of emissions sources, such as dense population centers, substantial vehicular traffic, and industry.

Stationary and mobile sources are the primary source of air pollutant emissions in the SDAB. Stationary sources can be divided into two major subcategories: point and area sources. Point sources occur at a specific location and are often identified by an exhaust vent or stack. Examples include boilers or combustion equipment that produce electricity or generate heat. Area sources are widely distributed and include such sources as residential and commercial water heaters, painting operations, lawn mowers, agricultural fields, landfills, and some consumer products. Mobile sources refer to emissions from motor vehicles, including tailpipe and evaporative emissions, and are classified as either on-road or off-road. On-road sources may be legally operated on roadways and highways. Off-road sources include aircraft, ships, trains, and self-propelled construction equipment. The natural environment can also generate air pollutants, such as when high winds suspend fine dust particles.

2.2 Air Pollutants of Concern

The SDAPCD monitors air pollutant levels to ensure that air quality standards are met and, if they are not met, develops strategies to meet the standards. The primary air pollutants of concern in the SDAB include the following:

OZONE

Commonly referred to as “smog,” ozone results from a chemical reaction that takes place in the atmosphere among ozone precursors (reactive organic gases and oxides of nitrogen) under the photochemical influence of sunlight. Nitrogen oxides are formed during the combustion of fuels, while reactive organic compounds are formed during combustion and evaporation of organic solvents. Various factors affect this process, including the quantity of gases present, the volume of air available for dilution, the temperature, and the intensity of the ultraviolet light. Worst case conditions for ozone formation occur in the summer and early fall on warm, windless, sunny days. The major effects of photochemical smog are aggravation of respiratory diseases, eye irritation, visibility reduction, and vegetation damage. Motor vehicles are the greatest source of ozone precursors in San Diego, and the groups most sensitive to ozone include children, the elderly, people with respiratory disorders, and people who exercise strenuously outdoors.

SUSPENDED PARTICLES

PM_{10} is small particulate matter measuring no more than 10 microns in diameter, while $PM_{2.5}$ is fine particulate matter measuring no more than 2.5 microns in diameter. Both PM_{10} and $PM_{2.5}$ are composed mostly of dust particles, nitrates, and sulfates. The characteristics, sources, and potential health effects associated with the small particulates (those between 2.5 and 10 microns in diameter) and fine particulates ($PM_{2.5}$) can be very different. The small particulates generally come from windblown dust and dust kicked up from mobile sources. The fine particulates are generally associated with combustion processes and form in the atmosphere as a secondary pollutant through chemical reactions. PM_{10} is a by-product of fuel combustion and wind erosion of soil and unpaved roads, and it is directly emitted into the atmosphere through these processes. Chemical reactions in the atmosphere also create PM_{10}. Fine particulate matter poses a serious health threat to all groups, but particularly to the elderly, children, and those with respiratory problems. More than half of the 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.

Diesel engine fuel combustion forms an important fraction of the particulate matter emission inventory, as particulates in diesel emissions are very small and readily respirable. The particles have hundreds of chemicals adsorbed onto their surfaces, including many known or suspected carcinogens. The Office of Environmental Health Hazard Assessment (OEHHA) reviewed and evaluated the potential for diesel exhaust to affect human health, and the associated scientific uncertainties (ARB 1998). Based on the available scientific evidence, it was determined that a level of diesel PM exposure, below which no carcinogenic effects are anticipated, has not been identified. The Scientific Review Panel that approved the OEHHA report determined that, based on studies to date, 3×10^{-4} micrograms per cubic meter ($\mu g/m^3$) is a reasonable estimate of the unit risk for diesel PM. This means that a person exposed to a diesel PM concentration of 1 $\mu g/m^3$ continuously over the course of a lifetime has a 3 per 10,000 chance (or 300 in one million chance) of contracting cancer due to this exposure. Based on an estimated year 2000 statewide average concentration of 1.26 $\mu g/m^3$ for indoor and outdoor ambient air, about 380 excess cancers per one million population could be expected if diesel PM concentrations remained the same (ARB 2000). Therefore, these particulate emissions have been determined by ARB to be a TAC.

Diesel PM emissions are estimated to be responsible for about 70% of the total ambient air toxics risk. In addition to these general risks, diesel PM can also be responsible for elevated localized or near-source exposures ("hot-spots"). Depending on the activity and nearness to receptors, these potential risks can range from small to 1,500 per million or more (ARB 2000).

ARB staff have conducted risk characterization scenarios to determine the potential excess cancer risks involved when individuals are near various sources of diesel engine emissions, ranging from school buses to high volume freeways. The purpose of the risk characterization was to estimate, through air dispersion modeling, the cancer risk associated with typical diesel-fueled engine or vehicle activities based on modeled PM concentration at the point of maximum impact. The study included various sources of diesel PM emissions, including idling school buses, truck stops, low- and high-volume freeways, and other sources. High-volume freeways (20,000 trucks per day) were estimated to cause 800-1,700 per million potential excess cancers, while low-volume freeways (2,000 trucks per day) were estimated to cause about 100-200 per million potential excess cancers (ARB 2000).

Besides diesel PM, several other pollutants that are a public health concern are emitted by vehicle exhausts. The U.S. EPA has identified six pollutants of highest priority: diesel particulate matter, acrolein, acetaldehyde, formaldehyde, benzene, and 1,3-butadiene. The latter five pollutants are part of the total organic gases emitted by diesel and gasoline fueled vehicles. A brief description of each of these chemicals follows:

- **Acrolein** is the simplest unsaturated aldehyde. It is a widely produced substance with a piercing, disagreeable, acrid smell similar to that of burning fat. Acrolein is an unstable toxic substance that can burn the nose and throat and is a severe pulmonary irritant. It is a flammable and poisonous substance prepared industrially by the oxidation of propene. Small amounts of acrolein are formed and enter the air when trees, tobacco, other plants, gasoline, and oil are burned.
- **Acetaldehyde**, sometimes known as ethanol, is an organic chemical compound used as an intermediate in the production of acetic acid, certain esters, and a number of other chemicals. It is a flammable liquid with a fruity smell. Acetaldehyde is a toxic when applied externally for prolonged periods, an irritant, and a probable carcinogen.
- **Formaldehyde** is an organic chemical compound containing a terminal carbonyl group. It is produced in the atmosphere by the action of sunlight and oxygen on atmospheric methane and other hydrocarbons, becoming a part of smog. Additionally, formaldehyde is an intermediate in the oxidation (or combustion) of methane as well as other carbon compounds including automobile exhaust. Formaldehyde is a flammable substance that can be toxic, allergenic, and carcinogenic. It is naturally made in small amounts in human bodies and is found in small amounts in household sources, such as fiberglass, carpets, permanent press fabrics, paper products, and some household cleaners.
- **Benzene**, or benzol, is an organic chemical compound and a known carcinogen. It is a colorless and highly flammable liquid with a sweet smell and a relatively high melting point. Benzene is an important industrial solvent and precursor in the production of drugs, plastics, synthetic rubber, and dyes. Benzene is a natural constituent of crude oil and may be synthesized from other compounds present in petroleum. It is found in gasoline and cigarette smoke. Natural sources of benzene include emissions from volcanoes and forest fires.
- **1,3-Butadiene** is an important industrial chemical used in the production of synthetic rubber (about 75% of manufactured 1,3-butadiene), which is then used primarily in the production of automobile tires. It is a colorless gas with a mild gasoline-like odor. Gasoline contains small amounts that are exhausted into the air after the combustion process. It is a carcinogen, highly irritative, and flammable.

2.3 Air Quality Regulation

Federal and state governments have established ambient air quality standards for the protection of public health. The U.S. EPA is the federal agency designated to administer air quality regulation, while the ARB is the state equivalent in the California Environmental Protection Agency (CalEPA). Air Quality Management Districts (AQMDs) and Air Pollution Control Districts (APCDs) provide local management of air quality. The ARB has established air quality standards and is responsible for the control of mobile emission sources, while the local AQMDs and APCDs are responsible for enforcing standards and regulating stationary sources. The ARB has established 15 air basins statewide.

The U.S. EPA has set primary national ambient air quality standards for ozone, CO, nitrogen dioxide (NO_2), sulfur dioxide (SO_2), PM_{10}, $PM_{2.5}$, and lead (Pb). Primary standards are those levels of air quality deemed necessary, with an adequate margin of safety, to protect public health. In addition, the State of California has established health-based ambient air quality standards for these and other pollutants, some of which are more stringent than the federal standards. Table 1 lists the current federal and state standards for regulated pollutants

Table 1 Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	Federal Primary Standards	California Standard
Ozone	8-Hour	0.070 ppm	0.07 ppm
	1-Hour	---	0.09 ppm
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
	1-Hour	0.075 ppm	0.25 ppm
PM_{10}	Annual	---	20 μg/m^3
	24-Hour	150 μg/m^3	50 μg/m^3
PM_{25}	Annual	12 μg/m^3	12 μg/m^3
	24-Hour	35 μg/m^3	---
Lead	30-Day Average	---	1.5 μg/m^3
	3-Month Average	0.15 μg/m^3	---

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

Source: ARB 2016.

The SDAPCD is the designated air quality control agency in the SDAB. The SDAB is designated in nonattainment for the federal and state eight-hour ozone standards, as well as the state one-hour ozone, $PM_{2.5}$ and PM_{10} standards. The SDAB is designated unclassifiable/attainment for all other federal and state standards.

2.4 Current Air Quality

The nearest SDAB monitoring station to the project site is the San Diego – 1110 Beardsley Street Monitoring Station, located approximately 0.6 miles northwest of the project site. Table 2 indicates the number of days each of the standards has been exceeded at this station in each of the last three years for which data is available.

Table 2 Ambient Air Quality Data

Pollutant	2014	2015	2016
Ozone (ppm) - 8-Hr Average	0.072	0.067	0.061
Number of Days of State exceedances (>0.070 ppm)	2	0	0
Number of days of Federal exceedances (>0.070 ppm)	1	0	0
Ozone (ppm) - Worst Hour	0.093	0.089	0.072
Number of days of State exceedances (>0.09 ppm)	0	0	0
Nitrogen Dioxide (ppm) - Worst Hour	0.075	0.062	0.073
Number of days of State exceedances (>0.18 ppm)	0	0	0
Particulate Matter <10 microns (μg/m^3) - Worst 24 Hours	40.0	53.0	49.0
Number of samples of State exceedances (>50 μg/m^3)	0	1	1*
Number of samples of Federal exceedances (>150 μg/m^3)	0	0	0
Particulate Matter <2.5 microns (μg/m^3) - Worst 24 Hours	36.7	33.4	34.4
Number of days above Federal standard (>35 μg/m^3)	1	0	0

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

*State and national pollutant concentration readings and exceedances differ due to sampling methods, conditions, and data analysis requirements. Pollutant concentrations in this table reflect national statistics.

Data was obtained for the San Diego – 1110 Beardsley Street Monitoring Station for all pollutants.

Source: ARB 2017.

3 Impact Analysis

3.1 Methodology

Mobile source TACs associated with vehicle traffic on I-5 within one-half mile of the project site and its associated on- and off-ramps within 1,000 feet of the proposed project were estimated based on the methodology developed by the UC Davis-Caltrans Air Quality Project, Estimating Mobile Source Air Toxics Emissions [MSAT]: A Step-By-Step Project Analysis Methodology (2006). This spreadsheet application was designed to generate the total amount of the six pollutants of concern based on total organic gases emission factors and particulate emission factors from EMFAC2014. The UC Davis-Caltrans spreadsheet contained speciation factors from the ARB, and the U.S. EPA's Motor Vehicle Emission Simulator (MOVES2014; U.S. EPA 2014) was used to supplement missing values for acrolein. These emission and speciation factors are then multiplied against traffic volumes for the mainline and ramp segments to obtain total emissions from I-5. Emission factors for this study were based on grams per mile. Spreadsheet outputs adapted from the UC Davis-Caltrans MSAT model and composite emission rates are contained in Appendix A.

For mainline emissions, emission factors were reviewed for speeds between 50 and 65 miles per hour (mph). The worst reasonable case speed (i.e., highest emission levels) for heavy duty trucks was 50 mph for total organic gases, and 60 mph for diesel PM. The worst reasonable case speed for light duty trucks and cars for both pollutants was 65 mph. Therefore, emissions from heavy duty trucks were based on average speeds of 50 and 60 mph for total organic gases and diesel PM, respectively, and 65 mph for light duty trucks and cars. For ramp emissions, emission factors were based on speeds of 35 mph for off-ramps and 50 mph for on-ramps.

Traffic volumes for the I-5 mainline were obtained from Caltrans *2015 Traffic Volumes on California State Highways*. According to the Caltrans traffic data (2015a), the Annual Average Daily Traffic (AADT) volume along the segment of I-5 northeast of the project site is 167,000 vehicles. Based on Caltrans *2015 Annual Average Daily Truck Traffic on the California State Highway System* (2015b), truck traffic comprises approximately 4.1% of I-5 AADT. Ramp AADT volumes were obtained from Caltrans *2015 Ramp Volumes on the California State Freeway System: District 11* (2015c). A shared off-ramp connects drivers from southbound I-5 to either South 27th Street/National Avenue or South 28th Street. Because the off-ramp is comprised of two lanes and AADT volumes are available for each exit, the shared ramp was treated as two distinct off-ramps for the purposes of this analysis. The AADT on the I-5S off-ramp at South 27th Street/National Avenue is approximately 2,950 vehicles, the AADT on the I-5S off-ramp at South 28th Street is approximately 6,700 vehicles, and the AADT on the I-5N on-ramp from westbound National Avenue is approximately 4,200 vehicles, based on 2014 traffic counts. Truck traffic percentages from I-5 were used for corresponding ramps.

Three representative sensitive receptor locations on the project site were chosen. Health risks at the sensitive receptors were analyzed on the second, third, and fourth floors of the proposed four-story building to correspond with the proposed location of residential units. The Point of Maximum Impact (PMI), which is typically at the border of the source (freeway fence), was not calculated since it is not relevant to the analysis given the specific location of the proposed residences. A receptor grid was used to evaluate whether or not sensitive receptor locations reflected the pattern of exposure. Grid points in the middle of the site were reflective of exposure at the chosen receptors. Figure 3 depicts the sources (freeways and ramps), receptor grid, and sensitive receptors.

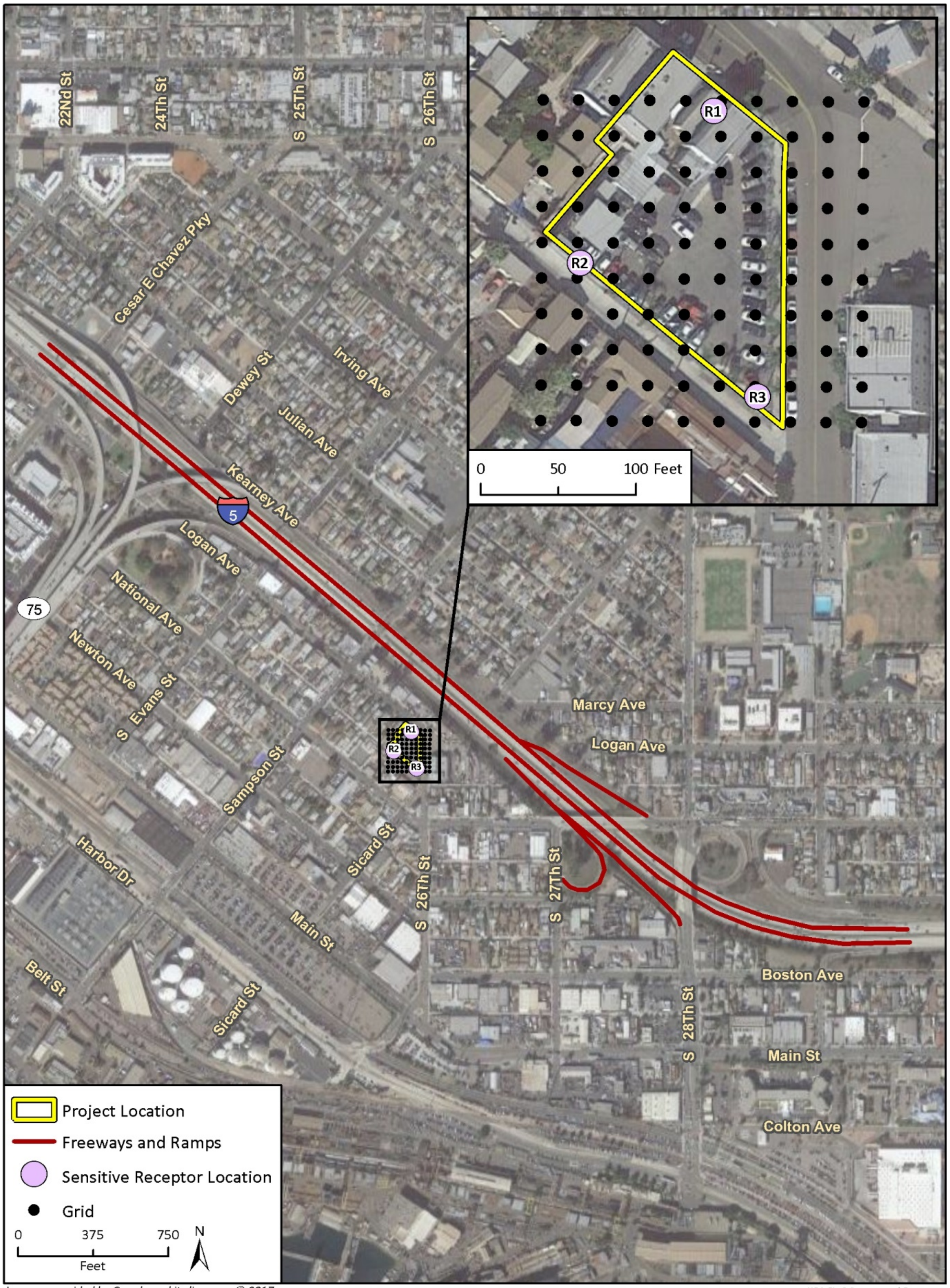
The American Meteorological Society/U.S. EPA air dispersion model, AERMOD version 15181, was used to calculate the concentrations of source emissions at the project site. Specific meteorology and terrain conditions for the site were input to the model using the nearest available meteorological data set, San Diego International Airport (approximately 3.5 miles northwest of the project site), and Digital Elevation Model (DEM) data from the ARB for the Point Loma quad. I-5 varies in elevation between approximately 9 and 24 meters above mean sea level (amsl) along the length of the approximately one-mile segment modeled. Ramps within 1,000 feet of the project site range in elevation from 11 to 20 meters amsl. Receptors on the project site are between approximately 24 and 30 meters amsl. The dispersion model considers these differences in topography. The I-5 mainline and on- and off-ramps within 1,000 feet of the project site were modeled as a series of volume sources in AERMOD. AERMOD provides X/Q (CHI/Q = chi/q = χ/q) values, the concentration estimated by the air quality model based on an emission rate of one gram per second.

For risk assessments conducted under the Air Toxics "Hot Spots" Information and Assessment Act (AB 2588, Connelly, Statutes of 1987; Health and Safety Code Section 44300 et seq.), a weighting factor that reflects early life exposure is applied to all carcinogens regardless of purported mechanism of action. HARP 2 incorporates the early life exposure adjustments presented in OEHHA's 2015 *Air Toxics Hotspots Program Guidance Manual for Preparation of Health Risk Assessments* and is used in this analysis. HARP 2 calculates excess cancer risk based on the emission concentration at each sensitive or grid receptor using the toxicity data contained in the HARP 2 emissions inventory database. The chronic health risk value is calculated by HARP 2 using the OEHHA method of dividing the annual average concentration by the chronic inhalation reference exposure level (REL). The acute health risk value is calculated by HARP 2 using the OEHHA method of dividing the maximum one hour concentration by the acute inhalation REL (CalEPA OEHHA 2015).

Three exposure pathways are considered for health effects: ingestion, dermal contact, and inhalation. The first two generally require direct contact with the contaminated medium (usually soil), while the latter includes the inhalation of vapors and respirable dust (usually in the form of PM_{10}). Inhalation is the only available pathway for the exhaust vapors that contain acrolein, acetaldehyde, formaldehyde, benzene, and 1,3-butadiene. Diesel PM is a respirable dust that can potentially be ingested (oral) or enter the body through contact with contaminated soil. Oral or non-inhalation exposure pathways include the ingestion of soil, fish, drinking water from surface waters, mother's milk, homegrown produce, beef, pork, chicken, eggs, and cow's milk. With respect to diesel PM, the oral pathway is available only through ingestion of contaminated soil, similar to dermal contact. However, oral slope toxicity for diesel PM is not listed by the OEHHA or by the U.S. EPA Integrated Risk Information System (IRIS) because toxicity studies have focused on the inhalation hazard. Therefore, only the inhalation pathway is considered in this risk assessment.

Excess cancer risk is based on a resident present at the proposed residential units for the high-end estimate of 30 years, which is SDAPCD's recommended exposure duration for sensitive and residential receptors (SDAPCD 2015). Although cancer risk is also commonly assessed for the 9-year and 70-year exposure durations, this analysis focuses on the recommended 30-year exposure and includes the 9-year exposure for informational purposes.

Figure 3 Map of Sources and Receptors



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HRA Fig 3 Sources and Receptors

3.2 Significance Thresholds

The U.S. EPA's accepted risk management range for site-related exposures is one in 10,000 (1.0 x 10^{-4} or 1.0E-04) and one in one million (1.0 x 10^{-6} or 1.0E-06). In this range, site-specific conditions determine whether the potential risk is acceptable. However, cancer risk above one in 10,000 is considered unacceptable and requires further action. Passage of Proposition 65 (encoded in California Health and Safety Code Section 25249.6) in 1986 prohibits a person in the course of doing business from knowingly and intentionally exposing any individual to a chemical that has been listed as known to the state to cause cancer or reproductive toxicity without first giving clear and reasonable warning. For a chemical that is listed as a carcinogen, the "no significant risk" level under Proposition 65 is defined as the level that is calculated to result in not more than one excess case of cancer in 100,000 individuals (1.0E-05). The County of San Diego recommends the use of this risk level (also reportable as 10 in one million) as the significance threshold for toxic air contaminants when Toxics-Best Available Control Technology (T-BACT) is applied. When such T-BACT is not applied, the County recommends a significance threshold of one in one million (1.0E-06)(County of San Diego 2007).

In addition, the SDAPCD recommends that the non-carcinogenic hazards of toxic air contaminants should not exceed a hazard index of 1.0 for either chronic or acute effects (SDAPCD 2017). Acute effects are due to short-term exposure, while chronic effects are due to long-term exposure to a substance. For chronic and acute risks, the hazard index is calculated as the summation of the hazard quotients for all chemicals to which an individual would be exposed.

To provide a perspective on risk, the American Cancer Society (2007) reports that in the U.S., men have about a one in two chance (0.50 probability) and women about a one in three chance (0.33) of developing cancer during a lifetime, with almost one in four deaths (0.23) in the U.S. attributed to cancer. Based on this background cancer risk level in the general population, application of a 1.0E-05 excess risk limit means that the contribution from a toxic hazard should not cause the resultant cancer risk for the exposed population to exceed 0.50001 for men or 0.33001 for women.

3.3 Results

Potential health risks were modeled for all three sensitive receptor locations, as shown in Table 3. The second, third, and fourth floors of the building were modeled for each sensitive receptor location. Carcinogenic health risk exceeding the significance criterion of one excess cancer case per one million population without application of T-BACT was identified at all three sensitive receptor locations for both 30-year and 9-year exposures. For the 30-year exposure, excess cancer risk for Receptors 1 through 3 would range from 5.to 10.8 in one million. In comparison, excess cancer risk for the 9-year exposure for these receptors would range from 3.to 7.7 in one million. Diesel exhaust particulates are the major source of the carcinogenic health risk, as they are responsible for nearly 74% of the calculated risk at the maximum exposed individual receptor (MEIR), which is Receptor 3 (Second Floor). Potential acute and chronic health risks were below SDAPCD's health risk criteria of 1.0 for all sensitive receptors. This analysis is based on outside air concentrations and conservatively assumes that interior concentrations would be identical. See Appendix A for more detailed accounting of the risk at each site per pollutant of concern.

Table 3 Potential Health Risks at Sensitive Receptors

	Cancer Risk		Chronic Risk		Acute Risk	
Exposure Duration	**Excess Cancer Risk**	**Exceed Criterion? (>1.0E-06)**	**Chronic Hazard Quotient**	**Exceed Criterion? (>1?)**	**Acute Hazard Quotient**	**Exceed Criterion? (>1?)**
Receptor 1 (Second Floor)						
30-Year	5.96E-06 (6.0 in one million)	Yes	3.80E-03	No	1.65E-03	No
9-Year	4.26E-06 (4.3 in one million)	Yes	3.80E-03	No	1.65E-03	No
Receptor 1 (Third Floor)						
30-Year	5.53E-06 (5.5 in one million)	Yes	3.52E-03	No	3.20E-03	No
9-Year	3.95E-06 (4.0 in one million)	Yes	3.52E-03	No	3.20E-03	No
Receptor 1 (Fourth Floor)						
30-Year	5.25E-06 (5.3 in one million)	Yes	3.34E-03	No	4.60E-03	No
9-Year	3.75E-06 (3.8 in one million)	Yes	3.34E-03	No	4.60E-03	No
Receptor 2 (Second Floor)						
30-Year	1.05E-05 (10.5 in one million)	Yes	6.64E-03	No	2.68E-03	No
9-Year	7.47E-06 (7.5 in one million)	Yes	6.64E-03	No	2.68E-03	No
Receptor 2 (Third Floor)						
30-Year	9.97E-06 (10 in one million)	Yes	6.32E-03	No	4.28E-03	No
9-Year	7.12E-06 (7.1 in one million)	Yes	6.32E-03	No	4.28E-03	No
Receptor 2 (Fourth Floor)						
30-Year	9.25E-06 (9.3 in one million)	Yes	5.87E-03	No	6.12E-03	No
9-Year	6.61E-06 (6.6 in one million)	Yes	5.87E-03	No	6.12E-03	No
Receptor 3 (Second Floor)						
30-Year	1.08E-05 (10.8in one million)	Yes	6.86E-03	No	2.53E-03	No
9-Year	7.71E-06 (7.7 in one million)	Yes	6.86E-03	No	2.53E-03	No
Receptor 3 (Third Floor)						
30-Year	1.02E-05 (10.2in one million)	Yes	6.50E-03	No	4.27E-03	No
9-Year	7.32E-06 (7.3 in one million)	Yes	6.50E-03	No	4.27E-03	No
Receptor 3 (Fourth Floor)						
30-Year	9.64E-06 (9.6 in one million)	Yes	6.12E-03	No	6.32E-03	No

	Cancer Risk		Chronic Risk		Acute Risk	
9-Year	6.89E-06 (6.9 in one million)	Yes	6.12E-03	No	6.32E-03	No

All floor levels (with the exception of the first floor) were modeled for each sensitive receptor (see Figure 3). Refer to Appendix A for complete model results.

4 Conclusions and Recommendations

The proposed use of the site for residential development would expose on-site residents to potentially significant carcinogenic health risks associated with TAC emissions, specifically diesel exhaust particulates, based upon SDAPCD health risk criteria. The calculated risk is based on exposure to outdoor air 24 hours per day. However, the U.S. EPA *Exposure Factors Handbook* indicates that the recommended daily activity pattern includes 16.6 hours per day spent inside and 2.3 hours per day outside, or approximately 88% of time at home is spent indoors and 12% of time at home is spent outdoors (U.S. EPA 2011). The remaining daily time is spent off-site. As a conservative simplifying assumption, this analysis presumes that residents would have the windows open sufficiently to equalize the concentration of pollutants between the indoor and outdoor environment. This simplifying assumption results in a calculated risk that is likely to be nearly an order of magnitude higher than actual indoor risk.

Diesel particulates will settle out to some unknown extent on window screens and other surfaces as outdoor air enters into the indoor air environment, though at least a portion of this settled material would become re-suspended during cleaning and other activities. Therefore, it is likely that this analysis over-estimates the carcinogenic health risk. Furthermore, current regulatory action by ARB is intended to reduce the amount of diesel exhaust particulates associated with on-road diesel trucks in the future (note that the analysis was based on year 2019 composite emission factors). Conversely, vehicle emissions are based on current traffic estimates; truck traffic growth that may occur in the future along this portion of I-5 may result in increased emissions on a per mile basis, but such increases in truck traffic will be offset to some degree by changes in both the truck and non-diesel vehicle fleets as newer, less polluting vehicles become the majority portion of the fleet populations. Nevertheless, because the carcinogenic health risks at the MEIR for the 30-year residency scenarios are greater than one in one million without the application of T-BACT, the potential effect of exposure to diesel particulate air pollutants at this site is considered potentially significant.

Based on the above analysis, the potential carcinogenic health risk can be mitigated to a less than significant level by reducing the amount of diesel exhaust particulates that the residents are exposed to in the indoor environment. The County of San Diego’s significance thresholds for exposing sensitive receptors to substantial pollutant concentrations are one excess cancer case per one million population for projects without the application of T-BACT, and ten excess cancer cases per one million population for projects using T-BACT (County of San Diego 2007). Installing filters with a minimum MERV rating of 10, which can remove 50% of particulates in the 1-3 µg range (Walker 2013), constitutes T-BACT and can reduce estimated excess cancer cases to less than the ten per one million population threshold. Therefore, the following actions are required to reduce overall cancer risk:

- Provide forced air mechanical ventilation with fresh air filtration screens on outside air intake ducts for all residential units proposed on the site. The filter screens should have a minimum MERV 10 rating, capable of removing at least 50% of the particulate matter including fine particulate matter ($PM_{2.5}$). Air intakes should be located on the side of the building facing away from I-5 and windows facing I-5 should not be capable of opening, unless warranted to comply with California Building Code requirements for emergency egress.
- For individual residential units with separate HVAC systems, provide a brochure notifying the future residents of the need for maintaining the filter screens and keeping windows closed to

ensure adequate fresh air filtration at the time of lease signing. In addition, record a notice of the risk hazard of diesel particulates and the need for screen maintenance in the property title and include this notice with lease agreements.

- Install high efficiency ceiling fans so that interior temperatures can be comfortable with windows closed.
- Weatherproof windows and doors with caulking and weather-stripping that is rated to last at least 20 years.

These mitigation actions would remove particulates before they enter the indoor environment, thereby reducing the overall exposure of individual residents. The above mitigation actions would apply to all residential receptors on the project site. Mitigated health risk values were derived using the following equation:

Mitigated Risk = [Unmitigated Risk]/EF*EF_a+(1-FE)*([Unmitigated Risk]/EF*EF_{ai})

Where:

EF =	*Exposure frequency in days per year*	*= 350*
EF_a =	*Exposure frequency adjusted outside (only 2.3 hours/day outside)*	*= 33.5*
EF_{ai} =	*Exposure frequency adjusted inside (16.9 hours/day inside)*	*= 246.5*
FE =	*Filter efficiency*	*= 50%*

Table 4 indicates the calculated cancer risk at each sensitive receptor with implementation of the above recommendations. The second, third, and fourth floors were modeled for each sensitive receptor location. The estimated reduction in cancer risk assumes removal of the DPM by the whole house filter (these filters have efficiency rates exceeding 50%), but continued exposure to outside air on the project site for a period of 2.3 hours daily (U.S. EPA 2011). As Table 4 indicates, incorporation of the filtration system and all other recommendations would reduce the overall cancer risk for all receptors to below the ten in one million level with application of T-BACT for both the 30-year (95^{th} percentile) and 9-year (50^{th} percentile) scenarios.

Table 4 Mitigated Potential Carcinogenic Health Risks Within the Project Site

Sensitive Receptor	Exposure Duration	Mitigated Cancer Risk[1]	Exceed Criterion? (>1.0E-05)
Receptor 1 (Second Floor)	30-Year	2.67E-06 (2.7 in one million)	No
	9-Year	1.91E-06 (1.9 in one million)	No
Receptor 1 (Third Floor)	30-Year	2.48E-06 (2.5 in one million)	No
	9-Year	1.77E-06 (1.8 in one million)	No
Receptor 1 (Fourth Floor)	30-Year	2.35E-06 (2.4 in one million)	No
	9-Year	1.68E-06 (1.7 in one million)	No
Receptor 2 (Second Floor)	30-Year	4.68E-06 (4.7 in one million)	No
	9-Year	3.34E-06 (3.3 in one million)	No
Receptor 2 (Third Floor)	30-Year	4.47E-06 (4.5 in one million)	No
	9-Year	3.19E-06 (3.2 in one million)	No
Receptor 2 (Fourth Floor)	30-Year	4.14E-06 (4.1 in one million)	No
	9-Year	2.96E-06 (3.0 in one million)	No
Receptor 3 (Second Floor)	30-Year	4.84E-06 (4.8 in one million)	No
	9-Year	3.45E-06 (3.5 in one million)	No
Receptor 3 (Third Floor)	30-Year	4.59E-06 (4.6 in one million)	No
	9-Year	3.28E-06 (3.3 in one million)	No
Receptor 3 (Fourth Floor)	30-Year	4.32E-06 (4.3 in one million)	No
	9-Year	3.08E-06 (3.1 in one million)	No

[1] Mitigated cancer risk was calculated using a filter efficiency of 50%.
All floor levels(with the exception of the first floor) were modeled for each sensitive receptor (see Figure 3). Refer to Appendix A for complete model results.

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Appendix A

Emissions Estimates (adapted from the UC Davis-Caltrans MSAT model), AERMOD Output, and HARP 2 Risk Results

Emissions Calculations: I-5

AADT	AADT per direction	Caltrans Truck %	Number of daily trucks	Diesel Trucks[1]	Gas Trucks[1]	LD Vehicles	LD Diesel[2]	All Gas
167,000	83,500	4.10%	3,424	733	2,691	80,076	581	82,186

Sources: Caltrans. 2015 Traffic Volumes on California State Highways; 2015 Annual Average Daily Truck Traffic on the California Highway System.

[1] "Translation Factors" (% of trucks that are diesel-powered; they translate Caltrans truck data into an estimate of diesel vehicles)

Diesel Proportion:	21.4%
Non-Diesel Proportion:	78.6%

Source: UC Davis-Caltrans Air Quality Project, Project-Level Mobile Source Air Toxics Analysis

[2] Light Duty Diesel proportion based on vehicle miles traveled for LDA, LDT1, and LDT2 for Year 2019, San Diego County , EMFAC2014.

	Truck Diesel Vehicles		Light Duty Diesel Vehicles		All Gas Vehicles
Speed (miles/hour)	**hot stabilized exhaust PM** (grams/mile)	**hot stabilized exhaust TOG** (grams/mile)	**hot stabilized exhaust PM** (grams/mile)	**hot stabilized exhaust TOG** (grams/mile)	**hot stabilized exhaust TOG** (grams/mile)
50 mph for truck TOG 60 mph for truck PM 65 mph for light duty and gas	0.0678	0.0956	0.0147	0.0235	0.0485

Source: EMFAC2014 Emissions Database

Mobile Source Air Toxics (MSAT) Speciation Factors Based on Proportion In TOG

Analysis Year	Diesel					Non-Diesel				
	Hot Stabilized Exhaust					Hot Stabilized Exhaust				
	benzene	1,3-butadiene	Acetaldehyde	Acrolein*	Formaldehyde	benzene	1,3-butadiene	Acetaldehyde	Acrolein	Formaldehyde
2019	0.0200	0.0019	0.0735	0.0061	0.1471	0.0222	0.0049	0.0029	0.0011	0.0147
Total Daily Emissions (g/mi)	1.68	0.16	6.16	0.51	12.32	88.37	19.70	11.39	4.50	58.57

Source: UC Davis-Caltrans Air Quality Project, Project-Level Mobile Source Air Toxics Analysis

* Acrolein for diesel was unavailable and used U.S. Environmental Protection Agency Motor Vehicle Emission Simulator (MOVES2014a).

Derivation of Emission Rates for I-5 Sources

Freeway width, one way	67.9 feet	20.7	m	4 lanes on I-5S
Each direction segment at	679.1 feet long	207	m long	

	Emissions					
	Diesel PM	Benzene	1,3-Butadiene	Acetaldehyde	Acrolein	Formaldehyde
grams/mi/day **	58.2857	90.0489	19.8564	17.5523	5.0119	70.8880
lbs/hour/segment	0.0007	0.0011	0.0002	0.0002	0.0001	0.0008
lbs/day/segment	0.0165	0.0255	0.0056	0.0050	0.0014	0.0201
lbs/year/segment ***	6.0327	9.3203	2.0552	1.8167	0.5187	7.3371

Freeway width, one way	67.9 feet	20.7	m	4 lanes on I-5N
Each direction segment at	679.1 feet long	207	m long	

	Emissions					
	Diesel PM	Benzene	1,3-Butadiene	Acetaldehyde	Acrolein	Formaldehyde
grams/mi/day **	58.2857	90.0489	19.8564	17.5523	5.0119	70.8880
lbs/hour/segment	0.0007	0.0011	0.0002	0.0002	0.0001	0.0008
lbs/day/segment	0.0165	0.0255	0.0056	0.0050	0.0014	0.0201
lbs/year/segment ***	6.0327	9.3203	2.0552	1.8167	0.5187	7.3371

** Total emissions per mile calculated using the above speciation factors.

*** Based on 365 day/year

Emissions Calculations: Ramp #1 (SB off to 27th/National)

AADT	AADT per direction	Caltrans Truck %	Number of daily trucks	Diesel Truck[1]	Gas Truck[1]	LD Vehicles	LD Diesel[2]	All Gas
2,950	1,475	4.10%	60	13	47	1,415	10	1,452

Sources: Caltrans. 2015 Traffic Volumes on California State Highways; 2015 Annual Average Daily Truck Traffic on the California Highway System.

[1] "Translation Factors" (% of trucks that are diesel-powered; they translate Caltrans truck data into an estimate of diesel vehicles)

Diesel Proportion:	21.4%
Non-Diesel Proportion:	78.6%

Source: UC Davis-Caltrans Air Quality Project, Project-Level Mobile Source Air Toxics Analysis

[2] Light Duty Diesel proportion based on vehicle miles traveled for LDA, LDT1, and LDT2 for Year 2014, San Diego County, EMFAC2014.

	Truck Diesel Vehicles		Light Duty Diesel Vehicles		All Gas Vehicles
Speed (miles/hour)	**hot stabilized exhaust PM** (grams/mile)	**hot stabilized exhaust TOG** (grams/mile)	**hot stabilized exhaust PM** (grams/mile)	**hot stabilized exhaust TOG** (grams/mile)	**hot stabilized exhaust TOG** (grams/mile)
35	0.033395316	0.212629955	0.014083522	0.026484131	0.049903791

Source: EMFAC2014 Emissions Database

Mobile Source Air Toxics (MSAT) Speciation Factors Based on Proportion In TOG

Analysis Year	Diesel					Non-Diesel				
	Hot Stabilized Exhaust					Hot Stabilized Exhaust				
	benzene	1,3-butadiene	Acetaldehyde	Acrolein*	Formaldehyde	benzene	1,3-butadiene	Acetaldehyde	Acrolein	Formaldehyde
2019	0.020009	0.001900	0.073526	0.006088	0.147133	0.022182	0.004944	0.002860	0.001130	0.014700
Total Daily Emissions (g/mi)	0.06	0.49	7.42	0.00	17.84	1.61	0.36	0.21	0.08	1.06

Source: UC Davis-Caltrans Air Quality Project, Project-Level Mobile Source Air Toxics Analysis

* Acrolein for diesel was unavailable and used U.S. Environmental Protection Agency Motor Vehicle Emission Simulator (MOVES2014a).

Derivation of Emission Rates for I-5 Sources: Ramp #1 (SB off to 27th/National)

Freeway width, one way	30.8 feet	9.4 m	1 lane
Each direction segment at	308.4 feet long	94 m long	

Emissions

	Diesel PM	Benzene	1,3-Butadiene	Acetaldehyde	Acrolein	Formaldehyde
grams/mi/day **	0.5788	1.6677	0.8530	7.6284	0.0819	18.9081
lbs/hour/segment	0.0000031	0.0000089	0.0000046	0.0000409	0.00000044	0.000101
lbs/day/segment	0.0001	0.0002	0.0001	0.0010	0.0000	0.0024
lbs/year/segment ***	0.0272	0.0784	0.0401	0.3585	0.0038	0.8887

** Total emissions per mile calculated using the above speciation factors.
*** Based on 365 day/year

Emissions Calculations: Ramp #2 (SB off to 28th)

AADT	AADT per direction	Caltrans Truck %	Number of daily trucks	Diesel Truck[1]	Gas Truck[1]	LD Vehicles	LD Diesel[2]	All Gas
6,700	3,350	4.10%	137	29	108	3,213	23	3,298

Sources: Caltrans. 2015 Traffic Volumes on California State Highways; 2015 Annual Average Daily Truck Traffic on the California Highway System.

[1] "Translation Factors" (% of trucks that are diesel-powered; they translate Caltrans truck data into an estimate of diesel vehicles)

Diesel Proportion:	21.4%
Non-Diesel Proportion:	78.6%

Source: UC Davis-Caltrans Air Quality Project, Project-Level Mobile Source Air Toxics Analysis

[2] Light Duty Diesel proportion based on vehicle miles traveled for LDA, LDT1, and LDT2 for Year 2014, San Diego County, EMFAC2014.

	Truck Diesel Vehicles		**Light Duty Diesel Vehicles**		**All Gas Vehicles**
Speed (miles/hour)	**hot stabilized exhaust PM** (grams/mile)	**hot stabilized exhaust TOG** (grams/mile)	**hot stabilized exhaust PM** (grams/mile)	**hot stabilized exhaust TOG** (grams/mile)	**hot stabilized exhaust TOG** (grams/mile)
35	0.033395316	0.212629955	0.014083522	0.026484131	0.049903791

Source: EMFAC2014 Emissions Database

Mobile Source Air Toxics (MSAT) Speciation Factors Based on Proportion In TOG

Analysis Year	**Diesel**					**Non-Diesel**				
	Hot Stabilized Exhaust					**Hot Stabilized Exhaust**				
	benzene	1,3-butadiene	Acetaldehyde	Acrolein*	Formaldehyde	benzene	1,3-butadiene	Acetaldehyde	Acrolein	Formaldehyde
2019	0.020009	0.001900	0.073526	0.006088	0.147133	0.022182	0.004944	0.002860	0.001130	0.014700
Total Daily Emissions (g/mi)	0.14	0.01	0.50	0.04	1.00	3.65	0.81	0.47	0.19	2.42

Source: UC Davis-Caltrans Air Quality Project, Project-Level Mobile Source Air Toxics Analysis

* Acrolein for diesel was unavailable and used U.S. Environmental Protection Agency Motor Vehicle Emission Simulator (MOVES2014a).

Derivation of Emission Rates for I-5 Sources: Ramp #2 (SB off to 28th Street)

Freeway width, one way	30.8 feet	9.4 m	1 lane
Each direction segment at	308.4 feet long	94 m long	

Emissions

	Diesel PM	Benzene	1,3-Butadiene	Acetaldehyde	Acrolein	Formaldehyde
grams/mi/day **	1.2969	3.7861	0.8265	0.9695	0.2273	3.4173
lbs/hour/segment	0.0000070	0.0000203	0.0000044	0.0000052	0.0000012	0.0000183
lbs/day/segment	0.0002	0.0005	0.0001	0.0001	0.0000	0.0004
lbs/year/segment ***	0.0610	0.1780	0.0388	0.0456	0.0107	0.1606

** Total emissions per mile calculated using the above speciation factors.
*** Based on 365 day/year

Emissions Calculations: Ramp #3 (NB on from WB National)

AADT	AADT per direction	Caltrans Truck %	Number of daily trucks	Diesel Truck[1]	Gas Truck[1]	LD Vehicles	LD Diesel[2]	All Gas
4,200	2,100	4.10%	86	18	68	2,014	14	2,068

Sources: Caltrans. 2015 Traffic Volumes on California State Highways; 2015 Annual Average Daily Truck Traffic on the California Highway System.

[1] "Translation Factors" (% of trucks that are diesel-powered; they translate Caltrans truck data into an estimate of diesel vehicles)

Diesel Proportion:	21.4%
Non-Diesel Proportion:	78.6%

Source: UC Davis-Caltrans Air Quality Project, Project-Level Mobile Source Air Toxics Analysis

[2] Light Duty Diesel proportion based on vehicle miles traveled for LDA, LDT1, and LDT2 for Year 2014, San Diego County, EMFAC2014.

	Truck Diesel Vehicles		**Light Duty Diesel Vehicles**		**All Gas Vehicles**
Speed (miles/hour)	**hot stabilized exhaust PM** (grams/mile)	**hot stabilized exhaust TOG** (grams/mile)	**hot stabilized exhaust PM** (grams/mile)	**hot stabilized exhaust TOG** (grams/mile)	**hot stabilized exhaust TOG** (grams/mile)
50	0.032262415	0.095612312	0.012043857	0.026484131	0.041173232

Source: EMFAC2014 Emissions Database

Mobile Source Air Toxics (MSAT) Speciation Factors Based on Proportion In TOG

Analysis Year	**Diesel**					**Non-Diesel**				
	Hot Stabilized Exhaust					**Hot Stabilized Exhaust**				
	benzene	1,3-butadiene	Acetaldehyde	Acrolein*	Formaldehyde	benzene	1,3-butadiene	Acetaldehyde	Acrolein	Formaldehyde
2019	0.020009	0.001900	0.073526	0.006088	0.147133	0.022182	0.004944	0.002860	0.001130	0.014700
Total Daily Emissions (g/mi)	0.04	0.00	0.15	0.01	0.31	1.89	0.42	0.24	0.10	1.25

Source: UC Davis-Caltrans Air Quality Project, Project-Level Mobile Source Air Toxics Analysis

* Acrolein for diesel was unavailable and used U.S. Environmental Protection Agency Motor Vehicle Emission Simulator (MOVES2014a).

Derivation of Emission Rates for I-5 Sources: Ramp #3 (NB on from WB National)

Freeway width, one way	30.8	feet	9.4	m	1 lane
Each direction segment at	308.4	feet long	94	m long	

Emissions

	Diesel PM	Benzene	1,3-Butadiene	Acetaldehyde	Acrolein	Formaldehyde
grams/mi/day **	0.7489	1.9306	0.4249	0.3972	0.1089	1.5593
lbs/hour/segment	0.0000040	0.0000104	0.0000023	0.0000021	0.0000006	0.0000084
lbs/day/segment	0.0001	0.0002	0.0001	0.0001	0.0000	0.0002
lbs/year/segment ***	0.0352	0.0907	0.0200	0.0187	0.0051	0.0733

** Total emissions per mile calculated using the above speciation factors.
*** Based on 365 day/year

*HARP - HRACalc v17023 7/20/2017 12:51:54 PM - Cancer Risk

REC	GRP	NETID	X	Y	RISK_SUM	SCENARIO	INH_RISK
101	SENSITIV	SR1001	487033	3617726	4.26E-06	9YrCancerDerived_Inh_FAH3to70	4.26E-06
102	SENSITIV	SR1002	487033	3617726	3.95E-06	9YrCancerDerived_Inh_FAH3to70	3.95E-06
103	SENSITIV	SR1003	487033	3617726	3.75E-06	9YrCancerDerived_Inh_FAH3to70	3.75E-06
104	SENSITIV	SR1004	487007	3617696	7.47E-06	9YrCancerDerived_Inh_FAH3to70	7.47E-06
105	SENSITIV	SR1005	487007	3617696	7.12E-06	9YrCancerDerived_Inh_FAH3to70	7.12E-06
106	SENSITIV	SR1006	487007	3617696	6.61E-06	9YrCancerDerived_Inh_FAH3to70	6.61E-06
107	SENSITIV	SR1007	487042	3617670	7.71E-06	9YrCancerDerived_Inh_FAH3to70	7.71E-06
108	SENSITIV	SR1008	487042	3617670	7.32E-06	9YrCancerDerived_Inh_FAH3to70	7.32E-06
109	SENSITIV	SR1009	487042	3617670	6.89E-06	9YrCancerDerived_Inh_FAH3to70	6.89E-06

*HARP - HRACalc v17023 7/20/2017 12:52:04 PM - Acute Risk

REC	GRP	NETID	X	Y	SCENARIO	CV	CNS	IMMUN	KIDNEY	GILV	REPRO/DEVEL	RESP	SKIN	EYE	BONE/TEETH	ENDO	BLOOD	ODOR	GENERAL	MAXHI
101	SENSITIV	SR1001	487033	3617726	NonCancerAcute	0.00E+00	0.00E+00	1.63E-03	0.00E+00	0.00E+00	1.65E-03	1.00E-03	0.00E+00	1.65E-03	0.00E+00	0.00E+00	1.63E-03	0.00E+00	0.00E+00	1.65E-03
102	SENSITIV	SR1002	487033	3617726	NonCancerAcute	0.00E+00	0.00E+00	3.11E-03	0.00E+00	0.00E+00	3.14E-03	1.91E-03	0.00E+00	3.20E-03	0.00E+00	0.00E+00	3.11E-03	0.00E+00	0.00E+00	3.20E-03
103	SENSITIV	SR1003	487033	3617726	NonCancerAcute	0.00E+00	0.00E+00	4.49E-03	0.00E+00	0.00E+00	4.53E-03	2.76E-03	0.00E+00	4.60E-03	0.00E+00	0.00E+00	4.49E-03	0.00E+00	0.00E+00	4.60E-03
104	SENSITIV	SR1004	487007	3617696	NonCancerAcute	0.00E+00	0.00E+00	2.66E-03	0.00E+00	0.00E+00	2.68E-03	1.63E-03	0.00E+00	2.68E-03	0.00E+00	0.00E+00	2.66E-03	0.00E+00	0.00E+00	2.68E-03
105	SENSITIV	SR1005	487007	3617696	NonCancerAcute	0.00E+00	0.00E+00	4.19E-03	0.00E+00	0.00E+00	4.23E-03	2.57E-03	0.00E+00	4.28E-03	0.00E+00	0.00E+00	4.19E-03	0.00E+00	0.00E+00	4.28E-03
106	SENSITIV	SR1006	487007	3617696	NonCancerAcute	0.00E+00	0.00E+00	6.02E-03	0.00E+00	0.00E+00	6.07E-03	3.69E-03	0.00E+00	6.12E-03	0.00E+00	0.00E+00	6.02E-03	0.00E+00	0.00E+00	6.12E-03
107	SENSITIV	SR1007	487042	3617670	NonCancerAcute	0.00E+00	0.00E+00	2.51E-03	0.00E+00	0.00E+00	2.53E-03	1.54E-03	0.00E+00	2.53E-03	0.00E+00	0.00E+00	2.51E-03	0.00E+00	0.00E+00	2.53E-03
108	SENSITIV	SR1008	487042	3617670	NonCancerAcute	0.00E+00	0.00E+00	4.17E-03	0.00E+00	0.00E+00	4.20E-03	2.56E-03	0.00E+00	4.27E-03	0.00E+00	0.00E+00	4.17E-03	0.00E+00	0.00E+00	4.27E-03
109	SENSITIV	SR1009	487042	3617670	NonCancerAcute	0.00E+00	0.00E+00	6.20E-03	0.00E+00	0.00E+00	6.25E-03	3.80E-03	0.00E+00	6.32E-03	0.00E+00	0.00E+00	6.20E-03	0.00E+00	0.00E+00	6.32E-03

*HARP - HRACalc v17023 7/20/2017 12:51:54 PM - Chronic Risk

REC	GRP	NETID	X	Y	SCENARIO	CV	CNS	IMMUN	KIDNEY	GILV	REPRO/DEVEL	RESP	SKIN	EYE	BONE/TEETH	ENDO	BLOOD	ODOR	GENERAL	MAXHI
101	SENSITIV	SR1001	487033	3617726	NonCancerChronicDerived_Inh	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.11E-03	3.80E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.33E-03	0.00E+00	0.00E+00	3.80E-03
102	SENSITIV	SR1002	487033	3617726	NonCancerChronicDerived_Inh	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.03E-03	3.52E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.10E-03	0.00E+00	0.00E+00	3.52E-03
103	SENSITIV	SR1003	487033	3617726	NonCancerChronicDerived_Inh	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.74E-04	3.34E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.94E-03	0.00E+00	0.00E+00	3.34E-03
104	SENSITIV	SR1004	487007	3617696	NonCancerChronicDerived_Inh	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.94E-03	6.64E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.85E-03	0.00E+00	0.00E+00	6.64E-03
105	SENSITIV	SR1005	487007	3617696	NonCancerChronicDerived_Inh	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.85E-03	6.32E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.57E-03	0.00E+00	0.00E+00	6.32E-03
106	SENSITIV	SR1006	487007	3617696	NonCancerChronicDerived_Inh	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.71E-03	5.87E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.17E-03	0.00E+00	0.00E+00	5.87E-03
107	SENSITIV	SR1007	487042	3617670	NonCancerChronicDerived_Inh	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.00E-03	6.86E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.04E-03	0.00E+00	0.00E+00	6.86E-03
108	SENSITIV	SR1008	487042	3617670	NonCancerChronicDerived_Inh	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.90E-03	6.50E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.73E-03	0.00E+00	0.00E+00	6.50E-03
109	SENSITIV	SR1009	487042	3617670	NonCancerChronicDerived_Inh	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.79E-03	6.12E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.39E-03	0.00E+00	0.00E+00	6.12E-03

*HARP - HRACalc v17023 7/20/2017 12:52:04 PM - Cancer Risk

REC	% Diesel PM	% Benzene	% 1,3-Butadiene	% Acetaldehyde	% Acrolein	% Formaldehyde	Total Risk	CONC
101	73.80%	10.41%	13.81%	0.21%	0.00%	1.77%	5.96E-06	0.006449
102	73.83%	10.40%	13.79%	0.21%	0.00%	1.76%	5.53E-06	0.005991
103	73.85%	10.40%	13.79%	0.21%	0.00%	1.75%	5.25E-06	0.005689
104	73.87%	10.40%	13.78%	0.21%	0.00%	1.75%	1.05E-05	0.011326
105	73.89%	10.40%	13.77%	0.21%	0.00%	1.74%	9.97E-06	0.010804
106	73.89%	10.40%	13.77%	0.21%	0.00%	1.74%	9.25E-06	0.010027
107	73.85%	10.40%	13.79%	0.21%	0.00%	1.75%	1.08E-05	0.011696
108	73.87%	10.40%	13.78%	0.21%	0.00%	1.74%	1.02E-05	0.0111
109	73.88%	10.40%	13.77%	0.21%	0.00%	1.74%	9.64E-06	0.010447

Diesel PM				Benzene				1,3-Butadiene		
POLID	POLABBREV	RISK_SUM	CONC	POLID	POLABBREV	RISK_SUM	CONC	POLID	POLABBREV	RISK_SUM
9901	DieselExhPM	4.40E-06	0.010004	71432	Benzene	6.20E-07	0.0022122	106990	1,3-Butadiene	8.23E-07
9901	DieselExhPM	4.08E-06	0.009286	71432	Benzene	5.76E-07	0.0020519	106990	1,3-Butadiene	7.63E-07
9901	DieselExhPM	3.88E-06	0.008815	71432	Benzene	5.46E-07	0.0019474	106990	1,3-Butadiene	7.24E-07
9901	DieselExhPM	7.72E-06	0.017535	71432	Benzene	1.09E-06	0.0038725	106990	1,3-Butadiene	1.44E-06
9901	DieselExhPM	7.37E-06	0.016721	71432	Benzene	1.04E-06	0.0036914	106990	1,3-Butadiene	1.37E-06
9901	DieselExhPM	6.84E-06	0.015517	71432	Benzene	9.62E-07	0.0034251	106990	1,3-Butadiene	1.27E-06
9901	DieselExhPM	7.97E-06	0.018118	71432	Benzene	1.12E-06	0.0040028	106990	1,3-Butadiene	1.49E-06
9901	DieselExhPM	7.57E-06	0.017187	71432	Benzene	1.07E-06	0.0037952	106990	1,3-Butadiene	1.41E-06
9901	DieselExhPM	7.12E-06	0.016171	71432	Benzene	1.00E-06	0.0035704	106990	1,3-Butadiene	1.33E-06

Acetaldehyde				Acrolein				Formaldehyde			
CONC	POLID	POLABBREV	RISK_SUM	CONC	POLID	POLABBREV	RISK_SUM	CONC	POLID	POLABBREV	RISK_SUM
0.0020474	75070	Acetaldehyde	1.27E-08	0.000557	107028	Acrolein	0.00E+00	0.008109	50000	Formaldehyde	1.06E-07
0.0018764	75070	Acetaldehyde	1.16E-08	0.000517	107028	Acrolein	0.00E+00	0.007469	50000	Formaldehyde	9.72E-08
0.0017745	75070	Acetaldehyde	1.10E-08	0.000491	107028	Acrolein	0.00E+00	0.007074	50000	Formaldehyde	9.21E-08
0.0035111	75070	Acetaldehyde	2.18E-08	0.000976	107028	Acrolein	0.00E+00	0.014027	50000	Formaldehyde	1.83E-07
0.0033252	75070	Acetaldehyde	2.06E-08	0.000931	107028	Acrolein	0.00E+00	0.013321	50000	Formaldehyde	1.73E-07
0.0030811	75070	Acetaldehyde	1.91E-08	0.000864	107028	Acrolein	0.00E+00	0.01235	50000	Formaldehyde	1.61E-07
0.0036522	75070	Acetaldehyde	2.26E-08	0.001008	107028	Acrolein	0.00E+00	0.014552	50000	Formaldehyde	1.89E-07
0.0034352	75070	Acetaldehyde	2.13E-08	0.000957	107028	Acrolein	0.00E+00	0.013734	50000	Formaldehyde	1.79E-07
0.0032245	75070	Acetaldehyde	2.00E-08	0.0009	107028	Acrolein	0.00E+00	0.012904	50000	Formaldehyde	1.68E-07

*HARP - HRACalc v17023 7/20/2017 12:52:04 PM - Cancer Risk

REC	GRP	NETID	X	Y	RISK_SUM	SCENARIO	INH_RISK
101	SENSITIV	SR1001	487033	3617726	5.96E-06	30YrCancerDerived_Inh_FAH3to70	5.96E-06
102	SENSITIV	SR1002	487033	3617726	5.53E-06	30YrCancerDerived_Inh_FAH3to70	5.53E-06
103	SENSITIV	SR1003	487033	3617726	5.25E-06	30YrCancerDerived_Inh_FAH3to70	5.25E-06
104	SENSITIV	SR1004	487007	3617696	1.05E-05	30YrCancerDerived_Inh_FAH3to70	1.05E-05
105	SENSITIV	SR1005	487007	3617696	9.97E-06	30YrCancerDerived_Inh_FAH3to70	9.97E-06
106	SENSITIV	SR1006	487007	3617696	9.25E-06	30YrCancerDerived_Inh_FAH3to70	9.25E-06
107	SENSITIV	SR1007	487042	3617670	1.08E-05	30YrCancerDerived_Inh_FAH3to70	1.08E-05
108	SENSITIV	SR1008	487042	3617670	1.02E-05	30YrCancerDerived_Inh_FAH3to70	1.02E-05
109	SENSITIV	SR1009	487042	3617670	9.64E-06	30YrCancerDerived_Inh_FAH3to70	9.64E-06

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REC	GRP	NETID	X	Y	SCENARIO	CV	CNS	IMMUN	KIDNEY	GILV	REPRO/DEVEL	RESP	SKIN	EYE	BONE/TEETH	ENDO	BLOOD	ODOR	GENERAL	MAXHI
101	SENSITIV	SR1001	487033	3617726	NonCancerAcute	0.00E+00	0.00E+00	1.63E-03	0.00E+00	0.00E+00	1.65E-03	1.00E-03	0.00E+00	1.65E-03	0.00E+00	0.00E+00	1.63E-03	0.00E+00	0.00E+00	1.65E-03
102	SENSITIV	SR1002	487033	3617726	NonCancerAcute	0.00E+00	0.00E+00	3.11E-03	0.00E+00	0.00E+00	3.14E-03	1.91E-03	0.00E+00	3.20E-03	0.00E+00	0.00E+00	3.11E-03	0.00E+00	0.00E+00	3.20E-03
103	SENSITIV	SR1003	487033	3617726	NonCancerAcute	0.00E+00	0.00E+00	4.49E-03	0.00E+00	0.00E+00	4.53E-03	2.76E-03	0.00E+00	4.60E-03	0.00E+00	0.00E+00	4.49E-03	0.00E+00	0.00E+00	4.60E-03
104	SENSITIV	SR1004	487007	3617696	NonCancerAcute	0.00E+00	0.00E+00	2.66E-03	0.00E+00	0.00E+00	2.68E-03	1.63E-03	0.00E+00	2.68E-03	0.00E+00	0.00E+00	2.66E-03	0.00E+00	0.00E+00	2.68E-03
105	SENSITIV	SR1005	487007	3617696	NonCancerAcute	0.00E+00	0.00E+00	4.19E-03	0.00E+00	0.00E+00	4.23E-03	2.57E-03	0.00E+00	4.28E-03	0.00E+00	0.00E+00	4.19E-03	0.00E+00	0.00E+00	4.28E-03
106	SENSITIV	SR1006	487007	3617696	NonCancerAcute	0.00E+00	0.00E+00	6.02E-03	0.00E+00	0.00E+00	6.07E-03	3.69E-03	0.00E+00	6.12E-03	0.00E+00	0.00E+00	6.02E-03	0.00E+00	0.00E+00	6.12E-03
107	SENSITIV	SR1007	487042	3617670	NonCancerAcute	0.00E+00	0.00E+00	2.51E-03	0.00E+00	0.00E+00	2.53E-03	1.54E-03	0.00E+00	2.53E-03	0.00E+00	0.00E+00	2.51E-03	0.00E+00	0.00E+00	2.53E-03
108	SENSITIV	SR1008	487042	3617670	NonCancerAcute	0.00E+00	0.00E+00	4.17E-03	0.00E+00	0.00E+00	4.20E-03	2.56E-03	0.00E+00	4.27E-03	0.00E+00	0.00E+00	4.17E-03	0.00E+00	0.00E+00	4.27E-03
109	SENSITIV	SR1009	487042	3617670	NonCancerAcute	0.00E+00	0.00E+00	6.20E-03	0.00E+00	0.00E+00	6.25E-03	3.80E-03	0.00E+00	6.32E-03	0.00E+00	0.00E+00	6.20E-03	0.00E+00	0.00E+00	6.32E-03

*HARP - HRACalc v17023 7/20/2017 12:52:04 PM - Chronic Risk

REC	GRP	NETID	X	Y	SCENARIO	CV	CNS	IMMUN	KIDNEY	GILV	REPRO/DEVEL	RESP	SKIN	EYE	BONE/TEETH	ENDO	BLOOD	ODOR	GENERAL	MAXHI
101	SENSITIV	SR1001	487033	3617726	NonCancerChronicDerived_Inh	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.11E-03	3.80E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.33E-03	0.00E+00	0.00E+00	3.80E-03
102	SENSITIV	SR1002	487033	3617726	NonCancerChronicDerived_Inh	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.03E-03	3.52E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.10E-03	0.00E+00	0.00E+00	3.52E-03
103	SENSITIV	SR1003	487033	3617726	NonCancerChronicDerived_Inh	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.74E-04	3.34E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.94E-03	0.00E+00	0.00E+00	3.34E-03
104	SENSITIV	SR1004	487007	3617696	NonCancerChronicDerived_Inh	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.94E-03	6.64E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.85E-03	0.00E+00	0.00E+00	6.64E-03
105	SENSITIV	SR1005	487007	3617696	NonCancerChronicDerived_Inh	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.85E-03	6.32E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.57E-03	0.00E+00	0.00E+00	6.32E-03
106	SENSITIV	SR1006	487007	3617696	NonCancerChronicDerived_Inh	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.71E-03	5.87E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.17E-03	0.00E+00	0.00E+00	5.87E-03
107	SENSITIV	SR1007	487042	3617670	NonCancerChronicDerived_Inh	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.00E-03	6.86E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.04E-03	0.00E+00	0.00E+00	6.86E-03
108	SENSITIV	SR1008	487042	3617670	NonCancerChronicDerived_Inh	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.90E-03	6.50E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.73E-03	0.00E+00	0.00E+00	6.50E-03
109	SENSITIV	SR1009	487042	3617670	NonCancerChronicDerived_Inh	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.79E-03	6.12E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.39E-03	0.00E+00	0.00E+00	6.12E-03

Barrio Flats Mixed-Use Project

Noise Study

prepared for
Logan Holdings, LLC
861 6th Avenue #130
San Diego, California 92101

prepared by
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2215 Faraday Avenue, Suite A
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October 2018

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Environmental Scientists Planners Engineers
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1 Project Description

1.1 Introduction

This report is an analysis of the potential noise impacts of a proposed mixed-use project, located in the Barrio Logan neighborhood in San Diego, California. The project site is located south of Interstate 5 (I-5) and of Logan Avenue, and west of South 26th Street. The report has been prepared by Rincon Consultants, Inc. under contract to and for use by Logan Holdings, LLC. The purpose of this report is to analyze the project's potential temporary noise impacts associated with construction activity and potential long-term noise impacts associated with project operation.

1.2 Project Summary

The 0.4-acre (17,860 square feet) project site is located at 2257 Logan Avenue in the Barrio Logan neighborhood in San Diego, California. The project site is bounded by Logan Avenue to the north, South 26th Street to the east, and a service alley along the southwest boundary. I-5 runs northeast of the project site, approximately 200 feet from the northern site boundary. The site consists of four parcels: Assessor's Parcel Numbers (APN) 585-580-15, 585-580-16, 585-580-17, and 585-580-18. A used car sales yard and two two-story buildings (Gil's Quality Cars) currently occupy the site.

The project entails demolition of a two-story building (totaling 3,812 square feet), a one-story building (1,954 square feet), a carport (144 square feet), and the removal of a 250 square-foot trailer. A new 38,940 square-foot four-story mixed-use building would be constructed on the project site, that contains 24 residential units (totaling 26,655 square feet), four hotel rooms (totaling 4,385 square feet), and five retail spaces (totaling 5,850 square feet). Four of the 24 residential units would be affordable units for very low income. Parking at the project site would consist of 24 parking spaces, one van accessible stall, two carpool/low emission stalls, one EV parking and charging stall, four motorcycle spaces, and seventeen bicycle spaces (fifteen long-term and two short-term). The project includes the planting of eight street trees along Logan Avenue and South 26th Street, a landscaped courtyard, and a bioretention area on-site, designed to conform to the City of San Diego's land development code and standards.

Primary access to the project would occur via one driveway from the alley perpendicular to South 26th Street along the southwest boundary of the project site. Figure 1 shows the project site location and Figure 2 through Figure 5 show the proposed site plan.

Proposed development would require grading of approximately 0.36 acres (90 percent) of the site. Out of the 200 cubic yards of soil that would be cut from the project site, 50 cubic yards would remain on-site to be used as fill and 150 cubic yards would be exported off-site. The maximum height of fill would be 0.5 feet, and the maximum depth of cut will be one foot. Construction is expected to begin in January 2019 with project opening scheduled for 2020.

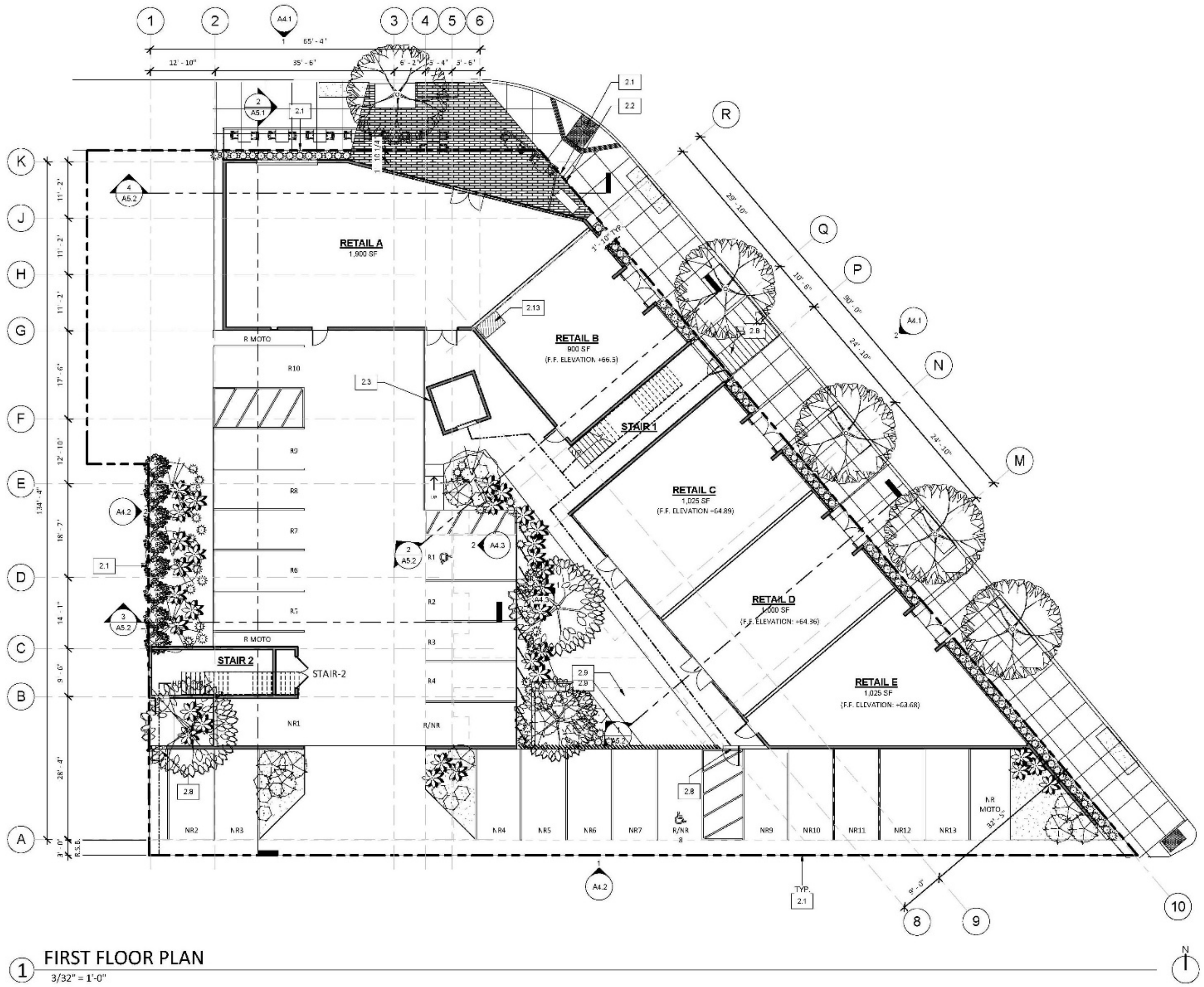
Surrounding land uses include light industrial uses to the south and north (automotive and metals), and commercial and residential uses to the east and west.

Figure 1 Project Site Location

Imagery provided by Google and its licensors © 2017.

HRA Fig 1 Project Location

Figure 2 Site Plan, First Floor



BUILDING PLAN NOTES

1. REFER TO GENERAL NOTES T-1.0 & ON SHEET T-1.1 FOR FURTHER INFORMATION AND REQUIREMENTS.

2. IN COMPLIANCE WITH THE CALIFORNIA GREEN BUILDING STANDARDS CODE, THE PROPOSED NON-RESIDENTIAL UNITS WOULD HAVE PLUMBING FIXTURES OF THE FOLLOWING SPECIFICATIONS:
   - CLOTHES WASHERS: 10% LESS THAN THE CEC's MAX. WATER FACTOR (WF) STANDARDS FOR COMMERCIAL CLOTHES WASHERS INDICATED IN TITLE 20 OF THE CCR
   - SHOWERHEADS: MAX. 1.8 gpm AT 80 psi
   - LAVATORY FAUCETS: MAX. 0.35 gpm AT 60 psi
   - KITCHEN FAUCETS: MAX. 1.6 gpm AT 60 psi
   - WASH FOUNTAINS: MAX. 1.6 (RIM SPACE (IN.) PER 20 gpm AT 60 psi
   - METERING FAUCETS: MAX. 0.18 GALLONS PER CYCLE
   - METERING FAUCETS FOR WASH FOUNTAINS: MAX. 0.18 (RIM SPACE (IN) PER 20 gpm AT 60 psi
   - ALL WATER CLOSETS: MAX. 1.12 GALLON PER FLUSH
   - URINALS: MAX. 0.5 GALLONS PER FLUSH

3. THE PROPOSED RESIDENTIAL UNITS WOULD HAVE PLUMBING FIXTURES OF THE FOLLOWING SPECIFICATIONS:
   - KITCHEN FAUCETS: MAX. 1.5 GALLONS PER MINUTE AT 60 psi
   - STANDARD DISHWASHERS: MAX. 4.25 GALLONS PER CYCLE
   - COMPACT DISHWASHERS: 3.5 GALLONS PER CYCLE
   - CLOTHES WASHERS: WATER FACTOR OF 6 GALLONS PER CUBIC FEET OF DRUM CAPACITY

4. ALL WINDOWS WILL BE DOUBLE PAINED WITH A MINIMUM SOUND TRANSMISSION CLASS (STC) RATING OF AT LEAST 30

5. ALL EXTERIOR DOORS TO BE SOLID CORE WITH WEATHER STRIPPING AND THRESHOLD SEALS

6. ALL EXTERIOR RESIDENTIAL WALLS AND FLOOR-CEILING ASSEMBLIES WILL BE CONSTRUCTED WITH A MIN. STC RATING OF OF AT LEAST 40

LEGEND

WALL

SITE WALL

WINDOW

DOOR

PATH OF EGRESS

R RESIDENTIAL PARKING

NR NON-RESIDENTIAL PARKING

KEYNOTES

2.1 LINE OF FLOOR/ROOF ABOVE OR BELOW
2.2 PROPERTY LINE
2.3 ELEVATOR
2.8 DIRECT PEDESTRIAN ACCESS
2.9 1182 SQFT COMMON AREA - SEE LANDSCAPE FOR MORE INFORMATION
2.13 (1) SHOWER STALL (ADA COMPLIANT) & (2) TWO TIER LOCKERS

STORM WATER BMP CALCULATIONS

SEE CIVIL DRAWINGS FOR FURTHER INFORMATION

TOTAL AREA DRAINING TO BMP:	17,860 SF
MIN. REQUIRED BMP FOOTPRINT:	482 SF
BMP PROPOSED:	
FIRST FLOOR PLANTER AREA:	TBD SF
SECOND FLOOR PLANTER AREA:	212 SF
THIRD FLOOR PLANTER AREA:	140 SF
FOURTH FLOOR PLANTER AREA:	140 SF
TOTAL PROPOSED BMP AREA:	492 SF

Figure 3 Site Plan, 2nd Floor

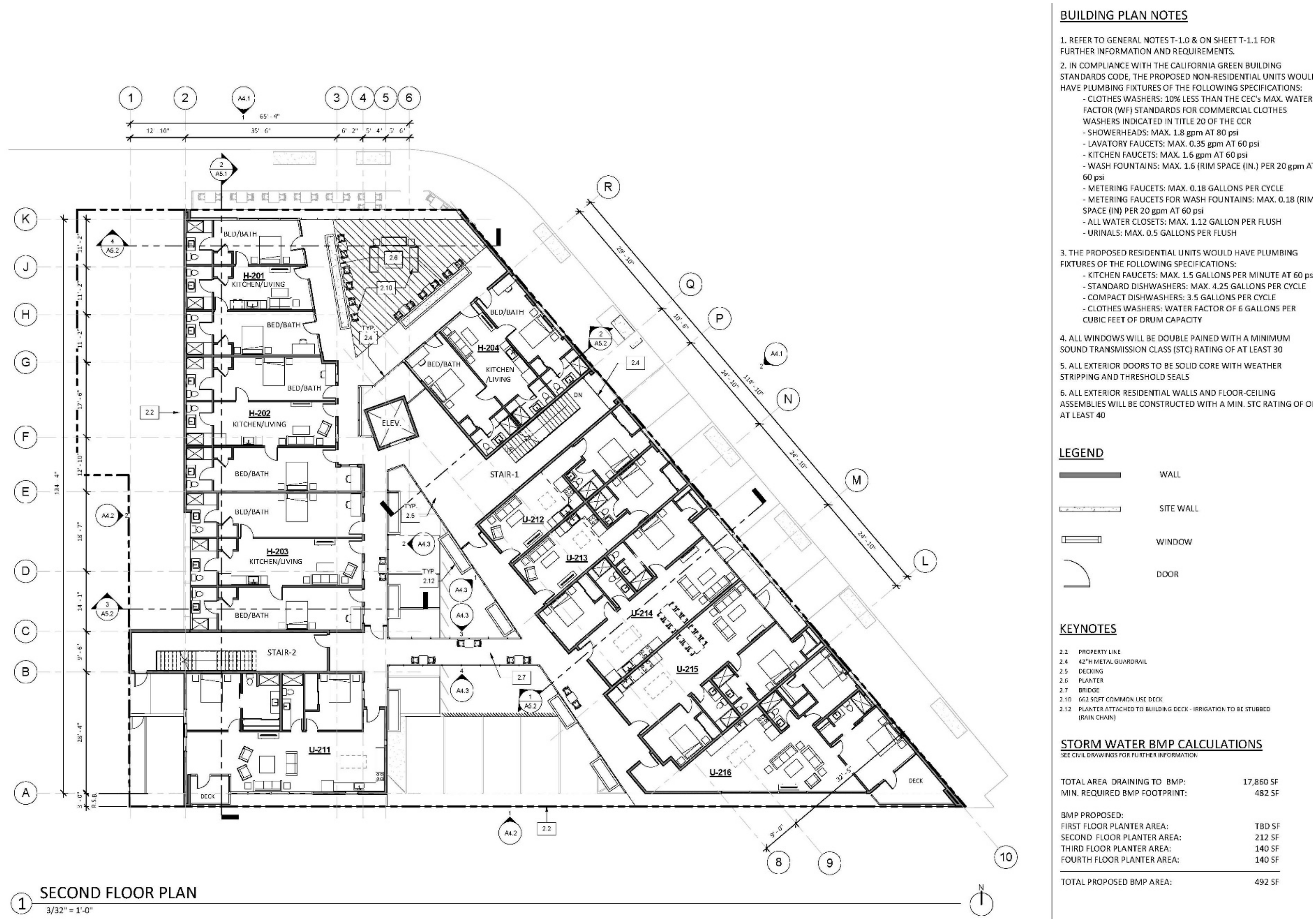


Figure 4 Site Plan, 3rd Floor

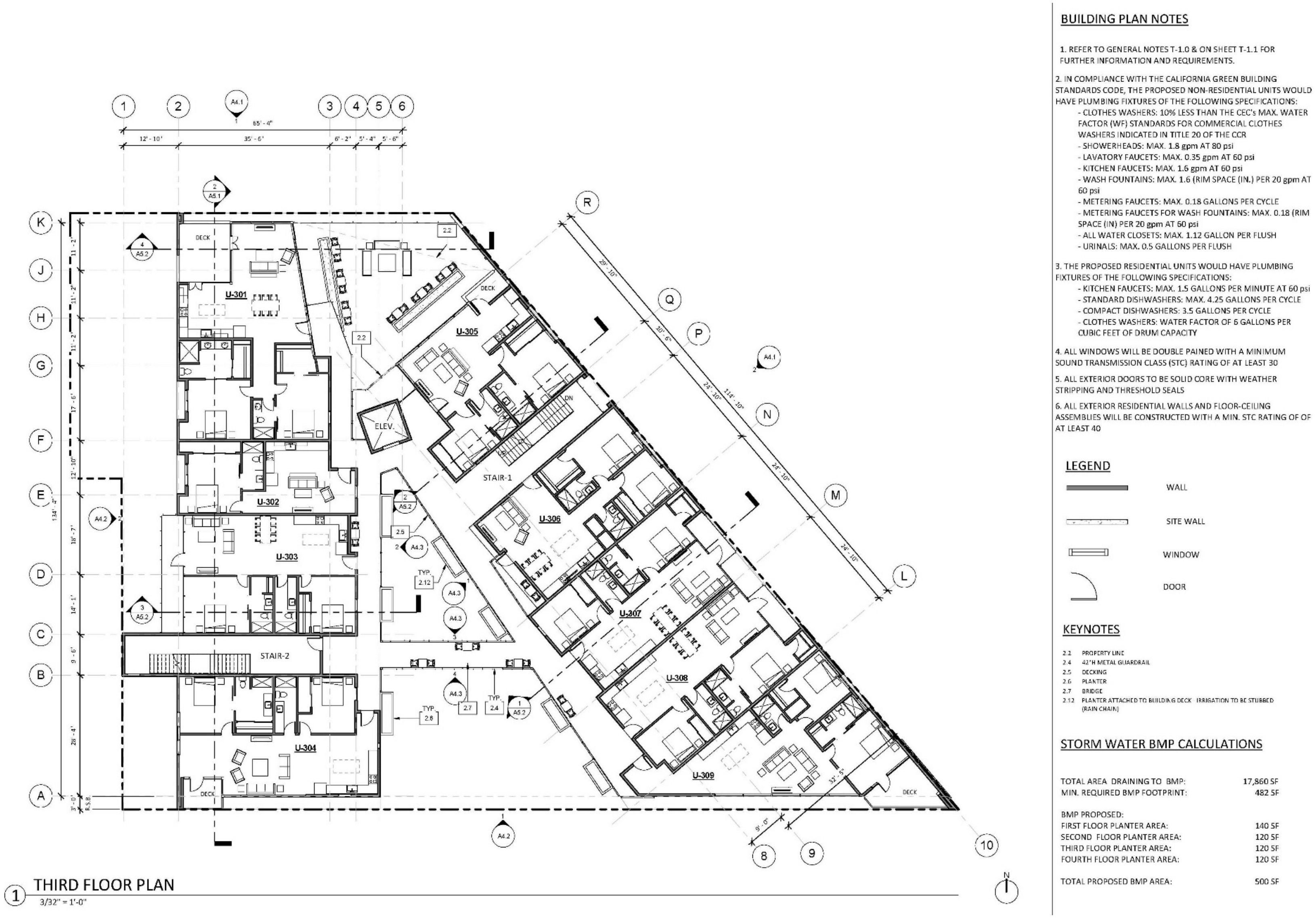
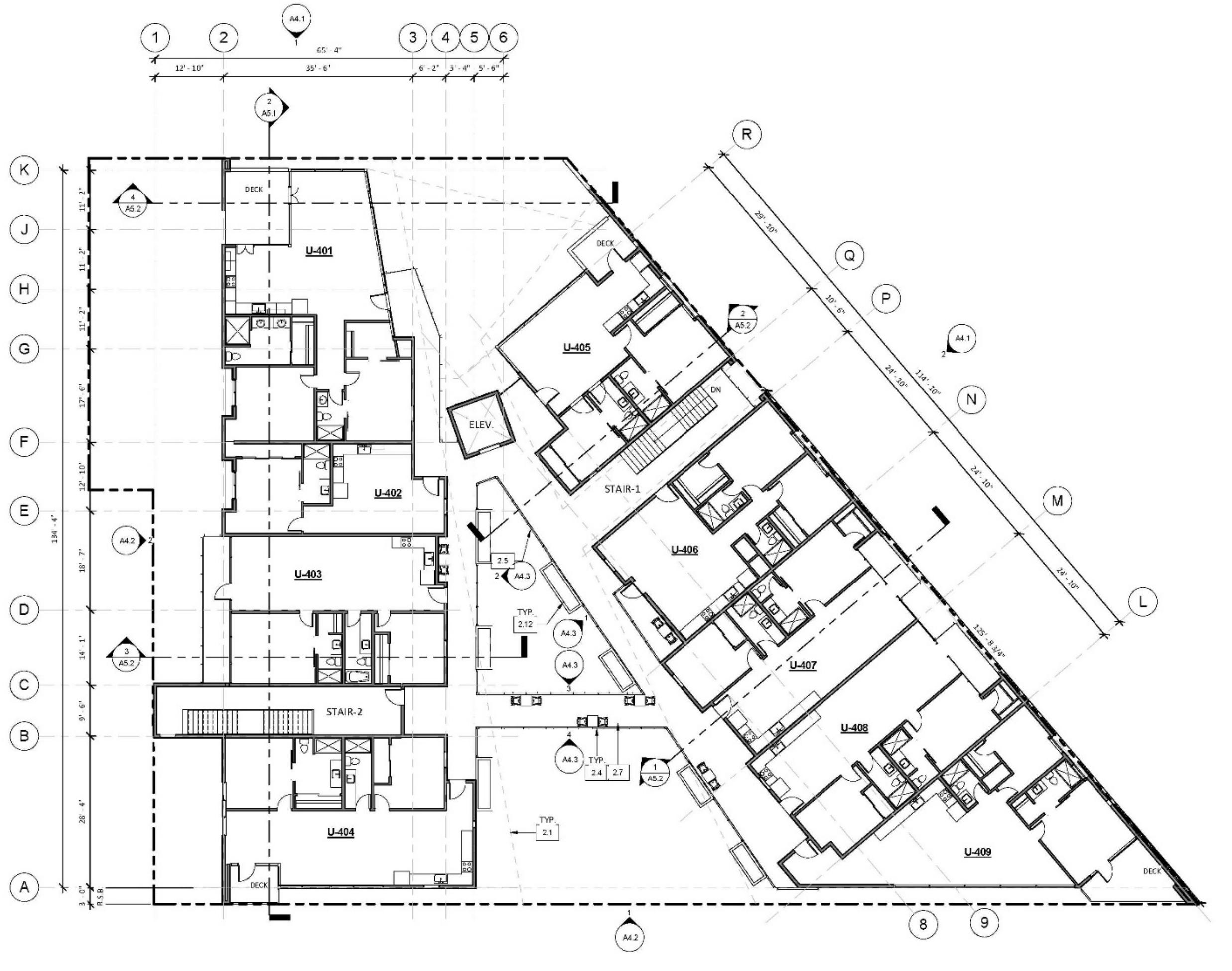


Figure 5 Site Plan, 4th Floor



1 FOURTH FLOOR PLAN

3/32" = 1'-0"

BUILDING PLAN NOTES

1. REFER TO GENERAL NOTES T-1.0 & ON SHEET T-1.1 FOR FURTHER INFORMATION AND REQUIREMENTS.

2. IN COMPLIANCE WITH THE CALIFORNIA GREEN BUILDING STANDARDS CODE, THE PROPOSED NON-RESIDENTIAL UNITS WOUL HAVE PLUMBING FIXTURES OF THE FOLLOWING SPECIFICATIONS:
   - CLOTHES WASHERS: 10% LESS THAN THE CEC's MAX. WATEI FACTOR (WF) STANDARDS FOR COMMERCIAL CLOTHES WASHERS INDICATED IN TITLE 20 OF THE CCR
   - SHOWERHEADS: MAX. 1.8 gpm AT 80 psi
   - LAVATORY FAUCETS: MAX. 0.35 gpm AT 60 psi
   - KITCHEN FAUCETS: MAX. 1.6 gpm AT 60 psi
   - WASH FOUNTAINS: MAX. 1.6 (RIM SPACE (IN.) PER 20 gpm A 60 psi
   - METERING FAUCETS: MAX. 0.18 GALLONS PER CYCLE
   - METERING FAUCETS FOR WASH FOUNTAINS: MAX. 0.18 (RIN SPACE (IN) PER 20 gpm AT 60 psi
   - ALL WATER CLOSETS: MAX. 1.12 GALLON PER FLUSH
   - URINALS: MAX. 0.5 GALLONS PER FLUSH

3. THE PROPOSED RESIDENTIAL UNITS WOULD HAVE PLUMBING FIXTURES OF THE FOLLOWING SPECIFICATIONS:
   - KITCHEN FAUCETS: MAX. 1.5 GALLONS PER MINUTE AT 60 p
   - STANDARD DISHWASHERS: MAX. 4.25 GALLONS PER CYCLE
   - COMPACT DISHWASHERS: 3.5 GALLONS PER CYCLE
   - CLOTHES WASHERS: WATER FACTOR OF 6 GALLONS PER CUBIC FEET OF DRUM CAPACITY

4. ALL WINDOWS WILL BE DOUBLE PAINED WITH A MINIMUM SOUND TRANSMISSION CLASS (STC) RATING OF AT LEAST 30

5. ALL EXTERIOR DOORS TO BE SOLID CORE WITH WEATHER STRIPPING AND THRESHOLD SEALS

6. ALL EXTERIOR RESIDENTIAL WALLS AND FLOOR-CEILING ASSEMBLIES WILL BE CONSTRUCTED WITH A MIN. STC RATING OF C AT LEAST 40

LEGEND

WALL

SITE WALL

WINDOW

DOOR

KEYNOTES

2.1 LINE OF FLOOR/ROOF ABOVE OR BELOW
2.4 42"H METAL GUARDRAIL
2.5 DECKING
2.7 BRIDGE
2.12 PLANTER ATTACHED TO BUILDING DECK - IRRIGATION TO BE STUBBED (RAIN CHAIN)

STORM WATER BMP CALCULATIONS

TOTAL AREA DRAINING TO BMP:	17,860 SF
MIN. REQUIRED BMP FOOTPRINT:	482 SF
BMP PROPOSED:	
FIRST FLOOR PLANTER AREA:	140 SF
SECOND FLOOR PLANTER AREA:	120 SF
THIRD FLOOR PLANTER AREA:	120 SF
FOURTH FLOOR PLANTER AREA:	120 SF
TOTAL PROPOSED BMP AREA:	500 SF

2 Noise

2.1 Overview of Sound Measurement

Noise level (or volume) is generally measured in decibels (dB) using the A-weighted sound pressure level (dBA). The A-weighting scale is an adjustment to the actual sound pressure levels to be consistent with that of human hearing response, which is most sensitive to frequencies around 4,000 Hertz (about the highest note on a piano) and less sensitive to low frequencies (below 100 Hertz).

Sound pressure level is measured on a logarithmic scale with the 0 dBA level based on the lowest detectable sound pressure level that people can perceive (an audible sound that is not zero sound pressure level). Based on the logarithmic scale, a doubling of sound energy is equivalent to an increase of 3 dBA, and a sound that is 10 dBA less than the ambient sound level has no effect on ambient noise. Because of the nature of the human ear, a sound must be about 10 dBA greater than the ambient noise level to be judged as twice as loud. In general, a 3 dBA change in the ambient noise level is noticeable, while 1-2 dBA changes generally are not perceived. Quiet suburban areas typically have noise levels in the range of 40-50 dBA, while areas adjacent to arterial streets are in the 50-60+ dBA range. Normal conversational levels are in the 60-65 dBA range, and ambient noise levels greater than 65 dBA can interrupt conversations.

Noise levels typically attenuate (i.e. drop off) at a rate of 6 dBA per doubling of distance from point sources (e.g. industrial machinery). Noise from lightly traveled roads typically attenuates at a rate of about 4.5 dBA per doubling of distance. Noise from heavily traveled roads typically attenuates at about 3 dBA per doubling of distance. Noise levels may also be reduced by intervening structures; generally, a single row of buildings between the receptor and the noise source reduces the noise level by about 5 dBA, while a solid wall or berm reduces noise levels by 5 to 10 dBA (Federal Transit Administration [FTA] 2006). The manner in which homes in California are constructed generally provides a reduction of exterior-to-interior noise levels of about 20 to 25 dBA with closed windows (FTA 2006).

In addition to the instantaneous measurement of sound levels, the duration of sound is important since sounds that occur over a long period of time are more likely to be an annoyance or cause direct physical damage or environmental stress. One of the most frequently used noise metrics that considers both duration and sound power level is the equivalent noise level (Leq). The Leq is defined as the single steady A-weighted level that is equivalent to the same amount of energy as that contained in the actual fluctuating levels over a period of time (essentially, the average noise level). Typically, Leq is summed over a one-hour period. Lmax is the highest RMS (root mean squared) sound pressure level within the measuring period, and Lmin is the lowest RMS sound pressure level within the measuring period.

The time period in which noise occurs is also important since noise that occurs at night tends to be more disturbing than that which occurs during the day. Community noise is usually measured using Day-Night Average Level (DNL), which is the 24-hour average noise level with a 10-dBA penalty for noise occurring during nighttime (10 PM to 7 AM) hours, or Community Noise Equivalent Level (CNEL), which is the 24-hour average noise level with a 5 dBA penalty for noise occurring from 7 PM to 10 PM and a 10 dBA penalty for noise occurring from 10 PM to 7 AM Noise levels described by DNL and CNEL usually do not differ by more than 1 dBA. In practice, CNEL and DNL are used interchangeably.

The relationship between peak hourly Leq values and associated Ldn or CNEL values depends on the distribution of traffic over the entire day. There is no precise way to convert a peak hourly Leq to Ldn or CNEL. However, in urban areas near heavy traffic, the peak hourly Leq is typically 2-4 dBA lower than the daily Ldn/CNEL (California State Water Resources Control Board [SWRCB] 1999).

Sensitive Receptors

Noise exposure goals for various types of land uses reflect the varying noise sensitivities associated with each land use type. The City of San Diego General Plan *Noise Element* describes noise-sensitive land uses as residential uses, hospitals, nursing facilities, intermediate care facilities, child care and educational facilities, libraries, museums, places of worship, and certain types of passive recreational parks and open space (City of San Diego 2008). These uses are considered sensitive because the presence of excessive noise may interrupt normal activities typically associated with their uses. Noise-sensitive receptors nearest to the project site are adjacent to the north boundary of the project site, and approximately 50 feet from the eastern boundary of the site (east of S 26th Street). There are also three churches within 350 feet north and west of the project site.

The project site is located in the Redevelopment Subdistrict zone of the Barrio Logan Community Plan, which encourages mixed uses. The project proposes 24 residential units and four hotel rooms, which would create new sensitive receptors on the site upon project completion. Exact uses for the five proposed retail spaces would be determined upon project completion, but are anticipated to entail food service, professional and business office, and art gallery uses. Compatible commercial uses shall be determined based on compatible land uses identified in the City's General Plan *Noise Element*, shown in Table 2, and pursuant to San Diego Municipal Code Section 152.0317 (*Redevelopment Subdistrict – Land Use Classifications*). Conditions of approval could limit commercial uses in order to ensure compatibility with proposed residential and hotel uses on-site.

Regulatory Setting

City of San Diego General Plan Noise Element

Table NE-2 of the *Noise Element* summarizes the related regulations and plans used to implement the *Noise Element* (City of San Diego 2015). Table 1 shows the regulation and description, including the noise levels found acceptable for specific land uses, such as indoor noise levels for multi-unit residential structures and outdoor noise levels for residential units near an airport, from Table NE-2 that are applicable to the project site.

Table 1 Regulations and Plans Used to Implement the City of San Diego Noise Element

Regulation	Description
California Environmental Quality Act (CEQA)	CEQA considers exposure to excessive noise an environmental impact. Implementation of CEQA ensures that during the decision-making stage of development, City officials and the public will be informed of any potentially excessive noise levels and available mitigation measures to reduce them to acceptable levels.
California Noise Insulation Standards (California Code of Regulations, Title 24)	Title 24 establishes an interior noise standard of 45 dBA for multiple unit and hotel/motel structures. Acoustical studies must be prepared for proposed multiple unit residential and hotel/motel structures within the Community Noise Equivalent Level (CNEL) noise contours of 60 dBA or greater. The studies must demonstrate that the design of the building will reduce interior noise to 45 dBA CNEL or lower.
California Airport Noise Standards (California Code of Regulations Title 21)	Title 21 establishes that the 65 dBA CNEL is the acceptable level of aircraft noise for persons living near an airport.
The City of San Diego Noise Abatement and Control Ordinance (Municipal Code Section 59.5.0101 et seq.)	Provides controls for excessive and annoying noise from sources such as refuse vehicles, parking lot sweepers, watercraft, animals, leaf blowers, alarms, loud music, and construction activities.

Source: Table NE-2 of the City of San Diego General Plan Noise Element (2015)

Sections A through H of the City's General Plan *Noise Element* provide goals and policies specific to certain land uses and activities, such as motor vehicle traffic noise, trolley and train noise, aircraft noise, commercial and mixed-use activity noise, industrial activity noise, construction, refuse vehicles, parking lot sweepers, and public activity noise, as well as event noise. The goals and policies of the *Noise Element* that are applicable to the proposed project are summarized below (City of San Diego 2015):

> **Goal A.** Consider existing and future noise levels when making land use planning decisions to minimize people's exposure to excessive noise.
>
>> **NE-A.2.** Assure the appropriateness of proposed developments relative to existing and future noise levels by consulting the guidelines for noise-compatible land use (shown on Table NE-3) to minimize the effects on noise-sensitive land uses.
>
> **Goal E.** Minimal exposure of residential and other noise-sensitive land uses to excessive commercial and mixed-use related noise.
>
>> **NE-E.1.** Encourage the design and construction of commercial and mixed-use structures with noise attenuation methods to minimize excessive noise to residential and other noise-sensitive land uses.
>
> **Goal G.** Minimal exposure of residential and other noise-sensitive land uses to excessive construction, refuse vehicles, parking lot sweeper-related noise and public noise.
>
>> **NE-G.1.** Implement limits on the hours of operation for non-emergency construction and refuse vehicle and parking lot sweeper activity in residential areas and areas abutting residential areas.

The City's General Plan *Noise Element* provides land use and noise compatibility guidelines. Table 2, below, shows the conditional noise exposure compatibility for interior and exterior noise levels for proposed land uses on the project site (multi-family units and commercial services) and sensitive uses in the vicinity which are largely comprised of single- and multi-family residences.

Table 2 Noise Compatibility Guidelines

Land Use Category		Noise Exposure (dBA CNEL) Compatible	Conditionally Compatible	Incompatible
Single Dwelling Units; Mobile Homes	Interior	45	45	
	Exterior	60	65	65+
Multiple Dwelling Units	Interior	45	45	
	Exterior	60	70	70+
Retail Sales	Interior	50	50	
	Exterior	65	75	75+
Commercial Services: Building Services, Business Support, Eating & Drinking, Financial Institutions, Maintenance & Repair, Personal Services, Assembly & Entertainment, Radio & Television Studios, Golf Course Support	Interior	50	50	
	Exterior	65	75	75+
Commercial Services: Visitor Accommodations	Interior	45	45	
	Exterior	60	75	75+

Source: Adapted from City of San Diego *Noise Element*, Table NE-3 (2015)

City of San Diego Municipal Code

The City of San Diego has issued sound level limits for the land uses described previously in Table 2. Table 3 summarizes these limits.

Table 3 Applicable Sound Level Limits

Land Use	Time of Day	One-Hour Average Sound Level (dBA Leq)
Single-Family Residential	7:00 AM to 7:00 PM	50
	7:00 PM to 10:00 PM	45
	10:00 PM to 7:00 AM	40
Multi-Family Residential (Up to a maximum density of 1/2000)	7:00 AM to 7:00 PM	55
	7:00 PM to 10:00 PM	50
	10:00 PM to 7:00 AM	45
All other Residential	7:00 AM to 7:00 PM	60
	7:00 PM to 10:00 PM	55
	10:00 PM to 7:00 AM	50
Commercial	7:00 AM to 7:00 PM	65
	7:00 PM to 10:00 PM 10:00 PM to 7:00 AM	60
Industrial or Agricultural	Any time	75

Source: Section 59.5.0401 of the City of San Diego Municipal Code (NDa)

Policy NE-G.1 of the City's *Noise Element* advises implementation of limits on the hours of non-emergency construction (City of San Diego 2015). The City of San Diego Municipal Code, Chapter 5 Public Safety, Morals and Welfare, Article 9.5 Noise Abatement and Control, Section 59.5.0404, *Construction Noise*, limits the hours of construction to the hours between 7:00 AM and 7:00 PM, Monday through Saturday. No construction is permitted on Sunday or legal holidays without prior application and approval of a permit by the Noise Abatement and Control Administrator. In addition, construction activity cannot cause noise levels greater than 75 dBA Leq at or beyond the property lines of any property zoned residential between the hours of 7:00 AM and 7:00 PM.

Barrio Logan Community Plan

The Barrio Logan Community Plan, adopted in 1978, does not include a *Noise Element*, but references the City's General Plan *Noise Element*. The Barrio Logan Community Plan provides information on the area's noise quality, stating that the community experiences a higher percentage of heavy truck traffic than can be found in other communities. Local streets in the community carry a variable mix of light and heavy vehicles that may generate noise exceeding 65 dBA Leq during peak traffic hours, although noise may not reach an average of 65 dBA CNEL (City of San Diego 1978).

The Barrio Logan Community Plan contains goals and major recommendations for housing infill and intensification in the plan area, while encouraging commercial development along Logan Avenue. The proposed project would intensify housing on-site through the provision of 24 residential uses, in an area that contains single- and multi-family residential uses. Consistent with the Community Plan, commercial retail space is proposed for the ground floor, fronting Logan Avenue and 26th Avenue. The proposed mixed-use project would be compatible with existing development in Barrio Logan and is consistent with the Community Plan and zoning designation.

San Diego International Airport Land Use Compatibility Plan

The airport nearest to the project site is the San Diego International Airport, located 3.5 miles northwest from the project site. The San Diego International Airport ALUCP contains policies that limit residential uses in areas experiencing noise above 60 dBA CNEL by placing conditions on residential uses within the 60 dBA CNEL contour. Barrio Logan, and the project site, does not lie within the airport influence area or the 60 dBA CNEL contour of the San Diego International Airport, and is also outside of the City's Airport Approach Overlay Zone (City of San Diego Municipal Code 132.0202, Diagram 132-02A).

Project Noise Setting

As shown in Figure 1, the project site is located approximately 200 feet west of I-5, south of Logan Avenue, and west of South 26th Street. Logan Avenue and 26th Street are accessible to smaller trucks serving commercial businesses in Barrio Logan. Large trucks, serving industrial uses in the vicinity of the community, are limited to movements along K and Imperial Streets, Harbor Drive, Commercial Street, and Wabash Boulevard, according to the Barrio Logan Community Plan *Transportation Element* (1978).

The project site is located in the Redevelopment Subdistrict zone of the Barrio Logan Community Plan, which permits residential (single- and multi-family), commercial, and limited light industrial uses. The Redevelopment Subdistrict zone encourages mixed uses. Single- and multi-family residential dwellings are present adjacent to and in the vicinity of the project site. There are three churches near the project site: Temple of Christ Church (2205 Logan Avenue), 350 feet north; Movimiento Mision de Dios (2232 National Avenue) 300 feet west; and Iglesia Mision de Cristo (2244 Logan Avenue), 200 feet north of the project site.

The most common source of noise in the project site vicinity is traffic on I-5 and surrounding roads. Motor vehicle noise, primarily from cars and trucks, is of concern because it is characterized by a high number of individual events, which often create sustained noise levels. Ambient noise levels would be expected to be highest during the daytime and rush hour unless congestion slows speeds substantially.

Secondary noise sources in the greater Barrio Logan community include traffic noise generated by I-15 and the Coronado Bay Bridge, and other transportation noise sources from aircraft, helicopters, railroads, boats, and ships. Industrial equipment noise is another major noise source due to the large number of heavy industry and commercial uses in the community, which include shipbuilding and repair facilities, auto and heavy metal salvage yards, and an aluminum can recycling center.

To determine ambient sound levels at and near the project site, three 15-minute sound level measurements were collected during the morning peak hour between 7:00 a.m. and 9:00 a.m. on June 29, 2017 using an ANSI Type II integrating sound level meter. Two measurements were taken in the immediate vicinity of the project site and an additional measurement was taken on-site (refer to Appendix A for sound level measurement data). Table 4 lists the ambient noise levels measured at all three locations and Figure 6 shows the sound level measurement locations.

Table 4 Project Vicinity Sound Level Monitoring Results

Measurement Number	Measurement Location	Sample Times	dBA Leq [15][1]	dBA Lmin	dBA Lmax	Distance to Centerline of the Logan Avenue/South 26th Street Roadway
1	Northeast of project site, on Logan Avenue	7:26 AM–7:41 AM	61.6	54.3	80.7	20 feet
2	South of project site, on S 26th Street	7:45 AM – 8:00 AM	60.5	50.1	82.1	20 feet
3	Center of project site, on-site	7:49 AM – 8:04 AM	56.8	51.5	75.6	90 feet

Source: Rincon Consultants, field visit on June 29, 2017 using ANSI Type 2 Integrating sound level meter.

See Appendix A for noise monitoring data

[1] The equivalent noise level (Leq) is defined as the single steady A-weighted level that is equivalent to the same amount of energy as that contained in the actual fluctuating levels over a period of time (essentially, the average noise level). For this measurement the Leq was over a 15-minute period (Leq [15]).

The sound level measured in the project site vicinity ranged from 56.8 dBA Leq to 61.6 dBA Leq. The results indicate that traffic noise along Logan Avenue and South 26th Street is the primary noise source for the project site.

Figure 6 Noise Measurement Locations

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FigX Noise

2.2 Impact Analysis

Methodology and Significance Thresholds

The analysis of noise impacts considers the effects of both temporary construction-related noise and long-term noise associated with operation of the project.

Exterior and Interior Noise

Based on the City's noise compatibility guidelines shown in Table 2, the ambient exterior noise environment is normally acceptable for multi-family and visitor accommodations when exterior noise levels are 60 dBA CNEL or less, and conditionally compatible at 70 dBA CNEL or less for the multi-family units and 75 dBA CNEL or less for visitor accommodations. For the 6,000 square feet of proposed commercial space, an exterior noise level of 65 dBA CNEL is normally acceptable and 75 dBA CNEL or less is conditionally compatible. As discussed above, to determine ambient noise levels at the project site and at nearby sensitive receptors, Rincon Consultants collected three 15-minute sound level measurements during the morning on June 29, 2017 (Table 4 and Appendix A). Average ambient sound levels measured in the project site vicinity ranged from 56.8 dBA Leq to 61.6 dBA Leq.

Monitoring results show that existing ambient sound levels at the project site are below the normally acceptable threshold for the commercial uses and visitor accommodations, but slightly above the normally acceptable threshold for multi-family residential uses. Ambient sound levels are below the 70 dBA and 75 dBA or less conditionally compatible threshold for the multi-family residential uses and the commercial uses and visitor accommodations, respectively.

Construction Noise

The threshold for temporary construction noise is an average of 75 dBA Leq at a residential property over a 12-hour period between 7:00 AM and 7:00 PM with construction prohibited between the hours of 7:00 PM of any day to 7:00 AM, legal holidays, and on Sunday per City of San Diego Municipal Code, Section 59.5.0404. Construction noise was estimated using the Federal Highway Administration (FHWA) Roadway Construction Noise Model (RCNM) (2006). RCNM predicts construction noise levels for a variety of construction operations based on empirical data and the application of acoustical propagation formulas. Using RCNM, construction noise levels were estimated at nearby noise-sensitive receptors near the project site, including single- and multi-family residents and churches. RCNM provides reference noise levels for standard construction equipment, with an attenuation of 6 dBA per doubling of distance for stationary equipment and 3 dBA per doubling of distance for mobile equipment. The model does not take into consideration topographic variation or staging locations of construction equipment, thus making the analysis conservative. Construction equipment modeled was based on the California Emissions Estimator Model (CalEEMod) Version 2016.3.2 equipment defaults by phase used in the Barrio Flats Mixed-Use Project Air Quality Study (Rincon Consultants, Inc. 2017).

On-Site Operational Noise

On-site operational noise would be significant if noise levels exceeded City guidelines for exterior noise at nearby noise-sensitive receptors, shown in Table 3. Noise impacts on nearby receptors, including single- and multi-family residences and churches, would be significant if these receptors were exposed to operational noise levels greater than 50 dBA Leq between the hours of 7:00AM to 7:00PM and 45 dBA Leq between the hours of 7:00PM to 10:00PM.

Off-site Traffic Noise

The project would generate vehicle trips, thereby increasing traffic on area roadways as a result of the project. Traffic noise was estimated based on peak hour traffic counts collected by Rincon Consultants, Inc. on June 29, 2017. Roadway noise was modeled using the U.S. Department of Housing and Urban Development (HUD) Exchange Day/Night Noise Level (DNL) Calculator based on daily traffic in the area (HUD 2017).

According to the City's *Noise Element*, the City conditionally allows multiple-unit and mixed-use residential uses up to 75 dBA CNEL in areas affected primarily by motor vehicle traffic noise with existing residential uses. Any future residential use above the 70 dBA CNEL must include noise attenuation measures to ensure an interior noise level of 45 dBA CNEL and be located in an area where a community plan allows multiple unit and mixed-use residential uses (City of San Diego 2015).

Impact Analysis

Temporary Construction Noise Impacts

Project construction would include demolition of select buildings and structures, grading, building construction, paving, architectural coating of the new building, and associated parking lot and landscaping. Existing uses near the project site include commercial and light industrial uses and noise-sensitive receptors, such as single- and multi-family residents and churches. Noise impacts are a function of the type of activity being undertaken and the distance to the receptor location. Construction activity is expected to occur over a period of approximately six months.

A list of typical peak noise levels associated with common types of heavy construction equipment is available in Appendix C. The type of equipment utilized during each phase was based on defaults in CalEEMod used to model emissions, as construction equipment details have not yet been finalized for the project (Rincon Consultants, Inc. 2017). Construction noise model worksheets are provided in Appendix B.

Table 5, below, details the type of equipment anticipated for use during each construction phase. The distances from construction equipment represent the distances to the nearest existing noise sensitive receptors. These include residences at 50 feet from the center of the project site, and churches at 200 and 300 feet from the project site. However, it is unlikely that construction equipment would operate from one location or operate exclusively along the project boundary near residential uses. Therefore, the noise levels presented in Table 5 represent a conservative estimate of noise levels generated during different phases of project construction.

Table 5 Noise Levels during Construction Phases

Construction Phase	Equipment	Estimated Noise at 50Feet (dBA Leq)	Estimated Noise at 200 Feet (dBA Leq)
Demolition	Concrete/Industrial Saw, Rubber-Tired Dozer, Tractors/Loaders/Backhoes	86	74
Site Preparation	Grader, Tractors/Loaders/Backhoes	84	72
Grading	Concrete/Industrial Saw, Rubber-Tired Dozer, Tractors/Loaders/Backhoes	86	74
Building Construction	Crane, Forklifts, Tractors/Loaders/Backhoes	82	70
Paving	Cement and Mortar Mixers, Pavers, Rollers, Tractors/Loaders/Backhoes	78	70
Architectural Coating	Air Compressor	74	70

Source: Federal Highway Administration. Roadway Construction Noise Model (2006)

See Appendix B for RCNM data sheets.

The noise levels presented in Table 5 represent a conservative estimate of construction noise because they assume the simultaneous use of construction equipment in the same construction staging location, closest to existing receptors. In practice, equipment would be dispersed temporally and spatially on the project site during construction activities. Due to spatial and equipment limitations, only a limited amount of equipment can operate near a given location at any particular time.

As shown in Table 5, construction noise could be as high as 86 dBA Leq at the nearest adjacent property, which contains residential uses. The City's construction noise threshold of 75 dBA Leq over a 12-hour period is applicable to residential receptors. Therefore, construction noise would exceed the City's construction noise level thresholds at a distance of 50 feet from the project site. The project would be required to comply with the construction hour restrictions of Chapter 5, Section 59.5.0404 of the City of San Diego Municipal Code, which prohibits construction outside the hours of 7:00 AM and 7:00 PM. However, the following noise reducing measures would be required during project construction to reduce temporary construction noise levels at nearby noise-sensitive receptors to below 75 dBA Leq:

- Construction activities should be scheduled to avoid operating several pieces of equipment simultaneously wherever feasible.
- Operate all diesel equipment with closed engine doors and equip all diesel equipment with factor-recommended mufflers.
- For stationary equipment, designate equipment areas with appropriate acoustic shielding on building and grading plans. Equipment and shielding should be installed prior to construction and remain in designated location throughout construction activities.
- Whenever feasible, use electrical power to run air compressors and similar power tools rather than diesel equipment.
- Require all contractors, as a condition of contract, to maintain and tune-up all construction equipment to minimize noise emissions.
- Temporary sound barriers that break the line of sight (at least six feet tall) should be erected along the perimeter of the project site between active on-site construction work using heavy equipment and adjacent sensitive receptors (residences). Such barriers should be of sufficient

height to break the line-of-sight between noise-generating equipment and the noise-sensitive receptor, and should be continuous with no gaps or holes between panels or the ground. Temporary sound barriers may include noise curtains, sound blankets, or solid temporary barriers with a Sound Transmission Class (STC) rating of at least 20 or greater based on sound transmission loss data taken according to ASTM Test Method E90. If an STC-rated product is not available or not feasible for use, a product with a similar industry-standard specification, or a product that would achieve a similar insertion loss based on a manufacturer or supplier recommendation, would be an acceptable substitute. A 15 dBA reduction barrier is feasible through the implementation of such construction barriers, which should be installed at the project site prior to beginning construction activities and stay in place for the entire duration of the construction period.

Installation of temporary sound attenuating barriers between construction activities and adjacent sensitive receptors typically provides up to 15 dBA attenuation. In addition, installation of sound shielding and muffling devices on construction equipment can generally provide approximately 5 dBA of attenuation (FHWA 2006). As shown in Table 5, 86 dBA Leq would be the highest noise level associated with construction activity. Implementation of the above mitigation measures would reduce construction noise by up to 15 dBA, which would result in construction noise levels of approximately 71 dBA Leq at adjacent noise-sensitive residences. This analysis conservatively assumes that a number of pieces of construction equipment would be operating simultaneously during each phase of construction, and that there would not be any obstructions to line-of-sight that would further attenuate construction noise. Staggered operation of equipment would further reduce construction related noise.

Therefore, with the implementation of the aforementioned construction noise reducing measures and compliance with Chapter 5, Section 59.5.0404 of the City of San Diego Municipal Code, the project would not exceed the 75 dBA Leq standard for construction noise.

Exterior and Interior Noise Exposure

The proposed project involves development of a mixed-use building at a site dominated by vehicular traffic noise along Logan Avenue and South 26th Street. As shown in Table 2, the City's exterior noise compatibility thresholds are 60 dBA CNEL for residential uses and 65 dBA CNEL for commercial uses. Sound level measurements taken by Rincon Consultants (Table 4) show an existing ambient noise level between 56.8 dBA Leq and 61.6 dBA Leq during peak traffic hours near the project site. The peak hourly Leq in an urban area with traffic is approximately 2-4 dBA lower than the daily CNEL value (California SWRCB 1999). Therefore, daily CNEL in the project site vicinity ranges between 59 to 66 dBA CNEL. As such, the proposed project would be exposed to noise levels in excess of the exterior noise compatibility thresholds for residential uses, which is noted in the Barrio Logan Community Plan.

Noise-sensitive areas on the second through fourth floors, which contain hotel and residential uses, that would be exposed to traffic noise consist of a common outdoor deck on the second floor (facing the corner of Logan Avenue and South 26th Street), windows to street-facing units, and outdoor decks for select residential units (facing Logan Avenue or South 26th Street). Although traffic noise levels at proposed patios and balconies could exceed the exterior noise standard and would be a potential annoyance for project tenants, passing vehicles would generate an intermittent noise source and tenants would have the option of retiring indoors. To further ensure exterior noise does not impact interior noise levels for residential and hotel occupants, the following noise reducing measures would be required to reduce exterior noise levels at nearby noise-sensitive receptors to below 60 dBA CNEL:

- Dual-pane windows for all residential and hotel units, laminated or similar with a Sound Transmission Class (STC) rating of at least 30;
- Exterior walls facing the street should be constructed of staggered wood studs, or equipped with a resilient channel between the studs and wallboard, or any other wall system, with an STC rating of at least 40;
- Solid core exterior doors with weather stripping and threshold seals; and,
- The completion of a pre-occupancy noise survey upon completion of project construction to ensure interior noise levels are below 45 dBA CNEL.

Based on the City's General Plan *Noise Element*, the applicable interior noise compatibility threshold is 45 dBA CNEL in any habitable room (City of San Diego 2015). Modern building construction techniques that comply with or exceed the 2016 California Green Building Code requirements typically provide an exterior-to-interior noise attenuation of 25 dBA (CALGreen Code 2016; FTA 2006). Therefore, proposed buildings would experience an interior noise level of at most 41 dBA CNEL (66 dBA CNEL minus 25 dBA of building attenuation), and the project would not be exposed to interior noise levels in excess of 45 dBA CNEL.

On-Site Operational Noise Impacts

The proposed project would introduce a new residential/commercial mixed-use development on the project site. Potential noise sources associated with the proposed project include on-site vehicle circulation/parking and use of the common outdoor deck area located on the second floor. Noise-sensitive uses in the vicinity of project site include single- and multi-family residents and churches. Operation of the proposed project would be significant if it generates noise levels in excess of the City's sound level limits shown in Table 2.

PARKING

The proposed parking area would be enclosed at the ground floor level of the mixed-use building; therefore, noise associated with vehicle parking and lot circulation would not be audible at nearby noise-sensitive receptors. Similarly, parking noise would not be audible by the proposed residential units and hotel rooms based on the use of wall and floor-ceiling assemblies that have an STC of at least 40 to ensure interior noise environment does not exceed an hourly equivalent noise level of 45 dBA in occupied areas, per CALGreen standards (CALGreen Code 2016).

COMMERCIAL AND TRUCK ACTIVITIES

There are many variables related to potential operational noise levels. At this time, potential commercial tenants are unknown and therefore, the actual hours of operation and total number of trucks that may operate at any given time is unknown. However, commercial truck activity would primarily involve loading and unloading operations of light- to medium-duty trucks based on the limited size of proposed commercial retail space (totaling 6,000 square feet across five tenant spaces). Loading and unloading operations would include noises related to airbrakes, backup alarms, and idling, and are presumed to be limited in duration based on business hours. All commercial operations would have to comply with sound level limits provided in San Diego Municipal Code Divisions 4 (*Sound Level Limits*) and 5 (*Noise Abatement and Control*), which specify sound levels based on time of day for specific land uses and provide limitations for nuisance noise, respectively.

In addition, as stated under Section 2.1, *Sensitive Receptors*, conditions of approval could limit allowed commercial uses in order to ensure compatibility with proposed residential and hotel uses on-site. Compatible commercial uses shall be determined based on compatible land uses identified in the City's General Plan *Noise Element*, shown in Table 2, and pursuant to San Diego Municipal Code Section 152.0317 (*Redevelopment Subdistrict – Land Use Classifications*).

Furthermore, tenant improvement of the proposed commercial retail spaces may be necessary at time of occupancy, dependent on the type of use and hours of operations, to ensure business operations are compatible with the residential and visitor-serving uses on-site. Such tenant improvement measures, based on California Noise Insulation Standards (1974) may include, but are not limited to:

- Interior sheetrock or exterior wall attached to studs by resilient channels or double walls
- Window assemblies, doors, wall construction materials, and insulation with a lab-tested STC rating of 30 or greater
- Airborne sound insulation with a STC rating of 50
- Penetrations or openings in construction assemblies for piping, electrical devices, recessed cabinets, soffits, or heating, ventilating or exhaust ducts shall be sealed, lined, insulated or otherwise treated to maintain the required ratings
- All separating floor-ceiling assemblies between separate units shall provide impact sound insulation with an Impact Insulation Class (IIC) rating of 50. Floor coverings may be included in the assembly to obtain the required rating, and must be retained as a permanent part of the assembly and may only be replaced by other floor covering that provides the same level of sound insulation.

HOTEL OPERATIONS

At this time, the actual hours of operation for the hotel are unknown. The general assumption for hotel operations is that the building premise would be accessible to guests 24-hours a day. The proposed four-room hotel operation would be a small-scale visitor-serving use. Noise associated with hotel use would include conversations between guests, housekeeping activities such as vacuuming, operation of the laundry facility, and guest movement in the hallways. These activities would be similar in nature with residential noise-generating activities.

Like the commercial retail operations noted above, hotel sound levels would have to comply with sound level limits provided in San Diego Municipal Code Divisions 4 (*Sound Level Limits*) and 5 (*Noise Abatement and Control*), which specify sound levels based on time of day for specific land uses and provide limitations for nuisance noise, respectively.

COMMON AREAS

The proposed common outdoor deck area would be located on the second floor along the northern boundary of the project site (see Figure 3). Outdoor deck noise would predominately consist of human conversation. However, the proposed outdoor deck would also be located between residential units and hotel rooms on the second floor, which would act as noise barriers for off-site residential receptors east and west of the project site and reduce potential noise from outdoor deck use. Further, Section 59.5.0502, of the San Diego Municipal Code prohibits the use or operation of any sound production or reproduction device, radio receiving set, musical instrument, drums, phonograph, television set, loud speakers and sound amplifier in such a manner as to disturb the peace, quiet, or comfort of any person of normal sensitivity in any area of the City. Therefore, operational use of the proposed common outdoor deck area by project tenants would not expose adjacent noise-sensitive receptors to significant noise impacts.

Overall, operation of the proposed project would not result in a substantial noise increase on the project site or vicinity with adherence to existing City noise ordinances and implementation of appropriate tenant improvement measures for the proposed commercial retail spaces.

Traffic Noise Impacts

Primary noise sources in the vicinity of the project site originate from motor vehicle activities and traffic. Periodically, local jurisdictions with the County of San Diego collect traffic count data on significant roadways. SANDAG compiles this information to present ADT volumes, which are two-way 24-hour traffic volumes. The most recent ADT estimate for the Logan Avenue/South 26th Street roadway between Sampson Street and Main Street is 2,000 ADT (SANDAG 2015). The proposed project would generate new vehicle trips and increase traffic on area roadways. Additional project trips were estimated using the Institute of Transportation Engineers (ITE) 9th Edition trip generation rates for hotels (ITE Use Code 310), retail centers (ITE Use Code 826), and apartments (ITE Code 220) to represent the proposed multi-family units. As shown in Table 6, the project would generate an estimated 508 daily trips with 58 AM peak hour trips and 37 PM peak hour trips.

Table 6 Projected-Generated Traffic Volumes

			Am Peak Hour Volumes			PM Peak Hour Volumes		
Land Use	**Size**	**Daily Trip Volume**	**In**	**Out**	**Total**	**In**	**Out**	**Total**
Multi-Family Housing [1]	24 Units	160	2	10	12	10	5	15
Hotel[2]	4 rooms	82	3	2	5	3	3	6
Retail Center[3]	5,850 square feet	266	20	21	41	7	9	16
Total		**508**	**25**	**33**	**58**	**20**	**17**	**37**

[1] ITE Land Use Code 220 (Apartment)

[2] ITE Land Use Code 310 (Hotel)

[3] ITE Land Use Code 826 (Retail Center)

Source: Institute of Transportation Engineers 9th Edition.

Project increase in traffic noise was modeled using the U.S. Department of Housing and Urban Development (HUD) Exchange Day/Night Noise Level (DNL) Calculator based on existing ADT data for the Logan Avenue/South 26th Street roadway and project-generated daily trips. Table 7 provides a summary of traffic noise resulting from the project.

Table 7 Comparison of Existing and Existing Plus Project Traffic Noise

Roadway Segment	Existing [1]	Existing Plus Project [2]	Change in Noise Level [2] – [1]	Significance Threshold (dBA CNEL)	Significant
	Noise Level (dBA CNEL)				
Logan Avenue/South 26th Street	63.4	64.3	0.9	>65	No

Source: HUD DNL Calculator, see Appendix C for noise model results. CNEL is the weighted 24-hour average noise level.

As shown in Table 8, modeled results for existing traffic noise in the project area is 63.4 dBA CNEL, which is 1.8 dBA higher than measured results in Table 4 (61.6 dBA Leq along Logan Avenue). Because peak hourly Leq in an urban area with traffic is approximately 2-4 dBA lower than the daily CNEL value (California SWRCB 1999), modeled noise is consistent with measured noise levels. Therefore, the HUD DNL model is an appropriate tool for determining existing and future noise levels for this area because the noise levels calculated by the noise model are similar to the measured noise levels shown in Table 4.

Implementation of project-generated traffic would only result in a 0.9 dBA CNEL increase to 64.3 dBA CNEL. According to the City's CEQA thresholds for traffic noise (Table 4), 65 dBA CNEL is the limit for exterior traffic noise levels around multi-family residential and hotel uses, and 75 dBA CNEL is the limit for exterior traffic noise levels around commercial and retail uses (see Table 4). Although project trips would add vehicle trips along Logan Avenue/South 26th Street, the resulting traffic noise increase would be below the City's thresholds for multi-family residential/hotel uses (65 dBA CNEL), and commercial/retails (75 dBA CNEL). Therefore, traffic noise impacts would be less than significant.

3 Conclusions

The proposed project would generate both temporary construction-related noise and long-term noise associated with operation of the project. Temporary construction noise would exceed the City's construction noise level thresholds at a distance of 50 feet from the project site, and affect adjacent residential receptors. Therefore, the following noise reducing measures were identified:

- Construction activities should be scheduled to avoid operating several pieces of equipment simultaneously wherever feasible.
- Operate all diesel equipment with closed engine doors and equip all diesel equipment with factor-recommended mufflers.
- For stationary equipment, designate equipment areas with appropriate acoustic shielding on building and grading plans. Equipment and shielding should be installed prior to construction and remain in designated location throughout construction activities.
- Whenever feasible, use electrical power to run air compressors and similar power tools rather than diesel equipment.
- Require all contractors, as a condition of contract, to maintain and tune-up all construction equipment to minimize noise emissions.
- Temporary sound barriers that break the line of sight (at least six feet tall) should be erected along the perimeter of the project site between active on-site construction work using heavy equipment and adjacent sensitive receptors (residences). Such barriers should be of sufficient height to break the line-of-sight between noise-generating equipment and the noise-sensitive receptor, and should be continuous with no gaps or holes between panels or the ground. Temporary sound barriers may include noise curtains, sound blankets, or solid temporary barriers with a Sound Transmission Class (STC) rating of at least 20 or greater based on sound transmission loss data taken according to ASTM Test Method E90. If an STC-rated product is not available or not feasible for use, a product with a similar industry-standard specification, or a product that would achieve a similar insertion loss based on a manufacturer or supplier recommendation, would be an acceptable substitute. A 15 dBA reduction barrier is feasible through the implementation of such construction barriers, which should be installed at the project site prior to beginning construction activities and stay in place for the entire duration of the construction period.

With implementation of the construction noise reducing measures above and compliance with Section 59.5.0404 of the San Diego Municipal Code, construction noise impacts would be less than significant.

Daily CNEL in the project site vicinity exceeds exterior noise compatibility thresholds for residential uses. Therefore, the following noise reducing measures were identified to ensure that exterior noise does not impact interior noise levels for residential and hotel occupants:

- Dual-pane windows for all residential and hotel units, laminated or similar with a Sound Transmission Class (STC) rating of at least 30;
- Exterior walls facing the street should be constructed of staggered wood studs, or equipped with a resilient channel between the studs and wallboard, or any other wall system, with an STC rating of at least 40;

- Solid core exterior doors with weather stripping and threshold seals; and,
- The completion of a pre-occupancy noise survey upon completion of project construction to ensure interior noise levels are below 45 dBA CNEL.

Implementation of the noise reducing measures above would ensure that interior noise levels are consistent with the City's General Plan *Noise Element* threshold of 45 dBA for habitable interior rooms. Although balconies could be exposed to noise exceeding City standards, balconies are required and specifically requested by the Community Planning Group. Moreover, residents would have the option to remain inside during peak traffic periods when exterior noise may be unacceptable.

The proposed residential and hotel uses would result in an incremental noise increase in the project site vicinity. Tenants for the proposed commercial retail spaces are unknown at this time. In order to ensure compatibility with proposed residential and hotel uses, future commercial uses would be determined based on compatible land uses identified in the City's General Plan *Noise Element* and pursuant to San Diego Municipal Code Section 152.0317, and adhere to land use-specific sound level thresholds based on hours of operations. The following tenant improvement measures were identified:

- Interior sheetrock or exterior wall attached to studs by resilient channels or double walls
- Window assemblies, doors, wall construction materials, and insulation with a lab-tested STC rating of 30 or greater
- Airborne sound insulation with a STC rating of 50
- Penetrations or openings in construction assemblies for piping, electrical devices, recessed cabinets, soffits, or heating, ventilating or exhaust ducts shall be sealed, lined, insulated or otherwise treated to maintain the required ratings
- All separating floor-ceiling assemblies between separate units shall provide impact sound insulation with an Impact Insulation Class (IIC) rating of 50. Floor coverings may be included in the assembly to obtain the required rating, and must be retained as a permanent part of the assembly and may only be replaced by other floor covering that provides the same level of sound insulation.

Therefore, implementation of the tenant improvement measures above and adherence to existing City land use compatibility and municipal codes would ensure that future commercial retail uses are compatible with the proposed residential and hotel uses.

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Appendix A

Noise Measurement Data

Measurement 1		Measurement 2	
Location:	Corner of Logan & S 26th	**Location:**	S 26th St
Start:	7:26AM	**Start:**	7:45AM
Stop:	7:41AM	**Stop:**	8:00AM
Weather:	Daytime 1 - Overcast >80%	**Weather:**	Daytime 1 - Overcast >80%
Temp:	69.6F	**Temp:**	74.6F
Wind:	0 mph	**Wind:**	0 mph
Primary Noise Source:	Logan Ave	**Primary Noise Source:**	S 26th St
Distance:	25 ft from centerline	**Distance:**	25 ft from centerline
Secondary Noise Source:	I-5 Freeway	**Secondary Noise Source:**	I-5 Freeway
Notes:		**Notes:**	
Leq:	61.6	**Leq:**	60.5
Lmin:	54.3	**Lmin:**	50.1
Lmax:	80.7	**Lmax:**	82.1
SEL:		**SEL:**	
L(10):	63.0	**L(10):**	63.6
Cars:	35	**Cars:**	29
Light Trucks:	5	**Light Trucks:**	7
Heavy Trucks:	0	**Heavy Trucks:**	0
Response:	Fast	**Response:**	Fast
Weighting:	A	**Weighting:**	A
Calibrated Start:	94.0	**Calibrated Start:**	94.0
Calibrated Stop:	94.1	**Calibrated Stop:**	94.0

Measurement 3

Location:	Center of Project Site
Start:	8:07AM
Stop:	8:22AM
Weather:	Daytime 1 - Overcast >80%
Temp:	72.1F
Wind:	0 mph
Primary Noise Source:	Logan Ave & S 26th St
Distance:	90 ft from centerline
Secondary Noise Source:	I-5 Freeway
Notes:	
Leq:	56.8
Lmin:	51.5
Lmax:	75.6
SEL:	
L(10):	58.1
Cars:	52
Light Trucks:	3
Heavy Trucks:	0
Response:	Fast
Weighting:	A
Calibrated Start:	94.0
Calibrated Stop:	94.1

Noise Measurement 1

17-04475_NM1_06292017.slmm

Barrio Flats
NM1

Data Logger
3
A
FAST
40-100

L10 63.0
L50 58.7
L90 56.5

Leq 55.9
LMax 80.7
LMin 54.3
Peak 98.2

2017/06/29 07:24:39

No.s	Date Time	dB
1	2017/06/29 07:23:39	58.4
2	2017/06/29 07:23:42	58.8
3	2017/06/29 07:23:45	64.0
4	2017/06/29 07:23:48	59.8
5	2017/06/29 07:23:51	58.6
6	2017/06/29 07:23:54	60.9
7	2017/06/29 07:23:57	61.6
8	2017/06/29 07:24:00	65.0
9	2017/06/29 07:24:03	60.8
10	2017/06/29 07:24:06	58.4
11	2017/06/29 07:24:09	61.4
12	2017/06/29 07:24:12	59.4
13	2017/06/29 07:24:15	59.1
14	2017/06/29 07:24:18	58.8
15	2017/06/29 07:24:21	59.9
16	2017/06/29 07:24:24	65.4
17	2017/06/29 07:24:27	61.8
18	2017/06/29 07:24:30	65.8
19	2017/06/29 07:24:33	67.2
20	2017/06/29 07:24:36	80.5
21	2017/06/29 07:24:39	63.1
22	2017/06/29 07:24:42	58.5
23	2017/06/29 07:24:45	57.7
24	2017/06/29 07:24:48	58.5
25	2017/06/29 07:24:51	59.6
26	2017/06/29 07:24:54	59.4
27	2017/06/29 07:24:57	58.8
28	2017/06/29 07:25:00	63.3
29	2017/06/29 07:25:03	57.9
30	2017/06/29 07:25:06	57.0
31	2017/06/29 07:25:09	57.2
32	2017/06/29 07:25:12	57.3
33	2017/06/29 07:25:15	56.8
34	2017/06/29 07:25:18	56.3
35	2017/06/29 07:25:21	57.1
36	2017/06/29 07:25:24	56.8
37	2017/06/29 07:25:27	57.3
38	2017/06/29 07:25:30	57.1
39	2017/06/29 07:25:33	57.9
40	2017/06/29 07:25:36	60.3
41	2017/06/29 07:25:39	63.5
42	2017/06/29 07:25:42	62.2

43	2017/06/29 07:25:45	64.9
44	2017/06/29 07:25:48	60.6
45	2017/06/29 07:25:51	58.4
46	2017/06/29 07:25:54	57.8
47	2017/06/29 07:25:57	58.2
48	2017/06/29 07:26:00	57.2
49	2017/06/29 07:26:03	57.2
50	2017/06/29 07:26:06	56.5
51	2017/06/29 07:26:09	56.0
52	2017/06/29 07:26:12	55.2
53	2017/06/29 07:26:15	58.0
54	2017/06/29 07:26:18	56.7
55	2017/06/29 07:26:21	56.9
56	2017/06/29 07:26:24	57.2
57	2017/06/29 07:26:27	58.7
58	2017/06/29 07:26:30	59.6
59	2017/06/29 07:26:33	58.8
60	2017/06/29 07:26:36	60.5
61	2017/06/29 07:26:39	61.6
62	2017/06/29 07:26:42	59.7
63	2017/06/29 07:26:45	57.7
64	2017/06/29 07:26:48	56.6
65	2017/06/29 07:26:51	57.6
66	2017/06/29 07:26:54	59.1
67	2017/06/29 07:26:57	61.5
68	2017/06/29 07:27:00	59.3
69	2017/06/29 07:27:03	61.2
70	2017/06/29 07:27:06	67.7
71	2017/06/29 07:27:09	59.1
72	2017/06/29 07:27:12	57.6
73	2017/06/29 07:27:15	58.5
74	2017/06/29 07:27:18	58.6
75	2017/06/29 07:27:21	59.3
76	2017/06/29 07:27:24	56.9
77	2017/06/29 07:27:27	57.7
78	2017/06/29 07:27:30	58.4
79	2017/06/29 07:27:33	57.3
80	2017/06/29 07:27:36	59.4
81	2017/06/29 07:27:39	63.1
82	2017/06/29 07:27:42	73.7
83	2017/06/29 07:27:45	65.9
84	2017/06/29 07:27:48	62.9
85	2017/06/29 07:27:51	60.4
86	2017/06/29 07:27:54	59.2
87	2017/06/29 07:27:57	62.5
88	2017/06/29 07:28:00	65.2
89	2017/06/29 07:28:03	59.1
90	2017/06/29 07:28:06	60.5
91	2017/06/29 07:28:09	58.5
92	2017/06/29 07:28:12	57.1
93	2017/06/29 07:28:15	57.0
94	2017/06/29 07:28:18	56.8
95	2017/06/29 07:28:21	57.9
96	2017/06/29 07:28:24	57.0
97	2017/06/29 07:28:27	55.7
98	2017/06/29 07:28:30	56.3
99	2017/06/29 07:28:33	57.7
100	2017/06/29 07:28:36	57.9
101	2017/06/29 07:28:39	57.1
102	2017/06/29 07:28:42	56.6
103	2017/06/29 07:28:45	55.4
104	2017/06/29 07:28:48	55.4
105	2017/06/29 07:28:51	56.2

106	2017/06/29 07:28:54	56.2
107	2017/06/29 07:28:57	56.7
108	2017/06/29 07:29:00	56.6
109	2017/06/29 07:29:03	57.1
110	2017/06/29 07:29:06	56.4
111	2017/06/29 07:29:09	57.2
112	2017/06/29 07:29:12	57.8
113	2017/06/29 07:29:15	57.5
114	2017/06/29 07:29:18	60.6
115	2017/06/29 07:29:21	59.5
116	2017/06/29 07:29:24	58.3
117	2017/06/29 07:29:27	60.9
118	2017/06/29 07:29:30	62.6
119	2017/06/29 07:29:33	58.4
120	2017/06/29 07:29:36	59.3
121	2017/06/29 07:29:39	57.5
122	2017/06/29 07:29:42	55.7
123	2017/06/29 07:29:45	56.2
124	2017/06/29 07:29:48	55.4
125	2017/06/29 07:29:51	60.9
126	2017/06/29 07:29:54	61.6
127	2017/06/29 07:29:57	63.1
128	2017/06/29 07:30:00	63.0
129	2017/06/29 07:30:03	61.2
130	2017/06/29 07:30:06	59.1
131	2017/06/29 07:30:09	59.7
132	2017/06/29 07:30:12	61.1
133	2017/06/29 07:30:15	66.1
134	2017/06/29 07:30:18	59.3
135	2017/06/29 07:30:21	62.4
136	2017/06/29 07:30:24	58.3
137	2017/06/29 07:30:27	57.1
138	2017/06/29 07:30:30	57.4
139	2017/06/29 07:30:33	57.4
140	2017/06/29 07:30:36	58.2
141	2017/06/29 07:30:39	56.3
142	2017/06/29 07:30:42	55.7
143	2017/06/29 07:30:45	58.8
144	2017/06/29 07:30:48	56.6
145	2017/06/29 07:30:51	56.5
146	2017/06/29 07:30:54	57.4
147	2017/06/29 07:30:57	57.9
148	2017/06/29 07:31:00	59.7
149	2017/06/29 07:31:03	59.8
150	2017/06/29 07:31:06	60.8
151	2017/06/29 07:31:09	65.7
152	2017/06/29 07:31:12	62.9
153	2017/06/29 07:31:15	69.5
154	2017/06/29 07:31:18	60.8
155	2017/06/29 07:31:21	58.7
156	2017/06/29 07:31:24	57.5
157	2017/06/29 07:31:27	55.0
158	2017/06/29 07:31:30	55.8
159	2017/06/29 07:31:33	56.4
160	2017/06/29 07:31:36	56.2
161	2017/06/29 07:31:39	57.6
162	2017/06/29 07:31:42	57.6
163	2017/06/29 07:31:45	57.9
164	2017/06/29 07:31:48	57.6
165	2017/06/29 07:31:51	59.4
166	2017/06/29 07:31:54	61.0
167	2017/06/29 07:31:57	56.5
168	2017/06/29 07:32:00	57.1

169	2017/06/29 07:32:03	57.3
170	2017/06/29 07:32:06	58.2
171	2017/06/29 07:32:09	60.8
172	2017/06/29 07:32:12	64.5
173	2017/06/29 07:32:15	65.0
174	2017/06/29 07:32:18	60.2
175	2017/06/29 07:32:21	58.4
176	2017/06/29 07:32:24	56.6
177	2017/06/29 07:32:27	58.7
178	2017/06/29 07:32:30	59.1
179	2017/06/29 07:32:33	62.1
180	2017/06/29 07:32:36	60.3
181	2017/06/29 07:32:39	61.5
182	2017/06/29 07:32:42	57.5
183	2017/06/29 07:32:45	57.2
184	2017/06/29 07:32:48	56.5
185	2017/06/29 07:32:51	56.7
186	2017/06/29 07:32:54	58.0
187	2017/06/29 07:32:57	59.7
188	2017/06/29 07:33:00	58.8
189	2017/06/29 07:33:03	60.7
190	2017/06/29 07:33:06	63.5
191	2017/06/29 07:33:09	59.4
192	2017/06/29 07:33:12	58.0
193	2017/06/29 07:33:15	58.1
194	2017/06/29 07:33:18	59.5
195	2017/06/29 07:33:21	61.5
196	2017/06/29 07:33:24	60.2
197	2017/06/29 07:33:27	58.9
198	2017/06/29 07:33:30	57.8
199	2017/06/29 07:33:33	57.4
200	2017/06/29 07:33:36	55.7
201	2017/06/29 07:33:39	56.2
202	2017/06/29 07:33:42	56.4
203	2017/06/29 07:33:45	57.5
204	2017/06/29 07:33:48	56.6
205	2017/06/29 07:33:51	55.4
206	2017/06/29 07:33:54	57.4
207	2017/06/29 07:33:57	58.8
208	2017/06/29 07:34:00	59.2
209	2017/06/29 07:34:03	59.2
210	2017/06/29 07:34:06	59.5
211	2017/06/29 07:34:09	59.0
212	2017/06/29 07:34:12	60.6
213	2017/06/29 07:34:15	63.0
214	2017/06/29 07:34:18	61.6
215	2017/06/29 07:34:21	58.5
216	2017/06/29 07:34:24	60.7
217	2017/06/29 07:34:27	60.5
218	2017/06/29 07:34:30	60.1
219	2017/06/29 07:34:33	56.8
220	2017/06/29 07:34:36	57.1
221	2017/06/29 07:34:39	57.9
222	2017/06/29 07:34:42	57.2
223	2017/06/29 07:34:45	58.6
224	2017/06/29 07:34:48	57.4
225	2017/06/29 07:34:51	59.4
226	2017/06/29 07:34:54	58.0
227	2017/06/29 07:34:57	59.0
228	2017/06/29 07:35:00	59.6
229	2017/06/29 07:35:03	59.6
230	2017/06/29 07:35:06	65.6
231	2017/06/29 07:35:09	66.1

232	2017/06/29 07:35:12	61.6
233	2017/06/29 07:35:15	59.1
234	2017/06/29 07:35:18	59.7
235	2017/06/29 07:35:21	59.4
236	2017/06/29 07:35:24	58.9
237	2017/06/29 07:35:27	58.6
238	2017/06/29 07:35:30	61.4
239	2017/06/29 07:35:33	57.9
240	2017/06/29 07:35:36	57.4
241	2017/06/29 07:35:39	57.8
242	2017/06/29 07:35:42	58.8
243	2017/06/29 07:35:45	58.7
244	2017/06/29 07:35:48	59.9
245	2017/06/29 07:35:51	60.0
246	2017/06/29 07:35:54	58.7
247	2017/06/29 07:35:57	61.2
248	2017/06/29 07:36:00	69.6
249	2017/06/29 07:36:03	67.7
250	2017/06/29 07:36:06	66.3
251	2017/06/29 07:36:09	62.0
252	2017/06/29 07:36:12	60.5
253	2017/06/29 07:36:15	58.5
254	2017/06/29 07:36:18	62.6
255	2017/06/29 07:36:21	63.7
256	2017/06/29 07:36:24	60.0
257	2017/06/29 07:36:27	59.5
258	2017/06/29 07:36:30	65.9
259	2017/06/29 07:36:33	57.8
260	2017/06/29 07:36:36	59.3
261	2017/06/29 07:36:39	57.6
262	2017/06/29 07:36:42	58.1
263	2017/06/29 07:36:45	60.6
264	2017/06/29 07:36:48	62.1
265	2017/06/29 07:36:51	64.6
266	2017/06/29 07:36:54	65.7
267	2017/06/29 07:36:57	59.0
268	2017/06/29 07:37:00	60.0
269	2017/06/29 07:37:03	57.9
270	2017/06/29 07:37:06	57.3
271	2017/06/29 07:37:09	57.0
272	2017/06/29 07:37:12	57.7
273	2017/06/29 07:37:15	57.8
274	2017/06/29 07:37:18	57.7
275	2017/06/29 07:37:21	57.5
276	2017/06/29 07:37:24	58.8
277	2017/06/29 07:37:27	57.6
278	2017/06/29 07:37:30	58.7
279	2017/06/29 07:37:33	58.0
280	2017/06/29 07:37:36	57.7
281	2017/06/29 07:37:39	58.1
282	2017/06/29 07:37:42	59.9
283	2017/06/29 07:37:45	60.7
284	2017/06/29 07:37:48	57.9
285	2017/06/29 07:37:51	57.0
286	2017/06/29 07:37:54	57.8
287	2017/06/29 07:37:57	57.8
288	2017/06/29 07:38:00	58.1
289	2017/06/29 07:38:03	58.1
290	2017/06/29 07:38:06	59.1
291	2017/06/29 07:38:09	59.8
292	2017/06/29 07:38:12	61.5
293	2017/06/29 07:38:15	62.9
294	2017/06/29 07:38:18	63.0

295	2017/06/29 07:38:21	60.2
296	2017/06/29 07:38:24	60.4
297	2017/06/29 07:38:27	62.4
298	2017/06/29 07:38:30	59.1
299	2017/06/29 07:38:33	58.8
300	2017/06/29 07:38:36	58.7

Noise Measurement 2

17-04475_NM2_06292017.slmm

Barrio Flats
NM2

Data Logger
3
A
FAST
40-100

L10 63.6
L50 54.1
L90 51.7

Leq 60.5
LMax 82.1
LMin 50.1
Peak 96.0

2017/06/29 07:43:54

No.s	Date Time	dB
1	2017/06/29 07:43:16	56.1
2	2017/06/29 07:43:19	54.8
3	2017/06/29 07:43:22	53.4
4	2017/06/29 07:43:25	53.1
5	2017/06/29 07:43:28	57.2
6	2017/06/29 07:43:31	65.2
7	2017/06/29 07:43:34	54.9
8	2017/06/29 07:43:37	55.5
9	2017/06/29 07:43:40	51.4
10	2017/06/29 07:43:43	66.7
11	2017/06/29 07:43:46	59.6
12	2017/06/29 07:43:49	54.5
13	2017/06/29 07:43:52	64.7
14	2017/06/29 07:43:55	58.4
15	2017/06/29 07:43:58	53.9
16	2017/06/29 07:44:01	67.0
17	2017/06/29 07:44:04	65.3
18	2017/06/29 07:44:07	61.9
19	2017/06/29 07:44:10	53.5
20	2017/06/29 07:44:13	50.8
21	2017/06/29 07:44:16	54.0
22	2017/06/29 07:44:19	51.5
23	2017/06/29 07:44:22	51.2
24	2017/06/29 07:44:25	51.5
25	2017/06/29 07:44:28	52.0
26	2017/06/29 07:44:31	54.9
27	2017/06/29 07:44:34	63.3
28	2017/06/29 07:44:37	62.5
29	2017/06/29 07:44:40	62.0
30	2017/06/29 07:44:43	52.9
31	2017/06/29 07:44:46	52.6
32	2017/06/29 07:44:49	52.2
33	2017/06/29 07:44:52	53.5
34	2017/06/29 07:44:55	52.8
35	2017/06/29 07:44:58	59.7
36	2017/06/29 07:45:01	68.5
37	2017/06/29 07:45:04	68.2
38	2017/06/29 07:45:07	64.4
39	2017/06/29 07:45:10	57.5
40	2017/06/29 07:45:13	52.7
41	2017/06/29 07:45:16	53.7
42	2017/06/29 07:45:19	57.5

43	2017/06/29 07:45:22	55.1
44	2017/06/29 07:45:25	51.7
45	2017/06/29 07:45:28	55.3
46	2017/06/29 07:45:31	54.7
47	2017/06/29 07:45:34	54.1
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Barrio Flats
NM3

Data Logger
3
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40-100

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L90 52.9

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Peak 87.9
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189	2017/06/29 08:14:34	53.4
190	2017/06/29 08:14:37	55.7
191	2017/06/29 08:14:40	57.6
192	2017/06/29 08:14:43	54.2
193	2017/06/29 08:14:46	53.9
194	2017/06/29 08:14:49	54.3
195	2017/06/29 08:14:52	54.4
196	2017/06/29 08:14:55	53.7
197	2017/06/29 08:14:58	53.0
198	2017/06/29 08:15:01	53.8
199	2017/06/29 08:15:04	55.9
200	2017/06/29 08:15:07	55.5
201	2017/06/29 08:15:10	55.7
202	2017/06/29 08:15:13	57.2
203	2017/06/29 08:15:16	57.0
204	2017/06/29 08:15:19	59.3
205	2017/06/29 08:15:22	55.1
206	2017/06/29 08:15:25	54.4
207	2017/06/29 08:15:28	53.6
208	2017/06/29 08:15:31	54.5
209	2017/06/29 08:15:34	55.9
210	2017/06/29 08:15:37	55.7
211	2017/06/29 08:15:40	56.2
212	2017/06/29 08:15:43	57.2
213	2017/06/29 08:15:46	60.0
214	2017/06/29 08:15:49	57.0
215	2017/06/29 08:15:52	62.7
216	2017/06/29 08:15:55	64.1
217	2017/06/29 08:15:58	67.7
218	2017/06/29 08:16:01	67.5
219	2017/06/29 08:16:04	65.1
220	2017/06/29 08:16:07	67.9
221	2017/06/29 08:16:10	62.5
222	2017/06/29 08:16:13	57.9
223	2017/06/29 08:16:16	55.2
224	2017/06/29 08:16:19	54.0
225	2017/06/29 08:16:22	53.9
226	2017/06/29 08:16:25	53.4
227	2017/06/29 08:16:28	52.5
228	2017/06/29 08:16:31	53.0
229	2017/06/29 08:16:34	53.4
230	2017/06/29 08:16:37	55.9
231	2017/06/29 08:16:40	57.1
232	2017/06/29 08:16:43	55.4

233	2017/06/29 08:16:46	55.0
234	2017/06/29 08:16:49	54.1
235	2017/06/29 08:16:52	53.4
236	2017/06/29 08:16:55	54.5
237	2017/06/29 08:16:58	53.2
238	2017/06/29 08:17:01	52.9
239	2017/06/29 08:17:04	52.6
240	2017/06/29 08:17:07	53.2
241	2017/06/29 08:17:10	54.0
242	2017/06/29 08:17:13	57.8
243	2017/06/29 08:17:16	55.7
244	2017/06/29 08:17:19	54.5
245	2017/06/29 08:17:22	53.8
246	2017/06/29 08:17:25	54.8
247	2017/06/29 08:17:28	54.5
248	2017/06/29 08:17:31	66.0
249	2017/06/29 08:17:34	60.6
250	2017/06/29 08:17:37	56.2
251	2017/06/29 08:17:40	55.3
252	2017/06/29 08:17:43	62.9
253	2017/06/29 08:17:46	62.3
254	2017/06/29 08:17:49	57.1
255	2017/06/29 08:17:52	54.9
256	2017/06/29 08:17:55	54.3
257	2017/06/29 08:17:58	56.2
258	2017/06/29 08:18:01	56.1
259	2017/06/29 08:18:04	55.5
260	2017/06/29 08:18:07	53.4
261	2017/06/29 08:18:10	56.6
262	2017/06/29 08:18:13	56.0
263	2017/06/29 08:18:16	54.7
264	2017/06/29 08:18:19	54.8
265	2017/06/29 08:18:22	55.8
266	2017/06/29 08:18:25	56.5
267	2017/06/29 08:18:28	54.9
268	2017/06/29 08:18:31	55.2
269	2017/06/29 08:18:34	56.0
270	2017/06/29 08:18:37	54.2
271	2017/06/29 08:18:40	53.2
272	2017/06/29 08:18:43	53.6
273	2017/06/29 08:18:46	54.4
274	2017/06/29 08:18:49	52.9
275	2017/06/29 08:18:52	53.6
276	2017/06/29 08:18:55	53.6
277	2017/06/29 08:18:58	54.6
278	2017/06/29 08:19:01	55.5
279	2017/06/29 08:19:04	55.7
280	2017/06/29 08:19:07	54.7
281	2017/06/29 08:19:10	53.5
282	2017/06/29 08:19:13	53.2
283	2017/06/29 08:19:16	54.0
284	2017/06/29 08:19:19	56.0
285	2017/06/29 08:19:22	56.6
286	2017/06/29 08:19:25	54.3
287	2017/06/29 08:19:28	54.5
288	2017/06/29 08:19:31	56.1
289	2017/06/29 08:19:34	54.8
290	2017/06/29 08:19:37	54.8
291	2017/06/29 08:19:40	56.4
292	2017/06/29 08:19:43	54.5
293	2017/06/29 08:19:46	55.0
294	2017/06/29 08:19:49	57.0
295	2017/06/29 08:19:52	57.0

296	2017/06/29 08:19:55	57.3
297	2017/06/29 08:19:58	55.9
298	2017/06/29 08:20:01	56.9
299	2017/06/29 08:20:04	57.3
300	2017/06/29 08:20:07	57.1

Appendix B

FHWA Roadway Construction Noise Model (RCNM) Data & Reference Table

Table 9.1 RCNM Default Noise Emission Reference Levels and Usage Factors

Equipment Description	Impact Device?	Acoustical Usage Factor (%)	Spec. 721.560 L_{max} @ 50 feet (dBA, slow)	Actual Measured L_{max} @ 50 feet (dBA, slow) (Samples Averaged)	Number of Actual Data Samples (Count)
All Other Equipment > 5 HP	No	50	85	N/A	0
Auger Drill Rig	No	20	85	84	36
Backhoe	No	40	80	78	372
Bar Bender	No	20	80	N/A	0
Blasting	Yes	N/A	94	N/A	0
Boring Jack Power Unit	No	50	80	83	1
Chain Saw	No	20	85	84	46
Clam Shovel (dropping)	Yes	20	93	87	4
Compactor (ground)	No	20	80	83	57
Compressor (air)	No	40	80	78	18
Concrete Batch Plant	No	15	83	N/A	0
Concrete Mixer Truck	No	40	85	79	40
Concrete Pump Truck	No	20	82	81	30
Concrete Saw	No	20	90	90	55
Crane	No	16	85	81	405
Dozer	No	40	85	82	55
Drill Rig Truck	No	20	84	79	22
Drum Mixer	No	50	80	80	1
Dump Truck	No	40	84	76	31
Excavator	No	40	85	81	170
Flat Bed Truck	No	40	84	74	4
Front End Loader	No	40	80	79	96
Generator	No	50	82	81	19
Generator (<25KVA, VMS Signs)	No	50	70	73	74

Equipment Description	Impact Device?	Acoustical Usage Factor (%)	Spec. 721.560 L_{max} @ 50 feet (dBA, slow)	Actual Measured L_{max} @ 50 feet (dBA, slow) (Samples Averaged)	Number of Actual Data Samples (Count)
Gradall	No	40	85	83	70
Grader	No	40	85	N/A	0
Grapple (on backhoe)	No	40	85	87	1
Horizontal Boring Hydraulic Jack	No	25	80	82	6
Hydra Break Ram	Yes	10	90	N/A	0
Impact Pile Driver	Yes	20	95	101	11
Jackhammer	Yes	20	85	89	133
Man Lift	No	20	85	75	23
Mounted Impact Hammer (hoe ram)	Yes	20	90	90	212
Pavement Scarifier	No	20	85	90	2
Paver	No	50	85	77	9
Pickup Truck	No	40	55	75	1
Pneumatic Tools	No	50	85	85	90
Pumps	No	50	77	81	17
Refrigerator Unit	No	100	82	73	3
Rivit Buster/Chipping Gun	Yes	20	85	79	19
Rock Drill	No	20	85	81	3
Roller	No	20	85	80	16
Sand Blasting (single nozzle)	No	20	85	96	9
Scraper	No	40	85	84	12
Sheers (on backhoe)	No	40	85	96	5
Slurry Plant	No	100	78	78	1
Slurry Trenching Machine	No	50	82	80	75
Soil Mix Drill Rig	No	50	80	N/A	0
Tractor	No	40	84	N/A	0
Vacuum Excavator	No	40	85	85	149

Equipment Description	**Impact Device?**	**Acoustical Usage Factor (%)**	**Spec. 721.560 L_{max} @ 50 feet (dBA, slow)**	**Actual Measured L_{max} @ 50 feet (dBA, slow) (Samples Averaged)**	**Number of Actual Data Samples (Count)**
(Vac-Truck)					
Vacuum Street Sweeper	No	10	80	82	19
Ventilation Fan	No	100	85	79	13
Vibrating Hopper	No	50	85	87	1
Vibratory Concrete Mixer	No	20	80	80	1
Vibratory Pile Driver	No	20	95	101	44
Warning Horn	No	5	85	83	12
Welder/Torch	No	40	73	74	5

Federal Highway Administration (FHWA). 2006. FHWA Highway Construction Noise Handbook. (FHWAHEP-06-015; DOT-VNTSC-FHWA-06-02). http://www.fhwa.dot.gov/environment/construction_noise/handbook.

Demolition
Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 07/28/2017
Case Description: Barrio Flats Mixed-Use Project - Demolition

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Residential Buildings	Residential	52.0	50.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	50.0	0.0
Dozer	No	40		81.7	50.0	0.0
Backhoe	No	40		77.6	50.0	0.0
Tractor	No	40	84.0		50.0	0.0

Results

Equipment	Calculated (dBA) Lmax	Leq	Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq	Noise Limit Exceedance (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq
Concrete Saw	89.6	82.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	81.7	77.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	77.6	73.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	84.0	80.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	89.6	85.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #2 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Churches	Commercial	52.0	50.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)

Demolition

Concrete Saw	No	20		89.6	200.0	0.0
Dozer	No	40		81.7	200.0	0.0
Backhoe	No	40		77.6	200.0	0.0
Tractor	No	40	84.0		200.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Saw	77.5	70.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	69.6	65.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	65.5	61.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	72.0	68.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	77.5	73.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Site Preparation

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 07/28/2017

Case Description: Barrio Flats Mixed-Use Project - Site Preparation

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Residential Buildings	Residential	52.0	50.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Grader	No	40	85.0		50.0	0.0
Tractor	No	40	84.0		50.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Grader	85.0	81.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	84.0	80.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	85.0	83.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #2 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Churches	Commercial	52.0	50.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Grader	No	40	85.0		200.0	0.0
Tractor	No	40	84.0		200.0	0.0

Results

Site Preparation

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Grader	73.0	69.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	72.0	68.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	73.0	71.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Grading

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 07/28/2017

Case Description: Barrio Flats Mixed-Use Project - Grading

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Residential Buildings	Residential	52.0	50.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	50.0	0.0
Dozer	No	40		81.7	50.0	0.0
Backhoe	No	40		77.6	50.0	0.0
Tractor	No	40	84.0		50.0	0.0

Results

Equipment	Calculated (dBA) Lmax	Leq	Noise Limits (dBA) Day Lmax	Leq	Evening Lmax	Leq	Night Lmax	Leq	Noise Limit Exceedance (dBA) Day Lmax	Leq	Evening Lmax	Leq	Night Lmax	Leq
Concrete Saw	89.6	82.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	81.7	77.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	77.6	73.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	84.0	80.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	89.6	85.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #2 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Churches	Commercial	52.0	50.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)

Grading

Concrete Saw	No	20		89.6	200.0	0.0
Dozer	No	40		81.7	200.0	0.0
Backhoe	No	40		77.6	200.0	0.0
Tractor	No	40	84.0		200.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Saw	77.5	70.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	69.6	65.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	65.5	61.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	72.0	68.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	77.5	73.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Building Construction
Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 07/28/2017
Case Description: Barrio Flats Mixed-Use Project - Grading

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Residential Buildings	Residential	52.0	50.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	50.0	0.0
Man Lift	No	20		74.7	50.0	0.0
Backhoe	No	40		77.6	50.0	0.0
Tractor	No	40	84.0		50.0	0.0
Man Lift	No	20		74.7	50.0	0.0

Results

Equipment	Calculated (dBA) Lmax	Leq	Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq	Noise Limit Exceedance (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq
Crane	80.6	72.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	74.7	67.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	77.6	73.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	84.0	80.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	74.7	67.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	84.0	81.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #2 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Churches	Commercial	52.0	50.0	50.0

Equipment

Spec Actual Receptor Estimated

Building Construction

Description	Impact Device	Usage (%)	Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)
Crane	No	16		80.6	200.0	0.0
Man Lift	No	20		74.7	200.0	0.0
Backhoe	No	40		77.6	200.0	0.0
Tractor	No	40	84.0		200.0	0.0
Man Lift	No	20		74.7	200.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane	68.5	60.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	62.7	55.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	65.5	61.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	72.0	68.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Man Lift	62.7	55.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	72.0	69.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Paving

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 07/28/2017

Case Description: Barrio Flats Mixed-Use Project - Paving

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Residential Buildings	Residential	52.0	50.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Paver	No	50		77.2	50.0	0.0
Roller	No	20		80.0	50.0	0.0
Backhoe	No	40		77.6	50.0	0.0

Results

Equipment	Calculated (dBA) Lmax	Leq	Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq	Noise Limit Exceedance (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq
Paver	77.2	74.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller	80.0	73.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	77.6	73.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	80.0	78.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #2 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Churches	Commercial	52.0	50.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Paver	No	50		77.2	200.0	0.0
Roller	No	20		80.0	200.0	0.0
Backhoe	No	40		77.6	200.0	0.0

Paving

Results

Equipment	Calculated (dBA) Lmax	Calculated (dBA) Leq	Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq	Noise Limit Exceedance (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq
Paver	65.2	62.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller	68.0	61.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe	65.5	61.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	68.0	66.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Architectural Coating
Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 07/28/2017
Case Description: Barrio Flats Mixed-Use Project - Architectural Coating

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Residential Buildings	Residential	52.0	50.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Compressor (air)	No	40		77.7	50.0	0.0

Results

Noise Limits (dBA)
Noise Limit Exceedance (dBA)

Equipment	Calculated (dBA) Lmax	Leq	Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq	Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq
Compressor (air)	77.7	73.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	77.7	73.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #2 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Churches	Commercial	52.0	50.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Compressor (air)	No	40		77.7	200.0	0.0

Results

Noise Limits (dBA)
Noise Limit Exceedance (dBA)

Architectural Coating

	Calculated (dBA)		Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)	65.6	61.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	65.6	61.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Appendix C

HUD DNL Calculator Results

DNL Calculator

The Day/Night Noise Level Calculator is an electronic assessment tool that calculates the Day/Night Noise Level (DNL) from roadway and railway traffic. For more information on using the DNL calculator, view the **Day/Night Noise Level Calculator Electronic Assessment Tool Overview (/programs/environmental-review/daynight-noise-level-electronic-assessment-tool/)**.

Guidelines

- To display the Road and/or Rail DNL calculator(s), click on the "Add Road Source" and/or "Add Rail Source" button(s) below.
- All Road and Rail input values must be positive non-decimal numbers.
- All Road and/or Rail DNL value(s) must be calculated separately before calculating the Site DNL.
- All checkboxes that apply must be checked for vehicles and trains in the tables' headers.
- **Note #1:** Tooltips, containing field specific information, have been added in this tool and may be accessed by hovering over all the respective data fields (site identification, roadway and railway assessment, DNL calculation results, roadway and railway input variables) with the mouse.
- **Note #2:** DNL Calculator assumes roadway data is always entered.

DNL Calculator

Site ID	Barrio Flats Mixed-Use Project
Record Date	08/01/2017
User's Name	Rincon Consultants, Inc.

Road # 1 Name:	**Logan Avenue/South 26th Street (Existing without Project Traffic)**

Road #1

Vehicle Type	**Cars** ☑	**Medium Trucks** ☑	**Heavy Trucks** ☐
Effective Distance	20	20	
Distance to Stop Sign			

Distance to Stop Sign			
Average Speed	35	35	
Average Daily Trips (ADT)	1900	100	
Night Fraction of ADT	15	15	
Road Gradient (%)			
Vehicle DNL	63.1	50.3	
Calculate Road #1 DNL	63.4	Reset	

Road # 2 Name: **Logan Avenue/South 26th Street (Existing with Project Traffic)**

Road #2

Vehicle Type	**Cars** ☑	**Medium Trucks** ☑	**Heavy Trucks** ☐
Effective Distance	20	20	
Distance to Stop Sign			
Average Speed	35	35	
Average Daily Trips (ADT)	2383	125	
Night Fraction of ADT	15	15	
Road Gradient (%)			
Vehicle DNL	64	51.2	
Calculate Road #2 DNL	64.3	Reset	

Add Road Source Add Rail Source

Add Road Source Add Rail Source

Airport Noise Level	
Loud Impulse Sounds?	Yes No
Combined DNL for all Road and Rail sources	**0**
Combined DNL including Airport	
Site DNL with Loud Impulse Sound	

Calculate

Mitigation Options

If your site DNL is in Excess of 65 decibels, your options are:

- **No Action Alternative**: Cancel the project at this location
- **Other Reasonable Alternatives**: Choose an alternate site
- **Mitigation**
  - **Contact your Field or Regional Environmental Officer (/programs/environmental-review/hud-environmental-staff-contacts/)**
  - Increase mitigation in the building walls (only effective if no outdoor, noise sensitive areas)
  - Reconfigure the site plan to increase the distance between the noise source and noise-sensitive uses
  - Incorporate natural or man-made barriers. See ***The Noise Guidebook (/resource/313/hud-noise-guidebook/)***
  - Construct noise barrier. See the **Barrier Performance Module (/programs/environmental-review/bpm-calculator/)**

Tools and Guidance

Day/Night Noise Level Assessment Tool User Guide (/resource/3822/day-night-noise-level-assessment-tool-user-guide/)

Day/Night Noise Level Assessment Tool Flowcharts (/resource/3823/day-night-noise-level-assessment-tool-flowcharts/)

The City of San Diego	**PRIORITY DEVELOPMENT PROJECT (PDP) STORM WATER QUALITY MANAGEMENT PLAN (SWQMP) FOR**

Logan Avenue & 26th St Mixed Use Project

PTS 541700

ENGINEER OF WORK:

REGISTERED PROFESSIONAL ENGINEER
JEFF RENO CROSS
NO. 67530
Expires
6/30/2019
CIVIL
STATE OF CALIFORNIA

Jeff Cross, PE C67530
Provide Wet Signature and Stamp Above Line

PREPARED FOR:

OBR Architecture
3817 Ray Street
San Diego, CA 92104
(619) 564-7586

PREPARED BY:

CROSS CIVIL ENGINEERING

Cross Civil Engineering
4653 Carmel Mtn. Rd,. Suite 308
San Diego, CA 92130
(858) 519-7783

DATE:

June, 2018

Approved by: City of San Diego Date

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Project Name: Logan Ave & 26th St. Mixed Use Project

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: Logan Ave & 26th St. Mixed Use Project
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.

C67530, Exp. 6-30-2019
Engineer of Work's Signature, PE Number & Expiration Date

Jeff Cross
Print Name

Cross Civil Engineering, Inc.
Company

June, 2018
Date

REGISTERED PROFESSIONAL ENGINEER
JEFF RENO CROSS
NO. 67530
Expires
6/30/2019
CIVIL
STATE OF CALIFORNIA

Engineer's Stamp

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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	3/1/17	◉ Preliminary Design/Planning/CEQA ○ Final Design	Initial Submittal
2	Enter a date.	○ Preliminary Design/Planning/CEQA ◉ Final Design	Click here to enter text.
3	Enter a date.	○ Preliminary Design/Planning/CEQA ◉ Final Design	Click here to enter text.
4	Enter a date.	○ Preliminary Design/Planning/CEQA ◉ Final Design	Click here to enter text.

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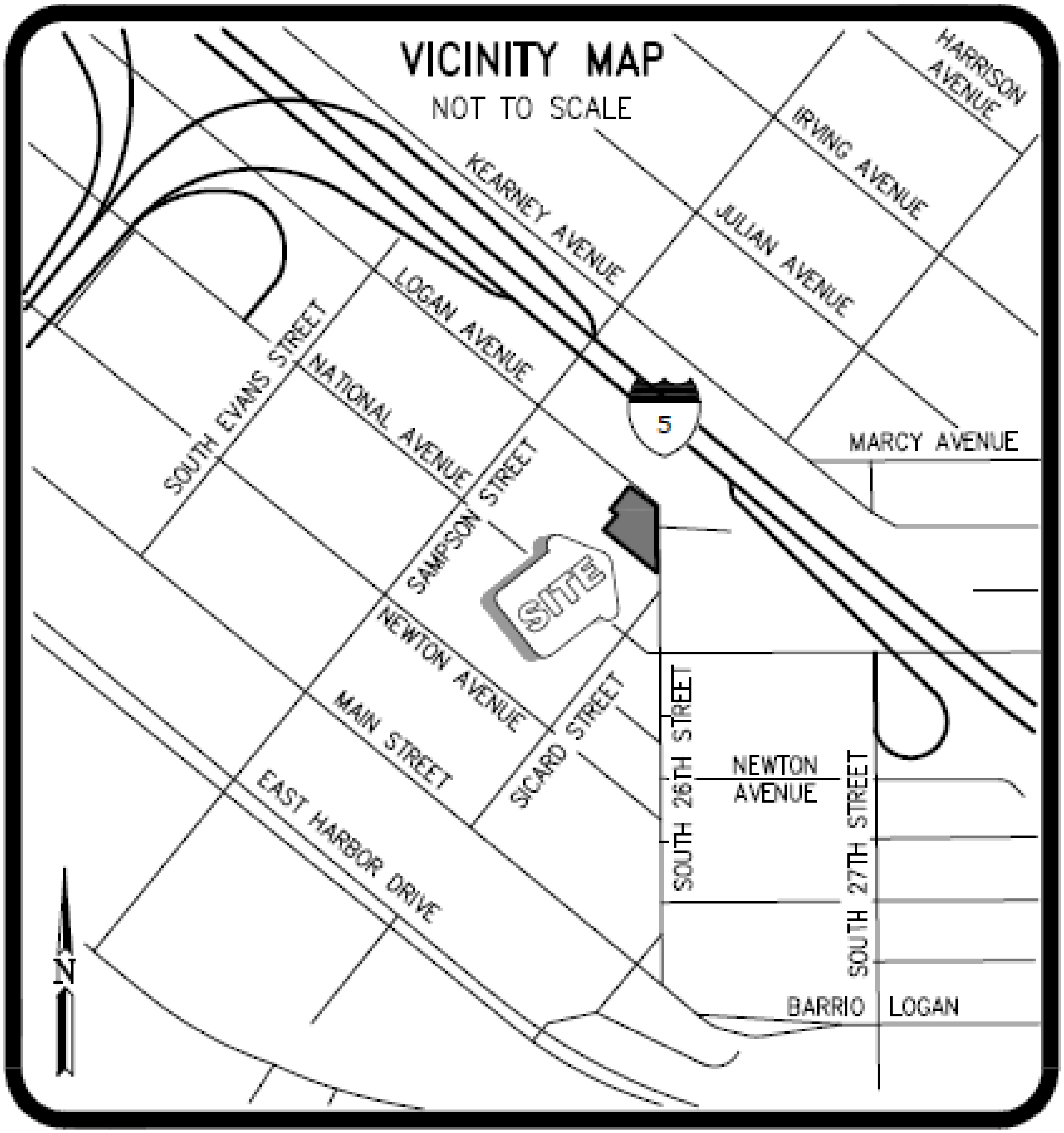
PROJECT VICINITY MAP

Project Name: Logan Ave & 26th St. Mixed Use Project
Permit Application Number: Insert Application Number.



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City of San Diego
Development Services
1222 First Ave., MS-302
San Diego, CA 92101
(619) 446-5000

Storm Water Requirements Applicability Checklist

FORM DS-560
OCTOBER 2016

Project Address:	Project Number *(for City Use Only)*:

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 administered 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 resulting in ground disturbance and contact with storm water runoff?

☒ Yes; WPCP required, skip 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 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 only ONE of the following activities: water service, sewer lateral, or 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, pot holing, curb and gutter replacement, and retaining wall encroachments.

☐ Yes; no document required

Check one of the boxes below, 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 proposes 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 questions 1-3, and checked "Yes" for question 4 PART B **does not apply and no document is required. Continue to Section 2.**

1. More information on the City's construction BMP requirements as well as CGP requirements can be found at: www.sandiego.gov/stormwater/regulations/index.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 State 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.

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 requiring a Water Pollution Control Plan but 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; project not exempt.

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 Development 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
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 (RGO) that create 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 (ADT) 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 PERMANENT STORM WATER REQUIREMENTS**.	☐
2.	The project is a **STANDARD DEVELOPMENT 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 a hydromodification plan management	☒

Jeff Cross — PE

Name of Owner or Agent *(Please Print)* — Title

Jeff R. Cross — 07/20/2017

Signature — 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: Logan Ave & 26th St Mixed Use Project		
Permit Application Number: Insert Application Number.		Date: 3/1/17
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 (<u>not required if prior lawful approval does not apply</u>): 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 <u>not</u> apply: Project discharging directly to San Diego Bay via surface flow at curb & gutters, then to curb inlet and underground storm drain system, which is exempt from hydromodification. Please see added exhibit 2 on page 48.		
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 <u>not</u> apply: Hydromodificatin is exempt for this project.		

Project Name: Logan Ave & 26th St. Mixed Use Project

Site Information Checklist For PDPs	Form I-3B
Project Summary Information	
Project Name	Logan Ave & 26th St. Mixed Use Project
Project Address	2267 Logan Avenue
Assessor's Parcel Number(s) (APN(s))	5385801800, 5385801700, 5385801600, 5385801500
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)	Pueblo San Diego (908.22)
Project Area (total area of Assessor's Parcel(s) associated with the project or total area of the right-of-way)	0.39 Acres ([SQFT] Square Feet)
Area to be disturbed by the project (Project Footprint)	0.39 Acres (17,000 Square Feet)
Project Proposed Impervious Area (subset of Project Footprint)	0.38 Acres (16,500 Square Feet)
Project Proposed Pervious Area (subset of Project Footprint)	0.01 Acres (482 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.	Decrease by 2.4 %

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: Existing site has a few small building, but most of the site is paved with asphalt paving. The existing use is a used car lot.
Existing Land Cover Includes (select all that apply): ☐ Vegetative Cover ☐ Non-Vegetated Pervious Areas ☒ Impervious Areas Description / Additional Information: Existing site is 100% impervious with asphalt parking lot and building footprint..
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: San Diego Bay is about 1 mile to the southwest and Chollas Creek is about 1.4 miles to the southeast.

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:
Existing drainage conveyance is urban. No offsite runoff is conveyed onto or through the site. Existing project site drainage sheet flows across asphalt parking site toward the south concrete alley, where it then routes to the adjacent curb gutters downsteam. No existing underground stormdrainage is within or adjacent to this property. The nearest underground storm drainage is several blocks downstream closer to the San Diego Bay. The pre-project drainage is surface flow from small building rooftop and asphalt paving with design peak flows of less than 2 cubic feet per second toward existing runoff discharge location where the alley meets with 26th Street.

Form I-3B Page 4 of 11
Description of Proposed Site Development and Drainage Patterns
Project Description / Proposed Land Use and/or Activities: The proposed project will be an urban site with a new 4-story building taking up most of the 0.39 acre property footprint. However, the each floor will feature several planter boxes hanging from interior courtyard area with flow drop from "rain-chains" to the next lowest floor planter box. The project design will utilize capturing roof runoff with detention and filtration storage through the use of planter drains prior to release of treated stormwater to the same southeast location routing of the site pre-development drainage.
List/describe proposed impervious features of the project (e.g., buildings, roadways, parking lots, courtyards, athletic courts, other impervious features): The proposed impervious features include the building footprint rooftop, outdoor common floor areas on first and fourth levels open to the sky. The first floor parking level is at ground level and covered by rooftop of 3 floors above.
List/describe proposed pervious features of the project (e.g., landscape areas): The pervious areas will include the landscape planters within the outdoor common space areas on the ground and planter boxes on each of the floor levels.
Does the project include grading and changes to site topography? ◉ Yes ○ No Description / Additional Information: The project will replace the existing impervious surface parking lot and small building with a new larger building which will change the topography by having a rooftop instead of a sloped parking lot. However, the site drainage will still be routed to the same southern alley location.

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 site drainage will change slightly. While the existing site drains via sheet flow across an asphalt parking lot directly to the southern alley, the proposed site will drain from rooftops via piping to planter box filters and outlet at 26th Street at southeast corner of the site via sidewalk curb outlet.

Project Name: Logan Ave & 26th St. Mixed Use Project

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: The trash dumpsters are located inside the first floor parking area and not exposed to outdoors.

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) Storm water will outlet from roof drains to southern curb outlet at 26th Street, which then surface flows several hundred feet toward southeastern curb/gutters and eventually is picked up via southern storm drain inlets several blocks south of project location. These storm drains outlet directly to San Diego Bay.
Provide a summary of all beneficial uses of receiving waters downstream of the project discharge locations.
Identify all ASBS (areas of special biological significance) receiving waters downstream of the project discharge locations. None in these receiving waters.
Provide distance from project outfall location to impaired or sensitive receiving waters. Not applicable as outfall location has no impaired or sensitive receiving waters.
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 Not applicable.

Table 2-3. BENEFICIAL USES OF COASTAL WATERS

Coastal Waters	Hydrologic Unit Basin Number	BENEFICIAL USE														
		IND	NAV	REC1	REC2	COMM	BIOL	EST	WILD	RARE	MAR	AQUA	MIGR	SPWN	WARM	SHELL
San Diego Bay		●	●	●	●	●	●	●	●	●	●		●	●		●

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
San Diego Bay	Indicator Bacteria, Dissolved	Indicator Bacteria, Dissolved
San Diego Bay Cont'd.	Copper, Lead, and Zinc.	Copper, Lead, and Zinc.
Click or tap here to enter text.	Click or tap here to enter text.	Click or tap here to enter text.
Click or tap here to enter text.	Click or tap here to enter text.	Click or tap here to enter text.
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Click or tap here to enter text.	Click or tap here to enter text.	Click or tap here to enter text.

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): Project will discharge runoff directly to surface curbs/gutters which routes downstream via gutters, surface cross-gutters, and underground piping directly to the San Diego Bay.
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: Hydromodification management requirements DO NOT apply and thus no CCSYA exhibit applies. See Page 50 for CCSYA Exhibit 2b

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. N/A
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: N/A
Discussion / Additional Information: (optional) Hydromod is N/A for this project as it is exempt.

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. Click or tap here to enter text.
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: **Logan Ave & 26th St. Mixed Use Project**

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: .			
SC-2 Storm Drain Stenciling or Signage	○ Yes	○ No	◉ N/A
Discussion / justification if SC-2 not implemented: No stormdrainage exists around site or off-site			
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: Logan Ave & 26th St. Mixed Use Project

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 all "No" answers shown above. Click or tap here to enter text.			

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: Site will be taken up by building footprint with rooftop drains. No existing natural drainage pathways to maintain.			
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: The project site has no exising natural areas to conserve.			

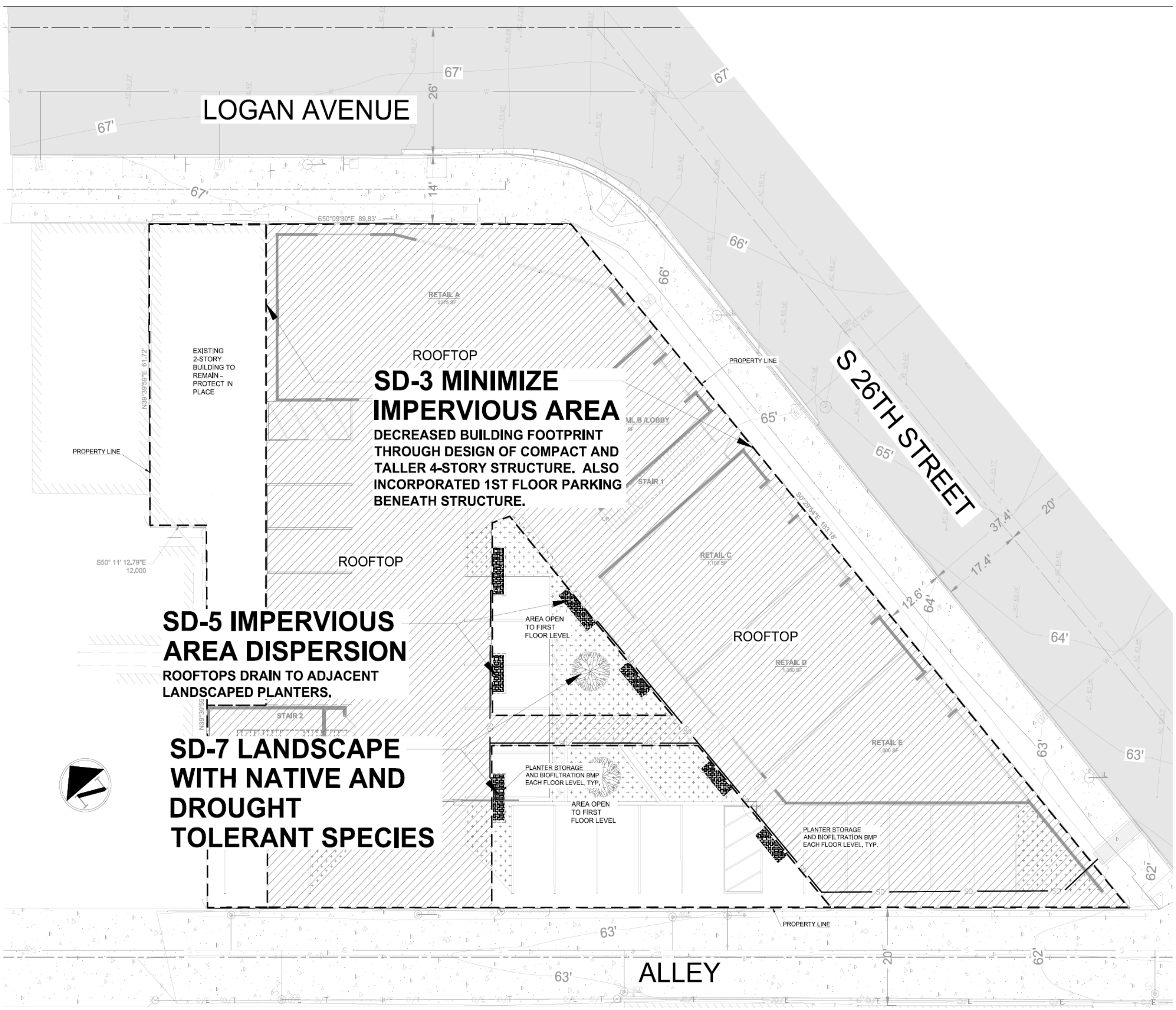
Form I-5 Page 2 of 4			
Site Design Requirement	Applied?		
SD-3 Minimize Impervious Area	◉ Yes	○ No	○ N/A
Discussion / justification if SD-3 not implemented: Decreased building footprint through design of compact and taller structure (4 -story) mixed-use structure. Design of parking beneath structure on 1st floor also helps minimize impervious area.			
SD-4 Minimize Soil Compaction	○ Yes	○ No	◉ N/A
Discussion / justification if SD-4 not implemented: Entire site is taken up by building footprint and requires compaction to support building foundation.			
SD-5 Impervious Area Dispersion	◉ Yes	○ No	○ N/A
Discussion / justification if SD-5 not implemented: Rooftops drain into adjacent landscape planters.			
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: Logan Ave & 26th St. Mixed Use Project

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: Infeasible to implement due to foundations surrounding entire area as well as soil recommendations.			
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: Landscape to implement native and drought tolerant species.			
SD-8 Harvesting and Using Precipitation	○ Yes	◉ No	○ N/A
Discussion / justification if SD-8 not implemented: Not feasible per calculation sheets.			
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: **Logan Ave & 26th St. Mixed Use Project**

Form I-5 Page 4 of 4
Insert Site Map with all site design BMPs identified:



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. This site is less than a half-acre with the building taking the entire area. The DMA is almost completely impervious and harvest and use is not feasible per calculations. Infiltration is not feasible, since the infiltration testing shows groundwater mounding, low infiltration rates, and building foundations surround the entire area. Thus, the project will utilize above grade planter areas with biofiltration and impermeable liner. The "no infiltration condition" will apply and the sizing requirements are implemented in the planter box biofiltration system BMP. (Continue on page 2 as necessary.)	

Form I-6 Page 2 of X
(Page reserved for continuation of description of general strategy for structural BMP implementation at the site)
(Continued from page 1) Click or tap here to enter text.

Form I-6 Page 3 of 13	
Structural BMP Summary Information	
Structural BMP ID No. BF-1: BMP #1	
Construction Plan Sheet No. Exhibit 1A	
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 ○ 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	TBD
Who will be the final owner of this BMP?	Logan Holdings, LLC.
Who will maintain this BMP into perpetuity?	Logan Holdings, LLC.
What is the funding mechanism for maintenance?	Logan Holdings, LLC.

Form I-6 Page 4 of 13	
Structural BMP Summary Information	
Structural BMP ID No. BF-1: BMP #2	
Construction Plan Sheet No. Exhibit 1A	
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 ○ 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	TBD
Who will be the final owner of this BMP?	Logan Holdings, LLC.
Who will maintain this BMP into perpetuity?	Logan Holdings, LLC.
What is the funding mechanism for maintenance?	Logan Holdings, LLC.

Form I-6 Page 5 of 13
Structural BMP Summary Information
Structural BMP ID No. BF-1: BMP #3
Construction Plan Sheet No. Exhibit 1A
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 ○ 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	TBD
Who will be the final owner of this BMP?	Logan Holdings, LLC.
Who will maintain this BMP into perpetuity?	Logan Holdings, LLC.
What is the funding mechanism for maintenance?	Logan Holdings, LLC.

Form I-6 Page 6 of 13	
Structural BMP Summary Information	
Structural BMP ID No. BF-1: BMP #4	
Construction Plan Sheet No. Exhibit 1A	
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 ○ 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	TBD
Who will be the final owner of this BMP?	Logan Holdings, LLC.
Who will maintain this BMP into perpetuity?	Logan Holdings, LLC.
What is the funding mechanism for maintenance?	Logan Holdings, LLC.

Form I-6 Page 7 of 13	
Structural BMP Summary Information	
Structural BMP ID No. BF-1: BMP #5	
Construction Plan Sheet No. Exhibit 1A	
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 ○ 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	TBD
Who will be the final owner of this BMP?	Logan Holdings, LLC.
Who will maintain this BMP into perpetuity?	Logan Holdings, LLC.
What is the funding mechanism for maintenance?	Logan Holdings, LLC.

Form I-6 Page 8 of 13	
Structural BMP Summary Information	
Structural BMP ID No. BF-1: BMP #6	
Construction Plan Sheet No. Exhibit 1A	
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 ○ 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	TBD
Who will be the final owner of this BMP?	Logan Holdings, LLC.
Who will maintain this BMP into perpetuity?	Logan Holdings, LLC.
What is the funding mechanism for maintenance?	Logan Holdings, LLC.

Form I-6 Page 9 of 13
Structural BMP Summary Information
Structural BMP ID No. BF-1: BMP #7
Construction Plan Sheet No. Exhibit 1A
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 ○ 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	TBD
Who will be the final owner of this BMP?	Logan Holdings, LLC.
Who will maintain this BMP into perpetuity?	Logan Holdings, LLC.
What is the funding mechanism for maintenance?	Logan Holdings, LLC.

Form I-6 Page 10 of 13	
Structural BMP Summary Information	
Structural BMP ID No. BF-1: BMP #8	
Construction Plan Sheet No. Exhibit 1A	
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 ○ 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	TBD
Who will be the final owner of this BMP?	Logan Holdings, LLC.
Who will maintain this BMP into perpetuity?	Logan Holdings, LLC.
What is the funding mechanism for maintenance?	Logan Holdings, LLC.

Form I-6 Page 11 of 13	
Structural BMP Summary Information	
Structural BMP ID No. BF-1: BMP #9	
Construction Plan Sheet No. Exhibit 1A	
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 ○ 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	TBD
Who will be the final owner of this BMP?	Logan Holdings, LLC.
Who will maintain this BMP into perpetuity?	Logan Holdings, LLC.
What is the funding mechanism for maintenance?	Logan Holdings, LLC.

Form I-6 Page 12 of 13	
Structural BMP Summary Information	
Structural BMP ID No. BF-1: BMP #10	
Construction Plan Sheet No. Exhibit 1A	
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 ○ 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	TBD
Who will be the final owner of this BMP?	Logan Holdings, LLC.
Who will maintain this BMP into perpetuity?	Logan Holdings, LLC.
What is the funding mechanism for maintenance?	Logan Holdings, LLC.

Form I-6 Page 13 of 13
Structural BMP ID No. Click or tap here to enter text.
Construction Plan Sheet No.
Discussion (as needed):

City of San Diego
Development Services
1222 First Ave., MS-501
San Diego, CA 92101

Permanent BMP Construction
Self Certification Form

FORM DS-563
December 2016

Date Prepared: 10/25/17	Project No./Drawing No.: 541700
Project Applicant: OBR Architecture	Phone: (619) 564-7586
Project Address: 2267 Logan Avenue	
Project Name: The Barrio Flats SDP	

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 Standards Manual 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 Priority Development Projects in order to comply with the City's Storm Water ordinances and applicable San Diego Regional MS4 Permit. 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, hydromodification, and treatment control BMP's required per the Storm Water Standards Manual; and that said BMP's have been constructed in compliance with the approved plans and all applicable specifications, permits, ordinances and San Diego Regional MS4 Permit.

I understand that this BMP certification statement does not constitute an operation and maintenance verification.

Signature: ______________________________

Date of Signature: ______________________________

Printed Name: ______________________________

Title: ______________________________

Phone No. ______________________________

Engineer's Stamp

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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: Logan Ave & 26th St. Mixed Use Project

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: Logan Ave & 26th St. Mixed Use Project

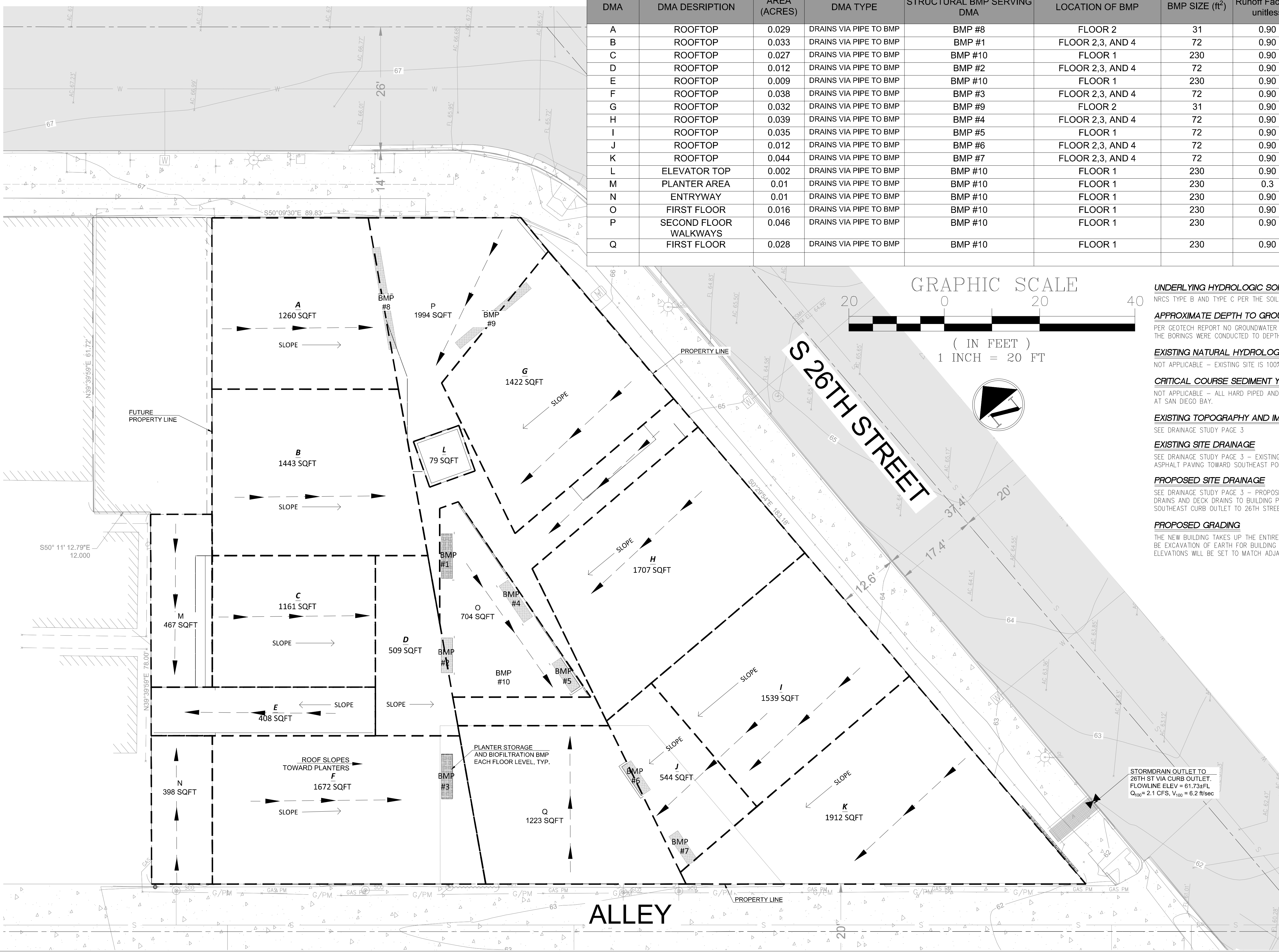
Use this checklist to ensure the required information has been included on the DMA Exhibit:

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)

PROPOSED DRAINAGE MANAGEMENT AREAS AND BMPS - THE BARRIO FLATS, LOGAN AVENUE

DMA	DMA DESRIPTION	AREA (ACRES)	DMA TYPE	STRUCTURAL BMP SERVING DMA	LOCATION OF BMP	BMP SIZE (ft^2)	Runoff Factor C unitless	Design Capture Volume (DCV) ft^3
A	ROOFTOP	0.029	DRAINS VIA PIPE TO BMP	BMP #8	FLOOR 2	31	0.90	47.37
B	ROOFTOP	0.033	DRAINS VIA PIPE TO BMP	BMP #1	FLOOR 2,3, AND 4	72	0.90	53.91
C	ROOFTOP	0.027	DRAINS VIA PIPE TO BMP	BMP #10	FLOOR 1	230	0.90	44.10
D	ROOFTOP	0.012	DRAINS VIA PIPE TO BMP	BMP #2	FLOOR 2,3, AND 4	72	0.90	19.60
E	ROOFTOP	0.009	DRAINS VIA PIPE TO BMP	BMP #10	FLOOR 1	230	0.90	14.70
F	ROOFTOP	0.038	DRAINS VIA PIPE TO BMP	BMP #3	FLOOR 2,3, AND 4	72	0.90	62.07
G	ROOFTOP	0.032	DRAINS VIA PIPE TO BMP	BMP #9	FLOOR 2	31	0.90	52.27
H	ROOFTOP	0.039	DRAINS VIA PIPE TO BMP	BMP #4	FLOOR 2,3, AND 4	72	0.90	63.71
I	ROOFTOP	0.035	DRAINS VIA PIPE TO BMP	BMP #5	FLOOR 1	72	0.90	57.17
J	ROOFTOP	0.012	DRAINS VIA PIPE TO BMP	BMP #6	FLOOR 2,3, AND 4	72	0.90	19.60
K	ROOFTOP	0.044	DRAINS VIA PIPE TO BMP	BMP #7	FLOOR 2,3, AND 4	72	0.90	71.87
L	ELEVATOR TOP	0.002	DRAINS VIA PIPE TO BMP	BMP #10	FLOOR 1	230	0.90	3.27
M	PLANTER AREA	0.01	DRAINS VIA PIPE TO BMP	BMP #10	FLOOR 1	230	0.3	5.45
N	ENTRYWAY	0.01	DRAINS VIA PIPE TO BMP	BMP #10	FLOOR 1	230	0.90	16.34
O	FIRST FLOOR	0.016	DRAINS VIA PIPE TO BMP	BMP #10	FLOOR 1	230	0.90	26.14
P	SECOND FLOOR WALKWAYS	0.046	DRAINS VIA PIPE TO BMP	BMP #10	FLOOR 1	230	0.90	75.14
Q	FIRST FLOOR	0.028	DRAINS VIA PIPE TO BMP	BMP #10	FLOOR 1	230	0.90	45.74
								678.45



UNDERLYING HYDROLOGIC SOIL GROUP
NRCS TYPE B AND TYPE C PER THE SOILS REPORT

APPROXIMATE DEPTH TO GROUNDWATER
PER GEOTECH REPORT NO GROUNDWATER WAS ENCOUNTERED. THE BORINGS WERE CONDUCTED TO DEPTHS OF UP TO 20 FEET.

EXISTING NATURAL HYDROLOGIC FEATURES
NOT APPLICABLE – EXISTING SITE IS 100% IMPERVIOUS

CRITICAL COURSE SEDIMENT YIELD AREAS
NOT APPLICABLE – ALL HARD PIPED AND IMPERVIOUS TO OUTLET AT SAN DIEGO BAY.

EXISTING TOPOGRAPHY AND IMPERVIOUS AREAS
SEE DRAINAGE STUDY PAGE 3

EXISTING SITE DRAINAGE
SEE DRAINAGE STUDY PAGE 3 – EXISTING SITE SHEET FLOWS VIA ASPHALT PAVING TOWARD SOUTHEAST PORTION OF EXISTING ALLEY.

PROPOSED SITE DRAINAGE
SEE DRAINAGE STUDY PAGE 3 – PROPOSED SITE DRAINS VIA ROOF DRAINS AND DECK DRAINS TO BUILDING PIPING AND OUTLETS AT SOUTHEAST CURB OUTLET TO 26TH STREET.

PROPOSED GRADING
THE NEW BUILDING TAKES UP THE ENTIRE PROPERTY LIMITS. THERE WILL BE EXCAVATION OF EARTH FOR BUILDING FOUNDATIONS AND FINISH FLOOR ELEVATIONS WILL BE SET TO MATCH ADJACENT GRADES.

obr
3817 Ray Street San Diego, Ca 92104
e info@obrarchitecture.com
w obrarchitecture.com
t 619.564.7586
f 619.568.3636
GARRICK OLIVER CHRISTOPHER BITTNER ANNEY ROSENTHAL-HALL

REGISTERED PROFESSIONAL ENGINEER JEFF RENO CROSS NO. 67530 Expires 6/30/2019 CIVIL STATE OF CALIFORNIA

NOT FOR CONSTRUCTION

CROSS CIVIL ENGINEERING

DMA EXHIBIT

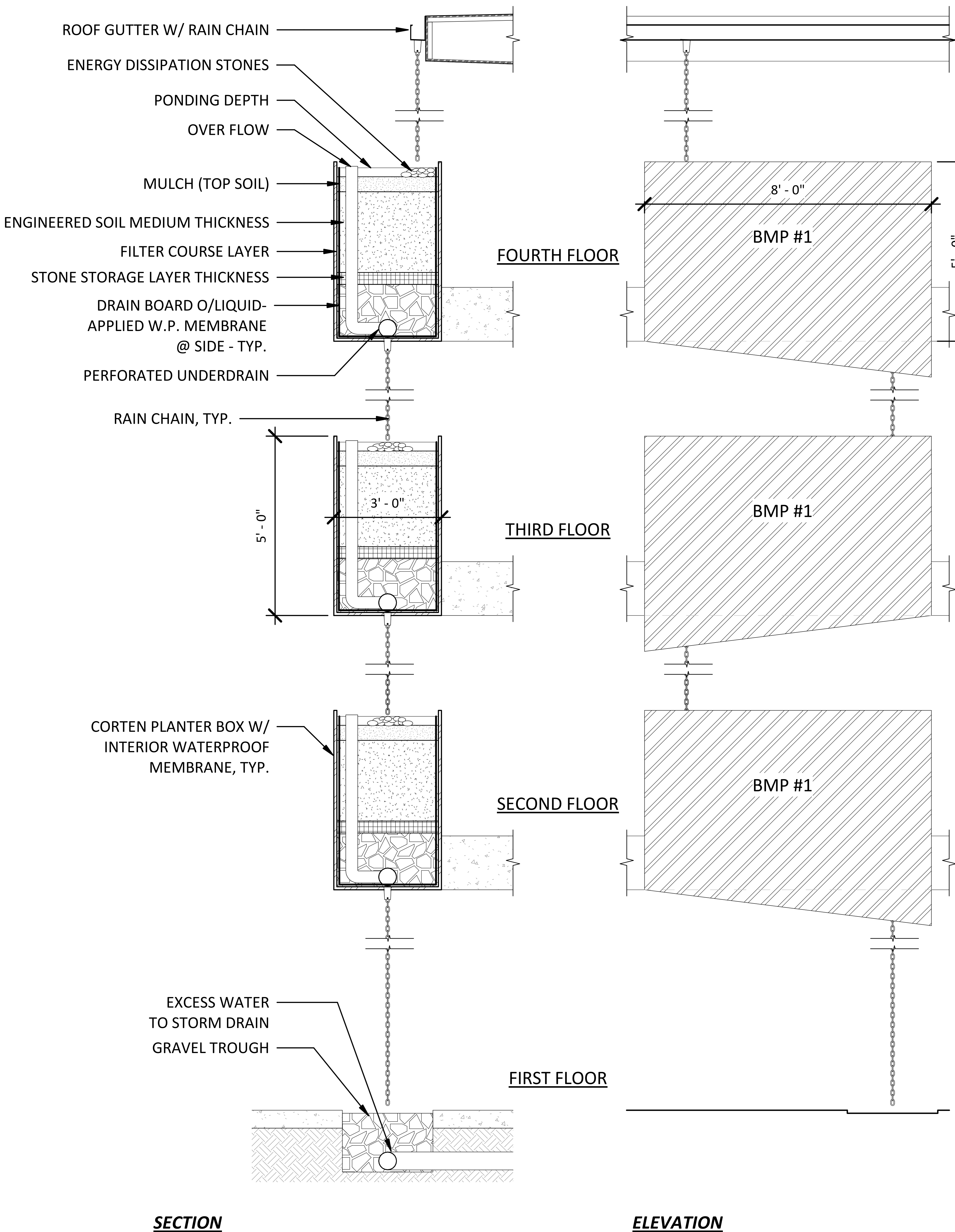
Date Issued

No. REVISIONS

Job No.

Sheet No.

1A



BMP PLANTER BOXES

3/8" = 1'-0"

THE BARRIO FLATS

EDK-008 03/12/17

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obr

GARRICK OLIVER CHRISTOPHER BITTNER ANNEY ROSENTHAL-HALL

Harvest and Use Feasibility Checklist			**Form I-7**
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:______________			
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. For Retail/Mixed Use - Toilet/Urinal - 30 people x 7 = 210 gallons/day, Landscape = 390 x 0.41 acre = 160gal/day. (210 + 160) x 1.5 days = 555 gal/36 hours = 74 cubic feet			
3. Calculate the DCV using worksheet B-2.1. DCV = C x d x A x 3630 = (0.9)x(0.53)x(0.41)x3630 =710 DCV = 710 (cubic feet)			
3a. Is the 36 hour demand greater than or equal to the DCV? ☐ Yes / ☐ No ⇨ ⇩	3b. Is the 36 hour demand greater than 0.25DCV but less than the full DCV? ☐ Yes / ☐ No ⇨ ⇩	3c. Is the 36 hour demand less than 0.25DCV? ☒ Yes ⇩	
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.	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.	Harvest and use is considered to be infeasible.	
Is harvest and use feasible based on further evaluation? No ☐ Yes, refer to Appendix E to select and size harvest and use BMPs. ☒ No, select alternate BMPs.			

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: Four percolation tests were performed on-site following the guidelines of the County of San Diego Department of Environmental Health (DEH), Version 2010. The percolation rates were converted to infiltration using the Prochet Method in accordance with the "Model BMP Design Manual, San Diego Region (February 2016)". lnfiltration rates ranged between 0.0136 to 0.0784 inches per hour. With an applied safety factor of two, the corresponding infiltration rates ranged form 0.0068 to 0.0392 inches per hour. Details of testing methodology and results are presented in the "Preliminary Geotechnica1 and Fault Hazard Evaluation, Proposed Logan Avenue Project, Logan Avenue and 26th Street, Completed by Construction Testing & Engineering, Inc.,(CTE), dated November 8, 2016. 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: As described above the infiltration rates are below the full infiltration rates of0.5 inches per hour, and as described in Geotechnical and Fault Hazard Report (referenced above) three of the the test locations with a safety factor or two applied, just meet the minimum infiltration rate for partial infiltration (0.01 in/hr). Based on the geotechnical evaluation and the infiltration test results, the eastern and particularly the southeastern portion of the site (P-2 location) were considered as the area (s) for possible BMP's locations. However, design of possible future BMP's will need to include mitigation measures to account for the low infiltration rates, and the anticipated to decrease in filtration capability over time. 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: As above, rates of 0.5 in/hr are not considered obtainable at the site based on infiltration testing. However, partial infiltration is possible as long as BMP design accounts for the low infiltration rates and deprecation of the rates over time. The site is currently be used as a used car Jot, and future proposed development is for a mixed use. The area is not industrial and the capture of surface waters are not anticipated to increase the risk of groundwater contamination. 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: As above, rates of 0.5 in/hr are not considered obtainable based on the site specific infiltration test results. However, partial infiltration could be allowed without causing potential water balance issues as described in the above comment. 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		NO

*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 Agency/Jurisdictions 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: See response to Screening Question 1, Part I. Partial infiltration is considered possible as long as mitigation for the low infiltration rates and anticipated decrease in rates over time are incorporated in the BMP design.

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:

Groundwater Mounding and Building Footings cannot allow infiltration without risk or hazard to structure and property.

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.

<table>
<tr><th colspan="4">Form I-8 Page 4 of 4</th></tr>
<tr><th>Criteria</th><th>Screening Question</th><th>Yes</th><th>No</th></tr>
<tr><td>7</td><td>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.</td><td>X</td><td></td></tr>
<tr><td colspan="4">Provide basis: Yes, partial infiltration is possible without posing significant risk for groundwater related concerns

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.</td></tr>
<tr><td>8</td><td>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.</td><td>X</td><td></td></tr>
<tr><td colspan="4">Provide basis: Yes

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.</td></tr>
<tr><td>Part 2 Result*</td><td colspan="2">If all answers from row 5-8 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.</td><td>No Infiltration</td></tr>
</table>

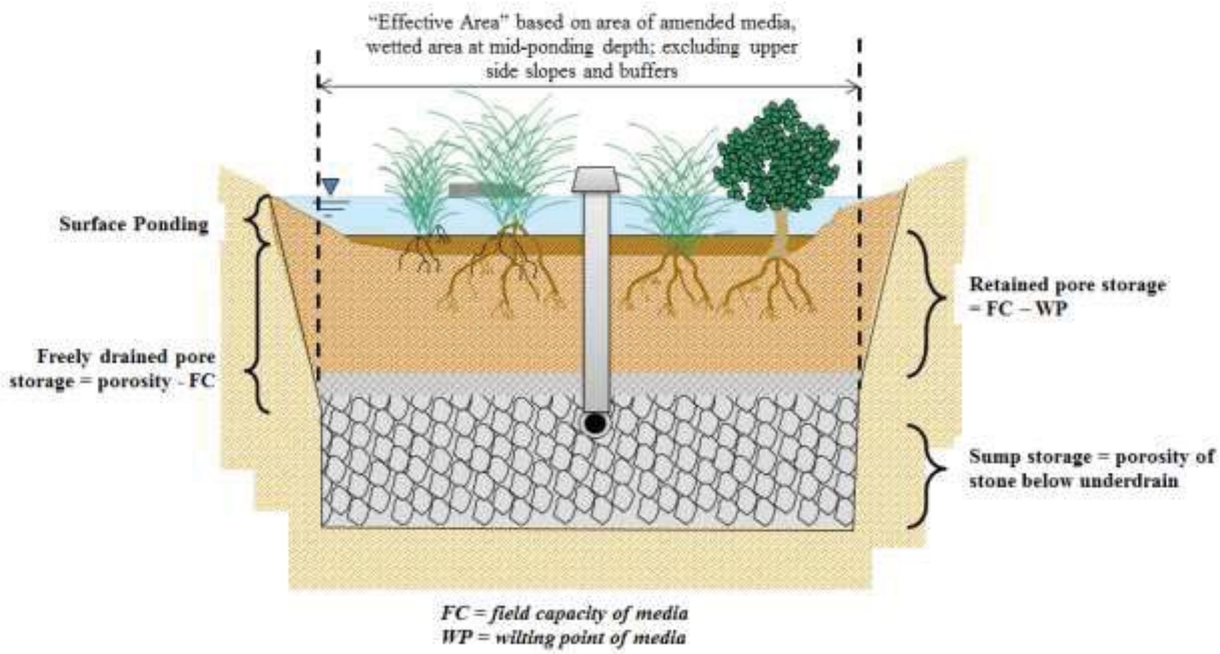
*To be completed using gathered site information and best professional judgment considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by Agency/Jurisdictions to substantiate findings

B.5 Biofiltration BMPs

Biofiltration BMPs shall be sized by one of the following sizing methods:

Option 1: Treat 1.5 times the portion of the DCV not reliably retained onsite, OR

Option 2: Treat 1.0 times the portion of the DCV not reliably retained onsite; and additionally check that the system has a total static (i.e., non-routed) storage volume, including pore spaces and pre-filter detention volume, equal to at least 0.75 times the portion of the DCV not reliably retained onsite.



Explanation of Biofiltration Volume Compartments for Sizing Purposes

Worksheet B.5-1 provides a simple sizing method for sizing biofiltration BMP with partial retention and biofiltration BMP.

When using sizing option 1 a routing period of 6 hours is allowed. The routing period was estimated based on 50th percentile storm duration for storms similar to 85th percentile rainfall depth. It was estimated based on inspection of continuous rainfall data from Lake Wohlford, Lindbergh and Oceanside rain gages.

BMP #1

Worksheet B.5-1: Simple Sizing Method for Biofiltration BMPs

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1 (Page 1 of 2)	
1	Remaining DCV after implementing retention BMPs	54	cubic-feet
Partial Retention			
2	Infiltration rate from Worksheet D.5-1 if partial infiltration is feasible		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]		inches
5	Aggregate pore space	0.40	in/in
6	Required depth of gravel below the underdrain [Line 4/ Line 5]		inches
7	Assumed surface area of the biofiltration BMP		sq-ft
8	Media retained pore storage	0.1	in/in
9	Volume retained by BMP [[Line 4 + (Line 12 x Line 8)]/12] x Line 7	0	cubic-feet
10	DCV that requires biofiltration [Line 1 – Line 9]	54	cubic-feet
BMP Parameters			
11	Surface Ponding [6 inch minimum, 12 inch maximum]	6	inches
12	Media Thickness [18 inches minimum], also add mulch layer thickness to this line for sizing calculations	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	12	inches
14	Media available pore space	0.2	in/in
15	Media filtration rate to be used for sizing (5 in/hr. with no outlet control; if the filtration rate is controlled by the outlet use the outlet controlled rate)	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)]	14.4	inches
19	Total Depth Treated [Line 17 + Line 18]	44.4	inches

Worksheet Error! No text of specified style in document.**-1: Simple Sizing Method for Biofiltration BMPs (continued)**

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1 (Page 2 of 2)	
Option 1 – Biofilter 1.5 times the DCV			
20	Required biofiltered volume [1.5 x Line 10]	81	cubic-feet
21	Required Footprint [Line 20/ Line 19] x 12	22	sq-ft
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
22	Required Storage (surface + pores) Volume [0.75 x Line 10]		cubic-feet
23	Required Footprint [Line 22/ Line 18] x 12		sq-ft
Footprint of the BMP			
24	Area draining to the BMP	1,443	sq-ft
25	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and B.2)	0.9	
26	BMP Footprint Sizing Factor (Default 0.03 or an alternative minimum footprint sizing factor from Worksheet B.5-2, Line 11)	0.03	unitless
27	Minimum BMP Footprint [Line 24 x Line 25 x Line 26]	39	sq-ft
28	Footprint of the BMP = Maximum(Minimum(Line 21, Line 23), Line 27)	39	sq-ft
Check for Volume Reduction [Not applicable for No Infiltration Condition]			
29	Calculate the fraction of the DCV retained by the BMP [Line 9/ Line 1]		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	☐ No

Note:

1. Line 7 is used to estimate the amount of volume retained by the BMP. Update assumed surface area in Line 7 until its equivalent to the required biofiltration footprint (either Line 21 or Line 23)
2. The DCV fraction of 0.375 is based on a 40% average annual percent capture and a 36-hour drawdown time.
3. The increase in footprint for volume reduction can be optimized using the approach presented in Appendix B.5.2. The optimized footprint cannot be smaller than the alternative minimum footprint sizing factor from Worksheet B.5-2.
4. If the proposed biofiltration BMP footprint is smaller than the alternative minimum footprint sizing factor from Worksheet B.5-2, but satisfies Option 1 or Option 2 sizing, it is considered a compact biofiltration BMP and may be allowed at the discretion of the [City Engineer], if it meets the requirements in Appendix F.

BMP #2

Worksheet B.5-1: Simple Sizing Method for Biofiltration BMPs

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1 (Page 1 of 2)	
1	Remaining DCV after implementing retention BMPs	20	cubic-feet
Partial Retention			
2	Infiltration rate from Worksheet D.5-1 if partial infiltration is feasible		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]		inches
5	Aggregate pore space	0.40	in/in
6	Required depth of gravel below the underdrain [Line 4/ Line 5]		inches
7	Assumed surface area of the biofiltration BMP		sq-ft
8	Media retained pore storage	0.1	in/in
9	Volume retained by BMP [[Line 4 + (Line 12 x Line 8)]/12] x Line 7	0	cubic-feet
10	DCV that requires biofiltration [Line 1 – Line 9]	20	cubic-feet
BMP Parameters			
11	Surface Ponding [6 inch minimum, 12 inch maximum]	6	inches
12	Media Thickness [18 inches minimum], also add mulch layer thickness to this line for sizing calculations	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	12	inches
14	Media available pore space	0.2	in/in
15	Media filtration rate to be used for sizing (5 in/hr. with no outlet control; if the filtration rate is controlled by the outlet use the outlet controlled rate)	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)]	14.4	inches
19	Total Depth Treated [Line 17 + Line 18]	44.4	inches

Worksheet Error! No text of specified style in document.**-1: Simple Sizing Method for Biofiltration BMPs (continued)**

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1 (Page 2 of 2)	
Option 1 – Biofilter 1.5 times the DCV			
20	Required biofiltered volume [1.5 x Line 10]	30	cubic-feet
21	Required Footprint [Line 20/ Line 19] x 12	8	sq-ft
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
22	Required Storage (surface + pores) Volume [0.75 x Line 10]		cubic-feet
23	Required Footprint [Line 22/ Line 18] x 12		sq-ft
Footprint of the BMP			
24	Area draining to the BMP	1,443	sq-ft
25	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and B.2)	0.9	
26	BMP Footprint Sizing Factor (Default 0.03 or an alternative minimum footprint sizing factor from Worksheet B.5-2, Line 11)	0.03	unitless
27	Minimum BMP Footprint [Line 24 x Line 25 x Line 26]	39	sq-ft
28	Footprint of the BMP = Maximum(Minimum(Line 21, Line 23), Line 27)	39	sq-ft
Check for Volume Reduction [Not applicable for No Infiltration Condition]			
29	Calculate the fraction of the DCV retained by the BMP [Line 9/ Line 1]		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	☐ No

Note:

1. Line 7 is used to estimate the amount of volume retained by the BMP. Update assumed surface area in Line 7 until its equivalent to the required biofiltration footprint (either Line 21 or Line 23)
2. The DCV fraction of 0.375 is based on a 40% average annual percent capture and a 36-hour drawdown time.
3. The increase in footprint for volume reduction can be optimized using the approach presented in Appendix B.5.2. The optimized footprint cannot be smaller than the alternative minimum footprint sizing factor from Worksheet B.5-2.
4. If the proposed biofiltration BMP footprint is smaller than the alternative minimum footprint sizing factor from Worksheet B.5-2, but satisfies Option 1 or Option 2 sizing, it is considered a compact biofiltration BMP and may be allowed at the discretion of the [City Engineer], if it meets the requirements in Appendix F.

BMP # 3

Worksheet B.5-1: Simple Sizing Method for Biofiltration BMPs

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1 (Page 1 of 2)	
1	Remaining DCV after implementing retention BMPs	62	cubic-feet
Partial Retention			
2	Infiltration rate from Worksheet D.5-1 if partial infiltration is feasible		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]		inches
5	Aggregate pore space	0.40	in/in
6	Required depth of gravel below the underdrain [Line 4/ Line 5]		inches
7	Assumed surface area of the biofiltration BMP		sq-ft
8	Media retained pore storage	0.1	in/in
9	Volume retained by BMP [[Line 4 + (Line 12 x Line 8)]/12] x Line 7	0	cubic-feet
10	DCV that requires biofiltration [Line 1 – Line 9]	62	cubic-feet
BMP Parameters			
11	Surface Ponding [6 inch minimum, 12 inch maximum]	6	inches
12	Media Thickness [18 inches minimum], also add mulch layer thickness to this line for sizing calculations	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	12	inches
14	Media available pore space	0.2	in/in
15	Media filtration rate to be used for sizing (5 in/hr. with no outlet control; if the filtration rate is controlled by the outlet use the outlet controlled rate)	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)]	14.4	inches
19	Total Depth Treated [Line 17 + Line 18]	44.4	inches

Worksheet Error! No text of specified style in document.**-1: Simple Sizing Method for Biofiltration BMPs (continued)**

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1 (Page 2 of 2)	
Option 1 – Biofilter 1.5 times the DCV			
20	Required biofiltered volume [1.5 x Line 10]	93	cubic-feet
21	Required Footprint [Line 20/ Line 19] x 12	25	sq-ft
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
22	Required Storage (surface + pores) Volume [0.75 x Line 10]		cubic-feet
23	Required Footprint [Line 22/ Line 18] x 12		sq-ft
Footprint of the BMP			
24	Area draining to the BMP	1,672	sq-ft
25	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and B.2)	0.9	
26	BMP Footprint Sizing Factor (Default 0.03 or an alternative minimum footprint sizing factor from Worksheet B.5-2, Line 11)	0.03	unitless
27	Minimum BMP Footprint [Line 24 x Line 25 x Line 26]	45	sq-ft
28	Footprint of the BMP = Maximum(Minimum(Line 21, Line 23), Line 27)	45	sq-ft
Check for Volume Reduction [Not applicable for No Infiltration Condition]			
29	Calculate the fraction of the DCV retained by the BMP [Line 9/ Line 1]		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	☐ No

Note:
1. Line 7 is used to estimate the amount of volume retained by the BMP. Update assumed surface area in Line 7 until its equivalent to the required biofiltration footprint (either Line 21 or Line 23)
2. The DCV fraction of 0.375 is based on a 40% average annual percent capture and a 36-hour drawdown time.
3. The increase in footprint for volume reduction can be optimized using the approach presented in Appendix B.5.2. The optimized footprint cannot be smaller than the alternative minimum footprint sizing factor from Worksheet B.5-2.
4. If the proposed biofiltration BMP footprint is smaller than the alternative minimum footprint sizing factor from Worksheet B.5-2, but satisfies Option 1 or Option 2 sizing, it is considered a compact biofiltration BMP and may be allowed at the discretion of the [City Engineer], if it meets the requirements in Appendix F.

Worksheet B.5-1: Simple Sizing Method for Biofiltration BMPs

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1 (Page 1 of 2)	
1	Remaining DCV after implementing retention BMPs	64	cubic-feet
Partial Retention			
2	Infiltration rate from Worksheet D.5-1 if partial infiltration is feasible		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]		inches
5	Aggregate pore space	0.40	in/in
6	Required depth of gravel below the underdrain [Line 4/ Line 5]		inches
7	Assumed surface area of the biofiltration BMP		sq-ft
8	Media retained pore storage	0.1	in/in
9	Volume retained by BMP [[Line 4 + (Line 12 x Line 8)]/12] x Line 7	0	cubic-feet
10	DCV that requires biofiltration [Line 1 – Line 9]	64	cubic-feet
BMP Parameters			
11	Surface Ponding [6 inch minimum, 12 inch maximum]	6	inches
12	Media Thickness [18 inches minimum], also add mulch layer thickness to this line for sizing calculations	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	12	inches
14	Media available pore space	0.2	in/in
15	Media filtration rate to be used for sizing (5 in/hr. with no outlet control; if the filtration rate is controlled by the outlet use the outlet controlled rate)	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)]	14.4	inches
19	Total Depth Treated [Line 17 + Line 18]	44.4	inches

Worksheet Error! No text of specified style in document.**-1: Simple Sizing Method for Biofiltration BMPs (continued)**

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1 (Page 2 of 2)	
Option 1 – Biofilter 1.5 times the DCV			
20	Required biofiltered volume [1.5 x Line 10]	96	cubic-feet
21	Required Footprint [Line 20/ Line 19] x 12	26	sq-ft
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
22	Required Storage (surface + pores) Volume [0.75 x Line 10]		cubic-feet
23	Required Footprint [Line 22/ Line 18] x 12		sq-ft
Footprint of the BMP			
24	Area draining to the BMP	1,707	sq-ft
25	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and B.2)	0.9	
26	BMP Footprint Sizing Factor (Default 0.03 or an alternative minimum footprint sizing factor from Worksheet B.5-2, Line 11)	0.03	unitless
27	Minimum BMP Footprint [Line 24 x Line 25 x Line 26]	46	sq-ft
28	Footprint of the BMP = Maximum(Minimum(Line 21, Line 23), Line 27)	46	sq-ft
Check for Volume Reduction [Not applicable for No Infiltration Condition]			
29	Calculate the fraction of the DCV retained by the BMP [Line 9/ Line 1]		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	☐ No

Note:

1. Line 7 is used to estimate the amount of volume retained by the BMP. Update assumed surface area in Line 7 until its equivalent to the required biofiltration footprint (either Line 21 or Line 23)
2. The DCV fraction of 0.375 is based on a 40% average annual percent capture and a 36-hour drawdown time.
3. The increase in footprint for volume reduction can be optimized using the approach presented in Appendix B.5.2. The optimized footprint cannot be smaller than the alternative minimum footprint sizing factor from Worksheet B.5-2.
4. If the proposed biofiltration BMP footprint is smaller than the alternative minimum footprint sizing factor from Worksheet B.5-2, but satisfies Option 1 or Option 2 sizing, it is considered a compact biofiltration BMP and may be allowed at the discretion of the [City Engineer], if it meets the requirements in Appendix F.

BMP # 5

Worksheet B.5-1: Simple Sizing Method for Biofiltration BMPs

	Simple Sizing Method for Biofiltration BMPs	Worksheet B.5-1 (Page 1 of 2)	
1	Remaining DCV after implementing retention BMPs	64	cubic-feet
Partial Retention			
2	Infiltration rate from Worksheet D.5-1 if partial infiltration is feasible		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]		inches
5	Aggregate pore space	0.40	in/in
6	Required depth of gravel below the underdrain [Line 4/ Line 5]		inches
7	Assumed surface area of the biofiltration BMP		sq-ft
8	Media retained pore storage	0.1	in/in
9	Volume retained by BMP [[Line 4 + (Line 12 x Line 8)]/12] x Line 7	0	cubic-feet
10	DCV that requires biofiltration [Line 1 – Line 9]	64	cubic-feet
BMP Parameters			
11	Surface Ponding [6 inch minimum, 12 inch maximum]	6	inches
12	Media Thickness [18 inches minimum], also add mulch layer thickness to this line for sizing calculations	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	12	inches
14	Media available pore space	0.2	in/in
15	Media filtration rate to be used for sizing (5 in/hr. with no outlet control; if the filtration rate is controlled by the outlet use the outlet controlled rate)	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)]	14.4	inches
19	Total Depth Treated [Line 17 + Line 18]	44.4	inches

Worksheet Error! No text of specified style in document.**-1: Simple Sizing Method for Biofiltration BMPs (continued)**

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1 (Page 2 of 2)	
Option 1 – Biofilter 1.5 times the DCV			
20	Required biofiltered volume [1.5 x Line 10]	96	cubic-feet
21	Required Footprint [Line 20/ Line 19] x 12	26	sq-ft
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
22	Required Storage (surface + pores) Volume [0.75 x Line 10]		cubic-feet
23	Required Footprint [Line 22/ Line 18] x 12		sq-ft
Footprint of the BMP			
24	Area draining to the BMP	1,707	sq-ft
25	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and B.2)	0.9	
26	BMP Footprint Sizing Factor (Default 0.03 or an alternative minimum footprint sizing factor from Worksheet B.5-2, Line 11)	0.03	unitless
27	Minimum BMP Footprint [Line 24 x Line 25 x Line 26]	46	sq-ft
28	Footprint of the BMP = Maximum(Minimum(Line 21, Line 23), Line 27)	46	sq-ft
Check for Volume Reduction [Not applicable for No Infiltration Condition]			
29	Calculate the fraction of the DCV retained by the BMP [Line 9/ Line 1]		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	☐ No

Note:

1. Line 7 is used to estimate the amount of volume retained by the BMP. Update assumed surface area in Line 7 until its equivalent to the required biofiltration footprint (either Line 21 or Line 23)
2. The DCV fraction of 0.375 is based on a 40% average annual percent capture and a 36-hour drawdown time.
3. The increase in footprint for volume reduction can be optimized using the approach presented in Appendix B.5.2. The optimized footprint cannot be smaller than the alternative minimum footprint sizing factor from Worksheet B.5-2.
4. If the proposed biofiltration BMP footprint is smaller than the alternative minimum footprint sizing factor from Worksheet B.5-2, but satisfies Option 1 or Option 2 sizing, it is considered a compact biofiltration BMP and may be allowed at the discretion of the [City Engineer], if it meets the requirements in Appendix F.

BMP # 6

Worksheet B.5-1: Simple Sizing Method for Biofiltration BMPs

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1 (Page 1 of 2)	
1	Remaining DCV after implementing retention BMPs	20	cubic-feet
Partial Retention			
2	Infiltration rate from Worksheet D.5-1 if partial infiltration is feasible		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]		inches
5	Aggregate pore space	0.40	in/in
6	Required depth of gravel below the underdrain [Line 4/ Line 5]		inches
7	Assumed surface area of the biofiltration BMP		sq-ft
8	Media retained pore storage	0.1	in/in
9	Volume retained by BMP [[Line 4 + (Line 12 x Line 8)]/12] x Line 7	0	cubic-feet
10	DCV that requires biofiltration [Line 1 – Line 9]	20	cubic-feet
BMP Parameters			
11	Surface Ponding [6 inch minimum, 12 inch maximum]	6	inches
12	Media Thickness [18 inches minimum], also add mulch layer thickness to this line for sizing calculations	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	12	inches
14	Media available pore space	0.2	in/in
15	Media filtration rate to be used for sizing (5 in/hr. with no outlet control; if the filtration rate is controlled by the outlet use the outlet controlled rate)	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)]	14.4	inches
19	Total Depth Treated [Line 17 + Line 18]	44.4	inches

Worksheet Error! No text of specified style in document.**-1: Simple Sizing Method for Biofiltration BMPs (continued)**

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1 (Page 2 of 2)	
Option 1 – Biofilter 1.5 times the DCV			
20	Required biofiltered volume [1.5 x Line 10]	30	cubic-feet
21	Required Footprint [Line 20/ Line 19] x 12	8	sq-ft
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
22	Required Storage (surface + pores) Volume [0.75 x Line 10]		cubic-feet
23	Required Footprint [Line 22/ Line 18] x 12		sq-ft
Footprint of the BMP			
24	Area draining to the BMP	544	sq-ft
25	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and B.2)	0.9	
26	BMP Footprint Sizing Factor (Default 0.03 or an alternative minimum footprint sizing factor from Worksheet B.5-2, Line 11)	0.03	unitless
27	Minimum BMP Footprint [Line 24 x Line 25 x Line 26]	15	sq-ft
28	Footprint of the BMP = Maximum(Minimum(Line 21, Line 23), Line 27)	15	sq-ft
Check for Volume Reduction [Not applicable for No Infiltration Condition]			
29	Calculate the fraction of the DCV retained by the BMP [Line 9/ Line 1]		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	☐ No

Note:

1. Line 7 is used to estimate the amount of volume retained by the BMP. Update assumed surface area in Line 7 until its equivalent to the required biofiltration footprint (either Line 21 or Line 23)
2. The DCV fraction of 0.375 is based on a 40% average annual percent capture and a 36-hour drawdown time.
3. The increase in footprint for volume reduction can be optimized using the approach presented in Appendix B.5.2. The optimized footprint cannot be smaller than the alternative minimum footprint sizing factor from Worksheet B.5-2.
4. If the proposed biofiltration BMP footprint is smaller than the alternative minimum footprint sizing factor from Worksheet B.5-2, but satisfies Option 1 or Option 2 sizing, it is considered a compact biofiltration BMP and may be allowed at the discretion of the [City Engineer], if it meets the requirements in Appendix F.

BMP # 7

Worksheet B.5-1: Simple Sizing Method for Biofiltration BMPs

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1 (Page 1 of 2)	
1	Remaining DCV after implementing retention BMPs	72	cubic-feet
Partial Retention			
2	Infiltration rate from Worksheet D.5-1 if partial infiltration is feasible		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]		inches
5	Aggregate pore space	0.40	in/in
6	Required depth of gravel below the underdrain [Line 4/ Line 5]		inches
7	Assumed surface area of the biofiltration BMP		sq-ft
8	Media retained pore storage	0.1	in/in
9	Volume retained by BMP [[Line 4 + (Line 12 x Line 8)]/12] x Line 7	0	cubic-feet
10	DCV that requires biofiltration [Line 1 – Line 9]	72	cubic-feet
BMP Parameters			
11	Surface Ponding [6 inch minimum, 12 inch maximum]	6	inches
12	Media Thickness [18 inches minimum], also add mulch layer thickness to this line for sizing calculations	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	12	inches
14	Media available pore space	0.2	in/in
15	Media filtration rate to be used for sizing (5 in/hr. with no outlet control; if the filtration rate is controlled by the outlet use the outlet controlled rate)	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)]	14.4	inches
19	Total Depth Treated [Line 17 + Line 18]	44.4	inches

Worksheet Error! No text of specified style in document.**-1: Simple Sizing Method for Biofiltration BMPs (continued)**

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1 (Page 2 of 2)	
Option 1 – Biofilter 1.5 times the DCV			
20	Required biofiltered volume [1.5 x Line 10]	108	cubic-feet
21	Required Footprint [Line 20/ Line 19] x 12	29	sq-ft
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
22	Required Storage (surface + pores) Volume [0.75 x Line 10]		cubic-feet
23	Required Footprint [Line 22/ Line 18] x 12		sq-ft
Footprint of the BMP			
24	Area draining to the BMP	1912	sq-ft
25	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and B.2)	0.9	
26	BMP Footprint Sizing Factor (Default 0.03 or an alternative minimum footprint sizing factor from Worksheet B.5-2, Line 11)	0.03	unitless
27	Minimum BMP Footprint [Line 24 x Line 25 x Line 26]	52	sq-ft
28	Footprint of the BMP = Maximum(Minimum(Line 21, Line 23), Line 27)	52	sq-ft
Check for Volume Reduction [Not applicable for No Infiltration Condition]			
29	Calculate the fraction of the DCV retained by the BMP [Line 9/ Line 1]		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	☐ No

Note:

1. Line 7 is used to estimate the amount of volume retained by the BMP. Update assumed surface area in Line 7 until its equivalent to the required biofiltration footprint (either Line 21 or Line 23)
2. The DCV fraction of 0.375 is based on a 40% average annual percent capture and a 36-hour drawdown time.
3. The increase in footprint for volume reduction can be optimized using the approach presented in Appendix B.5.2. The optimized footprint cannot be smaller than the alternative minimum footprint sizing factor from Worksheet B.5-2.
4. If the proposed biofiltration BMP footprint is smaller than the alternative minimum footprint sizing factor from Worksheet B.5-2, but satisfies Option 1 or Option 2 sizing, it is considered a compact biofiltration BMP and may be allowed at the discretion of the [City Engineer], if it meets the requirements in Appendix F.

BMP #8

Worksheet B.5-1: Simple Sizing Method for Biofiltration BMPs

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1 (Page 1 of 2)	
1	Remaining DCV after implementing retention BMPs	48	cubic-feet
Partial Retention			
2	Infiltration rate from Worksheet D.5-1 if partial infiltration is feasible		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]		inches
5	Aggregate pore space	0.40	in/in
6	Required depth of gravel below the underdrain [Line 4/ Line 5]		inches
7	Assumed surface area of the biofiltration BMP		sq-ft
8	Media retained pore storage	0.1	in/in
9	Volume retained by BMP [[Line 4 + (Line 12 x Line 8)]/12] x Line 7	0	cubic-feet
10	DCV that requires biofiltration [Line 1 – Line 9]	48	cubic-feet
BMP Parameters			
11	Surface Ponding [6 inch minimum, 12 inch maximum]	6	inches
12	Media Thickness [18 inches minimum], also add mulch layer thickness to this line for sizing calculations	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	12	inches
14	Media available pore space	0.2	in/in
15	Media filtration rate to be used for sizing (5 in/hr. with no outlet control; if the filtration rate is controlled by the outlet use the outlet controlled rate)	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)]	14.4	inches
19	Total Depth Treated [Line 17 + Line 18]	44.4	inches

Worksheet Error! No text of specified style in document.**-1: Simple Sizing Method for Biofiltration BMPs (continued)**

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1 (Page 2 of 2)	
Option 1 – Biofilter 1.5 times the DCV			
20	Required biofiltered volume [1.5 x Line 10]	72	cubic-feet
21	Required Footprint [Line 20/ Line 19] x 12	19.5	sq-ft
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
22	Required Storage (surface + pores) Volume [0.75 x Line 10]		cubic-feet
23	Required Footprint [Line 22/ Line 18] x 12		sq-ft
Footprint of the BMP			
24	Area draining to the BMP	1,260	sq-ft
25	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and B.2)	0.9	
26	BMP Footprint Sizing Factor (Default 0.03 or an alternative minimum footprint sizing factor from Worksheet B.5-2, Line 11)	0.03	unitless
27	Minimum BMP Footprint [Line 24 x Line 25 x Line 26]	34	sq-ft
28	Footprint of the BMP = Maximum(Minimum(Line 21, Line 23), Line 27)	34	sq-ft
Check for Volume Reduction [Not applicable for No Infiltration Condition]			
29	Calculate the fraction of the DCV retained by the BMP [Line 9/ Line 1]		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	☐ No

Note:

1. Line 7 is used to estimate the amount of volume retained by the BMP. Update assumed surface area in Line 7 until its equivalent to the required biofiltration footprint (either Line 21 or Line 23)
2. The DCV fraction of 0.375 is based on a 40% average annual percent capture and a 36-hour drawdown time.
3. The increase in footprint for volume reduction can be optimized using the approach presented in Appendix B.5.2. The optimized footprint cannot be smaller than the alternative minimum footprint sizing factor from Worksheet B.5-2.
4. If the proposed biofiltration BMP footprint is smaller than the alternative minimum footprint sizing factor from Worksheet B.5-2, but satisfies Option 1 or Option 2 sizing, it is considered a compact biofiltration BMP and may be allowed at the discretion of the [City Engineer], if it meets the requirements in Appendix F.

BMP #9

Worksheet B.5-1: Simple Sizing Method for Biofiltration BMPs

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1 (Page 1 of 2)	
1	Remaining DCV after implementing retention BMPs	52	cubic-feet
Partial Retention			
2	Infiltration rate from Worksheet D.5-1 if partial infiltration is feasible		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]		inches
5	Aggregate pore space	0.40	in/in
6	Required depth of gravel below the underdrain [Line 4/ Line 5]		inches
7	Assumed surface area of the biofiltration BMP		sq-ft
8	Media retained pore storage	0.1	in/in
9	Volume retained by BMP [[Line 4 + (Line 12 x Line 8)]/12] x Line 7	0	cubic-feet
10	DCV that requires biofiltration [Line 1 – Line 9]	52	cubic-feet
BMP Parameters			
11	Surface Ponding [6 inch minimum, 12 inch maximum]	6	inches
12	Media Thickness [18 inches minimum], also add mulch layer thickness to this line for sizing calculations	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	12	inches
14	Media available pore space	0.2	in/in
15	Media filtration rate to be used for sizing (5 in/hr. with no outlet control; if the filtration rate is controlled by the outlet use the outlet controlled rate)	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)]	14.4	inches
19	Total Depth Treated [Line 17 + Line 18]	44.4	inches

Worksheet Error! No text of specified style in document.**-1: Simple Sizing Method for Biofiltration BMPs (continued)**

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1 (Page 2 of 2)	
Option 1 – Biofilter 1.5 times the DCV			
20	Required biofiltered volume [1.5 x Line 10]	78	cubic-feet
21	Required Footprint [Line 20/ Line 19] x 12	21	sq-ft
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
22	Required Storage (surface + pores) Volume [0.75 x Line 10]		cubic-feet
23	Required Footprint [Line 22/ Line 18] x 12		sq-ft
Footprint of the BMP			
24	Area draining to the BMP	1,422	sq-ft
25	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and B.2)	0.9	
26	BMP Footprint Sizing Factor (Default 0.03 or an alternative minimum footprint sizing factor from Worksheet B.5-2, Line 11)	0.03	unitless
27	Minimum BMP Footprint [Line 24 x Line 25 x Line 26]	38.4	sq-ft
28	Footprint of the BMP = Maximum(Minimum(Line 21, Line 23), Line 27)	38.4	sq-ft
Check for Volume Reduction [Not applicable for No Infiltration Condition]			
29	Calculate the fraction of the DCV retained by the BMP [Line 9/ Line 1]		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	☐ No

Note:

1. Line 7 is used to estimate the amount of volume retained by the BMP. Update assumed surface area in Line 7 until its equivalent to the required biofiltration footprint (either Line 21 or Line 23)
2. The DCV fraction of 0.375 is based on a 40% average annual percent capture and a 36-hour drawdown time.
3. The increase in footprint for volume reduction can be optimized using the approach presented in Appendix B.5.2. The optimized footprint cannot be smaller than the alternative minimum footprint sizing factor from Worksheet B.5-2.
4. If the proposed biofiltration BMP footprint is smaller than the alternative minimum footprint sizing factor from Worksheet B.5-2, but satisfies Option 1 or Option 2 sizing, it is considered a compact biofiltration BMP and may be allowed at the discretion of the [City Engineer], if it meets the requirements in Appendix F.

BMP # 10

Worksheet B.5-1: Simple Sizing Method for Biofiltration BMPs

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1 (Page 1 of 2)	
1	Remaining DCV after implementing retention BMPs	288	cubic-feet
Partial Retention			
2	Infiltration rate from Worksheet D.5-1 if partial infiltration is feasible		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]		inches
5	Aggregate pore space	0.40	in/in
6	Required depth of gravel below the underdrain [Line 4/ Line 5]		inches
7	Assumed surface area of the biofiltration BMP		sq-ft
8	Media retained pore storage	0.1	in/in
9	Volume retained by BMP [[Line 4 + (Line 12 x Line 8)]/12] x Line 7	0	cubic-feet
10	DCV that requires biofiltration [Line 1 – Line 9]	288	cubic-feet
BMP Parameters			
11	Surface Ponding [6 inch minimum, 12 inch maximum]	6	inches
12	Media Thickness [18 inches minimum], also add mulch layer thickness to this line for sizing calculations	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	12	inches
14	Media available pore space	0.2	in/in
15	Media filtration rate to be used for sizing (5 in/hr. with no outlet control; if the filtration rate is controlled by the outlet use the outlet controlled rate)	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)]	14.4	inches
19	Total Depth Treated [Line 17 + Line 18]	44.4	inches

Worksheet Error! No text of specified style in document.**-1: Simple Sizing Method for Biofiltration BMPs (continued)**

Simple Sizing Method for Biofiltration BMPs		Worksheet B.5-1 (Page 2 of 2)	
Option 1 – Biofilter 1.5 times the DCV			
20	Required biofiltered volume [1.5 x Line 10]	432	cubic-feet
21	Required Footprint [Line 20/ Line 19] x 12	117	sq-ft
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
22	Required Storage (surface + pores) Volume [0.75 x Line 10]		cubic-feet
23	Required Footprint [Line 22/ Line 18] x 12		sq-ft
Footprint of the BMP			
24	Area draining to the BMP	7972	sq-ft
25	Adjusted Runoff Factor for drainage area (Refer to Appendix B.1 and B.2)	0.9	
26	BMP Footprint Sizing Factor (Default 0.03 or an alternative minimum footprint sizing factor from Worksheet B.5-2, Line 11)	0.03	unitless
27	Minimum BMP Footprint [Line 24 x Line 25 x Line 26]	215	sq-ft
28	Footprint of the BMP = Maximum(Minimum(Line 21, Line 23), Line 27)	215	sq-ft
Check for Volume Reduction [Not applicable for No Infiltration Condition]			
29	Calculate the fraction of the DCV retained by the BMP [Line 9/ Line 1]		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	☐ No

Note:

1. Line 7 is used to estimate the amount of volume retained by the BMP. Update assumed surface area in Line 7 until its equivalent to the required biofiltration footprint (either Line 21 or Line 23)
2. The DCV fraction of 0.375 is based on a 40% average annual percent capture and a 36-hour drawdown time.
3. The increase in footprint for volume reduction can be optimized using the approach presented in Appendix B.5.2. The optimized footprint cannot be smaller than the alternative minimum footprint sizing factor from Worksheet B.5-2.
4. If the proposed biofiltration BMP footprint is smaller than the alternative minimum footprint sizing factor from Worksheet B.5-2, but satisfies Option 1 or Option 2 sizing, it is considered a compact biofiltration BMP and may be allowed at the discretion of the [City Engineer], if it meets the requirements in Appendix F.

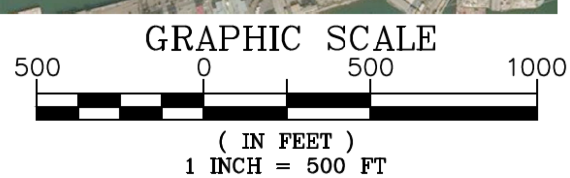
ATTACHMENT 2
BACKUP FOR PDP HYDROMODIFICATION CONTROL MEASURES

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.

Project Name: **Logan Ave & 26th St. Mixed Use Project**

ATTACHMENT 2
DOWNSTEAM STORM
WATER CONVEYANCE



Project Name: Logan Ave & 26th St. Mixed Use Project

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: **Logan Ave & 26th St. Mixed Use Project** Attachment 2b

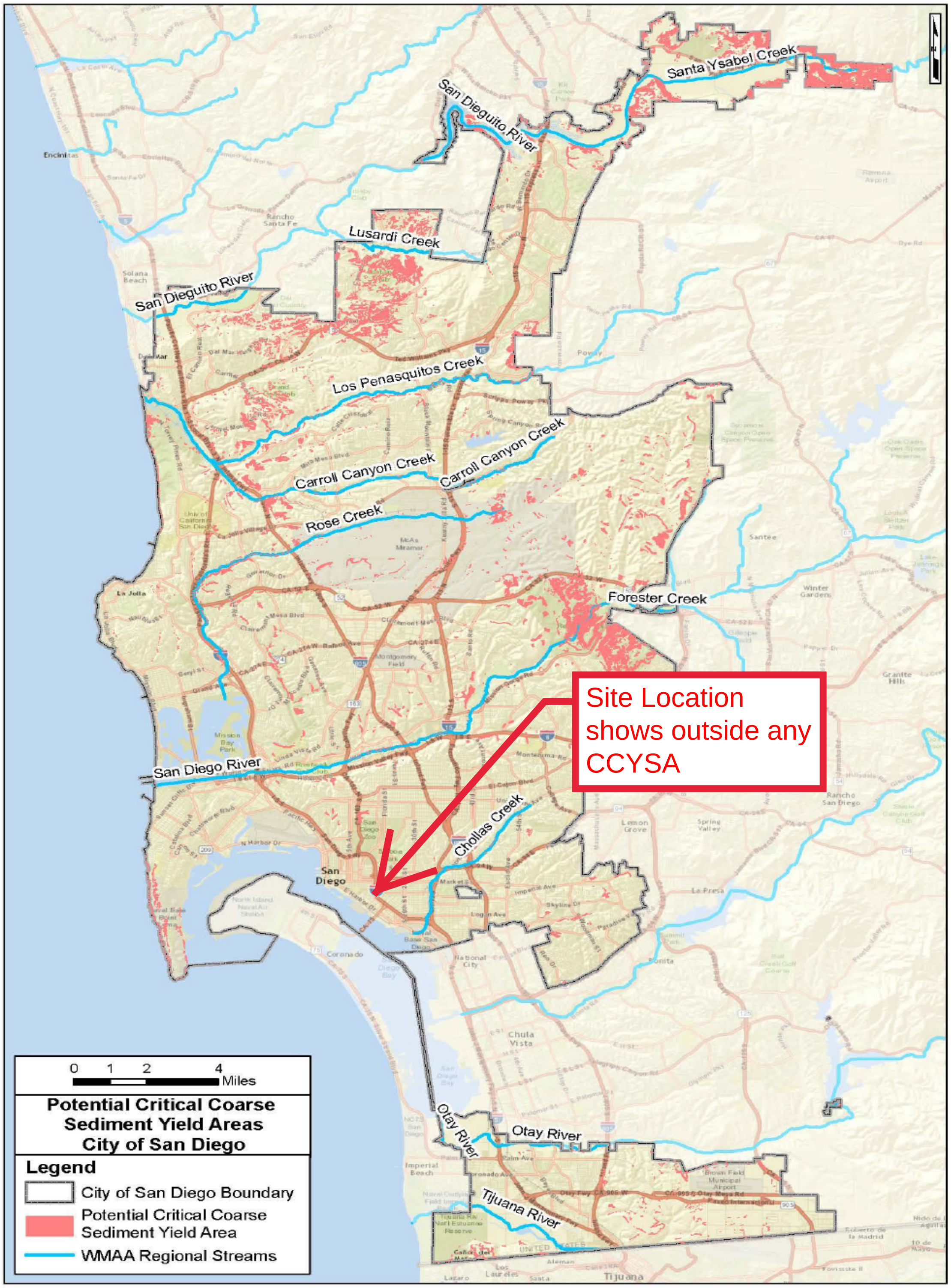


Figure H-G.2-1 Potential Critical Coarse Sediment Yield Areas

Attachment 2b

ATTACHMENT 3
STRUCTURAL BMP MAINTENANCE INFORMATION

This is the cover sheet for Attachment 3.

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Project Name: Logan Ave & 26th St. Mixed Use Project

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: Logan Ave & 26th St. Mixed Use Project

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:

(THIS SPACE IS FOR RECORDER'S USE ONLY)

STORM WATER MANAGEMENT AND DISCHARGE CONTROL MAINTENANCE AGREEMENT

APPROVAL NUMBER:	ASSESSORS PARCEL NUMBER:	PROJECT NUMBER:
	538-580-15 to 538-580-18	541700

This agreement is made by and between the City of San Diego, a municipal corporation [City] and Logan Holdings LLC.,

the owner or duly authorized representative of the owner [Property Owner] of property located at

2257-2271 Logan Avenue, San Diego, CA
(Property Address)

and more particularly described as: Lots 28 through 33 in Block 144 of San Diego Land and Town Company's Addition, according to Map thereof No 379, filed in the office of the County Recorder of San Diego County.
(Legal Description of Property)

in the City of San Diego, County of San Diego, State of California.

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): ______________________.

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): ______________________.

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): __________.

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 SWQMP and Grading and/or Improvement Plan Drawing No(s), or Building Plan Project No(s) ___________.

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 Exhibit(s): ____________________________

____
(Owner Signature)

____
(Print Name and Title)

Logan Holdings, LLC.
(Company/Organization Name)

____
(Date)

THE CITY OF SAN DIEGO

APPROVED:

____
(City Control Engineer Signature)

____
(Print Name)

____
(Date)

NOTE: ALL SIGNATURES MUST INCLUDE NOTARY ACKNOWLEDGMENTS PER CIVIL CODE SEC. 1180 ET.SEQ.

ATTACHMENT 4
COPY OF PLAN SHEETS SHOWING PERMANENT STORM WATER BMPS

This is the cover sheet for Attachment 4.

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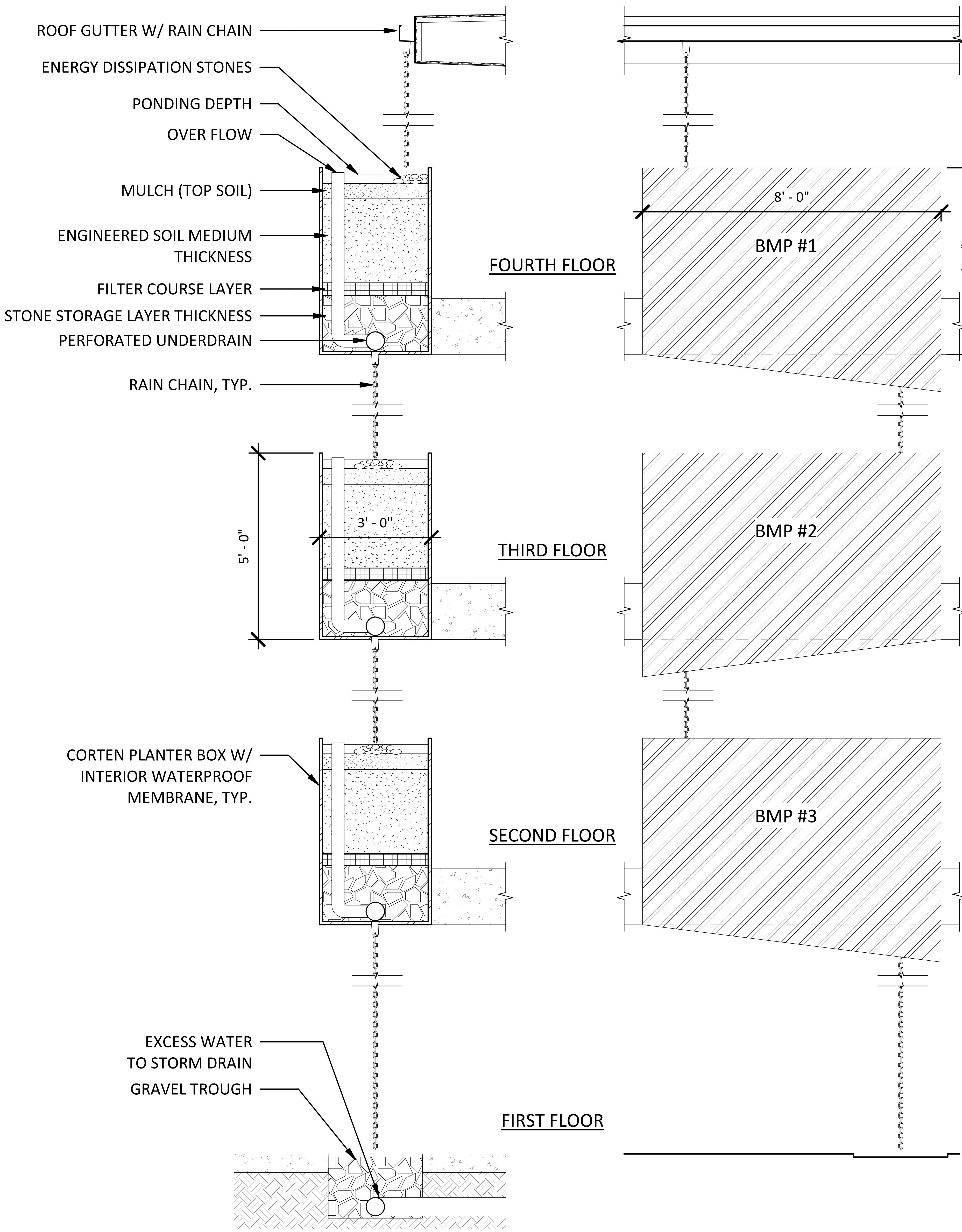

SECTION ***ELEVATION***

BMP PLANTER BOXES

3/8" = 1'-0"

THE BARRIO FLATS

EDK-008 12/20/17

3817 Ray Street San Diego, Ca 92104
e info@obrarchitecture.com
w obrarchitecture.com
t 619.564.7586
f 619.568.3636

GARRICK OLIVER CHRISTOPHER BITTNER ANNEY ROSENTHAL-HALL

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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ATTACHMENT 5
DRAINAGE REPORT

Attach project's drainage report. Refer to Drainage Design Manual to determine the reporting requirements.

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Preliminary

Drainage Study

Logan Avenue & 26th Street Mixed-Use Project

San Diego, CA

Prepared for:

obr

ARCHITECTURE
3817 RAY STREET
SAN DIEGO, CA 92104
619.564.7586

Prepared by:

CROSS CIVIL ENGINEERING

4653 Carmel Mountain Road, Suite 308
San Diego, CA 92130
858.519.7783
Jeff R. Cross, P.E.

May, 2018

REGISTERED PROFESSIONAL ENGINEER
JEFF RENO CROSS
NO. 67530
Expires
6/30/2019
CIVIL
STATE OF CALIFORNIA

TABLE OF CONTENTS

Contents

INTRODUCTION

I. Purpose and Scope

This Drainage Study provides both hydrology and hydraulic calculations for both the onsite and off-site drainage related to the project. This report will calculate, analyze, and compare storm water runoff for both the existing and proposed site conditions in order to ensure that proposed drainage improvements are sized adequately for the project.

This Study limits its content to hydrology and hydraulics. For issues of stormwater quality please refer to the Storm Water Quality Management Plan. The design outlined in this Study follows the City of San Diego Drainage Design Manual and has been formulated so its application in the overall planning and design of drainage facilities will be practical and economical in the majority of situations.

II. Description

The project site is located at 2275 Logan Avenue on the west side of 26th Street in the Barrio Logan area within the City of San Diego.

The existing site has an existing alley at the south and an existing market/housing to the west. The project site area is approximately 0.39 acres. The existing site is a used car lot (Gil's Quality Cars) with a small two-story building and asphalt parking lot. The existing 2-story building within the property northwest corner will remain as is and will be separate from the project.

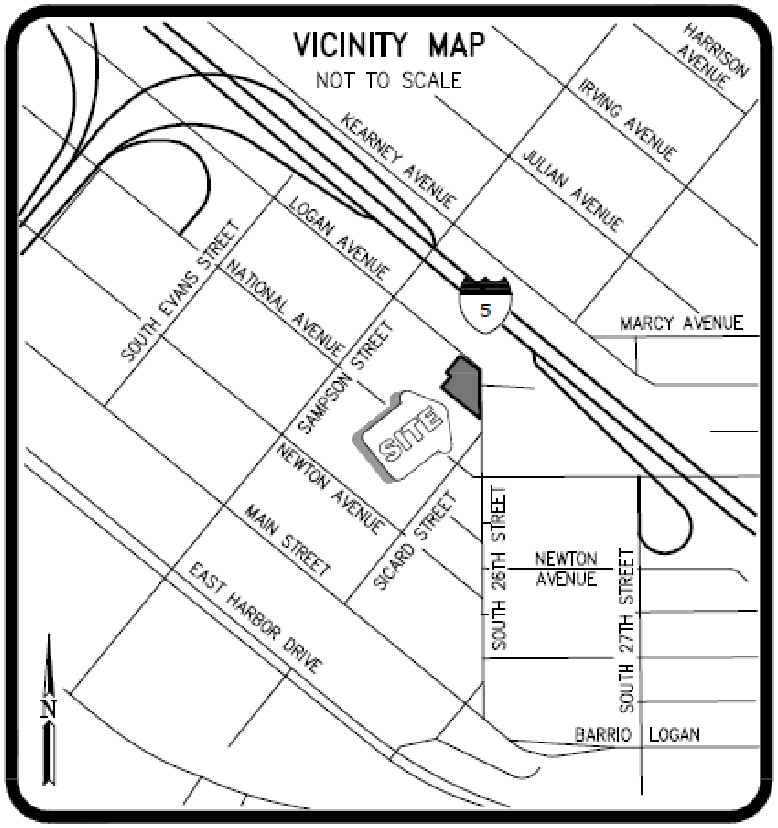
The proposed project is a mixed-use commercial and residential development with a new 4 story building, including 40 proposed parking spaces on the ground level (covered beneath floors above). The new project proposes outdoor common space areas on each level. The project proposes to activate the streetscape along Logan Avenue and 26th Street with outdoor commercial space. Biofiltration of rooftop stormwater will be accommodated through the use of planter drains on each floor level. New raised planter drains will also be part of the first floor.

III. RWQCB Federal Clean Water Act Section 401 and 404.

Section 401 and 404 of the Federal Clean Water Act requires any applicant for Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into the navigable waters, shall provide the licensing or permitting agency a certification from the State in which the discharge originates.

This project sheet flows via hard surface to storm drains which lead directly to the San Diego Bay. This project is not a "Federal license or permit" and it does not discharge to "navigable waters". Thus, is exempt from the FCWA sections 401 and 404.

IV. Vicinity Map



V. FEMA Flood Mapping Information

The FEMA Flood Map Service shows this site is outside the 100-year and 500-year flood plains and is considered an “area of minimal flood hazard – zone x”. The Map provided from the FEMA website is provided:

HYDROLOGIC AND HYDRAULIC METHOD AND DESIGN CRITERIA

VI. Hydrologic Design Criteria

The Rational Method

Storm discharge flows shall be based on the Rational Method (RM) for areas less than one square mile, per the San Diego Drainage Design Manual. The Rational Method is a mathematical formula used to determine maximum runoff rate from a given rainfall. It is used to estimate peak runoff rates from small urban and rural watersheds for the design of storm drains and small drainage structures. The RM will be applied to this project using a 50-year design storm frequency. The RM formula estimates the peak rate of runoff at any location in a watershed as a function of the drainage area (A), runoff coefficient (C), and rainfall intensity (I) for a duration equal to the time of concentration (T_c), which is the time required for water to flow from the most remote point of the basin to the location being analyzed. The RM formula is expressed as follows:

$$Q = C\,I\,A$$

Where:
- Q = peak discharge, in cubic feet per second (cfs)
- C = runoff coefficient, proportion of the rainfall that runs off the surface (no units)
- I = average rainfall intensity for a duration equal to the T_c for the area, in inches per hour (Note: If the computed T_c is less than 5 minutes, use 5 minutes for computing the peak discharge, Q)
- A = drainage area contributing to the design location, in acres

The RM formula is based on the assumption that for constant rainfall intensity, the peak discharge rate at a point will occur when the raindrop that falls at the most upstream point in the tributary drainage basin arrives at the point of interest.

Storm water runoff for both the existing and proposed site conditions is calculated, analyzed, and compared in order to ensure that the proposed conditions do not negatively affect the existing hydrologic regime. Hydrologic basin boundaries, landscape areas, and flow path characteristics such as change in elevation and length of flow are obtained from the Existing and Proposed Conditions Maps created as part of this Study.

Runoff Coefficient

Table 3-1 lists the estimated runoff coefficients for urban areas. The runoff coefficients are based on land use and soil type. Soil type can be determined from the soil type map. An appropriate runoff coefficient (C) for each type of land use in the subarea should be selected from this table and multiplied by the percentage of the total area (A) included in that class. The sum of the products for all land uses is the weighted runoff coefficient ($\sum[CA]$). In any event, the impervious percentage (% Impervious) as given in the table, for any area, shall govern the selected value for C. The runoff coefficient can also be calculated for an area based on soil type and impervious percentage using the following formula:

$$C = 0.90 \times (\%\ \text{Impervious}) + Cp \times (1 - \%\ \text{Impervious})$$

Where: Cp = Pervious Coefficient Runoff Value for the soil type (shown in Table 3-1 as Undisturbed Natural Terrain/Permanent Open Space, 0% Impervious). Soil type can be determined from the soil type map.

The values in Table 3-1 are typical for most urban areas. A soil type D shall be used for most all areas within the City of San Diego, unless a soils report provides supplemental information.

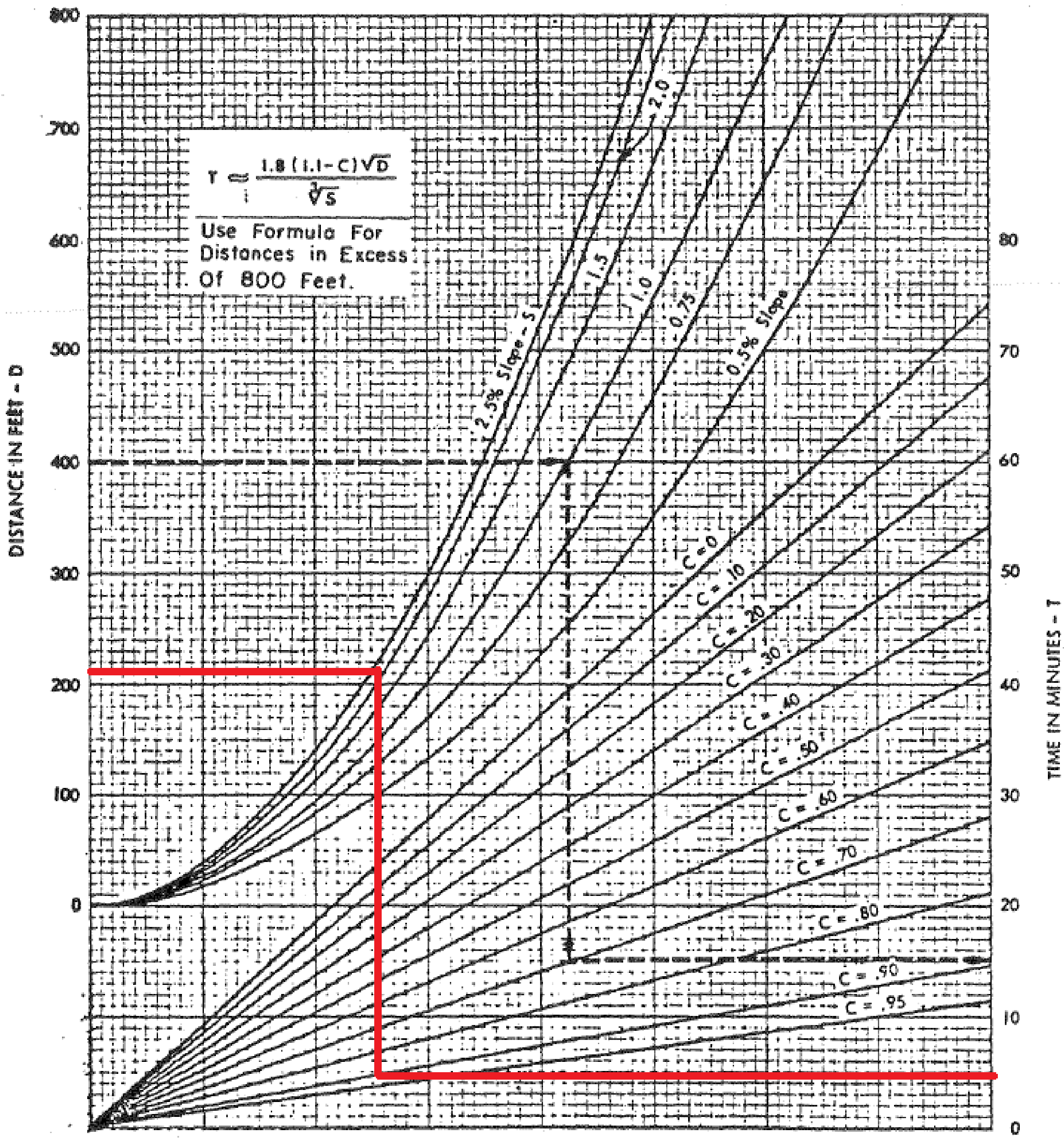
Table 3-1
RUNOFF COEFFICIENTS FOR URBAN AREAS

Land Use		Runoff Coefficient "C"				
			Soil Type			
NRCS Elements	County Elements	% IMPER.	A	B	C	D
Undisturbed Natural Terrain (Natural)	Permanent Open Space	0*	0.20	0.25	0.30	0.35
Low Density Residential (LDR)	Residential, 1.0 DU/A or less	10	0.27	0.32	0.36	0.41
Low Density Residential (LDR)	Residential, 2.0 DU/A or less	20	0.34	0.38	0.42	0.46
Low Density Residential (LDR)	Residential, 2.9 DU/A or less	25	0.38	0.41	0.45	0.49
Medium Density Residential (MDR)	Residential, 4.3 DU/A or less	30	0.41	0.45	0.48	0.52
Medium Density Residential (MDR)	Residential, 7.3 DU/A or less	40	0.48	0.51	0.54	0.57
Medium Density Residential (MDR)	Residential, 10.9 DU/A or less	45	0.52	0.54	0.57	0.60
Medium Density Residential (MDR)	Residential, 14.5 DU/A or less	50	0.55	0.58	0.60	0.63
High Density Residential (HDR)	Residential, 24.0 DU/A or less	65	0.66	0.67	0.69	0.71
High Density Residential (HDR)	Residential, 43.0 DU/A or less	80	0.76	0.77	0.78	0.79
Commercial/Industrial (N. Com)	Neighborhood Commercial	80	0.76	0.77	0.78	0.79
Commercial/Industrial (G. Com)	General Commercial	85	0.80	0.80	0.81	0.82
Commercial/Industrial (O.P. Com)	Office Professional/Commercial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (Limited I.)	Limited Industrial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (General I.)	General Industrial	95	0.87	0.87	0.87	0.87

*The values associated with 0% impervious may be used for direct calculation of the runoff coefficient as described in Section 3.1.2 (representing the pervious runoff coefficient, Cp, for the soil type), or for areas that will remain undisturbed in perpetuity. Justification must be given that the area will remain natural forever (e.g., the area is located in Cleveland National Forest).
DU/A = dwelling units per acre
NRCS = National Resources Conservation Service

Time of Concentration, Tc

The time of concentration is the time required for the runoff to flow from the most remote part of the watershed to the outlet point under consideration. Methods of calculation differ for natural watersheds (non-urbanized) and for urban drainage systems. The Tc for urban areas are computed using the "Urban Areas Overland Time of Flow Curves", per page 86 of the City of San Diego Drainage Design Manual.



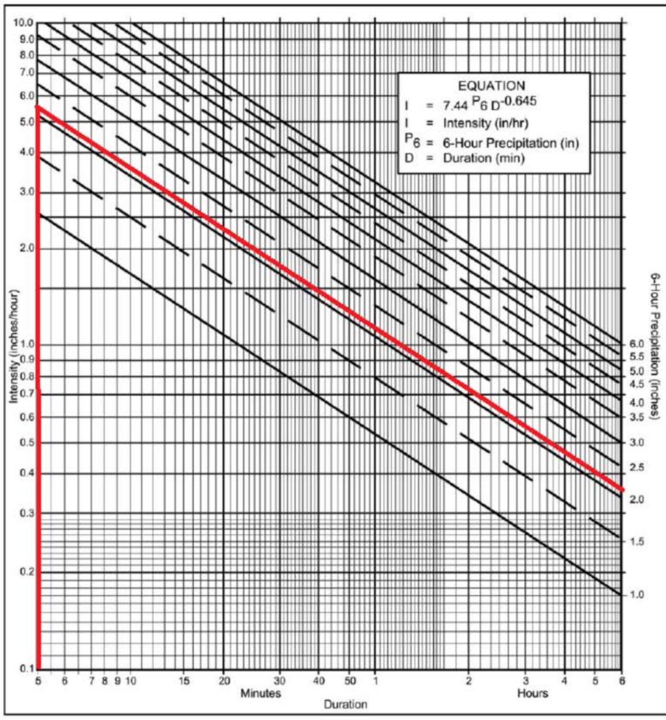
Surface Flow Time Curves

Rainfall Intensity

The rainfall intensity (I) is the rainfall in inches per hour (in/hr) for a duration equal to the Tc for a selected storm frequency. Once a particular storm frequency has been selected for design and a Tc calculated for the drainage area, the rainfall intensity can be determined from the Intensity-Duration Design Chart (Figure 3-1). The 6-hour storm rainfall amount (P6) and the 24-hour storm rainfall amount (P24) for the selected storm frequency are also needed for calculation of I. P6 and P24 can be read from the isopluvial maps provided in Appendix B. An Intensity-Duration Design Chart applicable to all areas within San Diego County is provided as Figure 3-1. Figure 3-2 provides an example of use of the Intensity-Duration Design Chart. Intensity can also be calculated using the following equation:

$$I = 7.44\, P_6\, D^{-0.645}$$

Where: P6 = adjusted 6-hour storm rainfall amount (see discussion below)
D = duration in minutes (use Tc)



Directions for Application:

(1) From precipitation maps determine 6 hr and 24 hr amounts for the selected frequency. These maps are included in the County Hydrology Manual (10, 50, and 100 yr maps included in the Design and Procedure Manual).

(2) Adjust 6 hr precipitation (if necessary) so that it is within the range of 45% to 65% of the 24 hr precipitation (not applicaple to Desert).

(3) Plot 6 hr precipitation on the right side of the chart.

(4) Draw a line through the point parallel to the plotted lines.

(5) This line is the intensity-duration curve for the location being analyzed.

Application Form:

(a) Selected frequency 50 year

(b) P_6 = 2.1 in., P_{24} = 3.5, $\frac{P_6}{P_{24}}$ = 60 %[(2)]

(c) Adjusted P_6[(2)] = 2.1 in.

(d) t_x = 5 min.

(e) I = 5.5 in./hr.

Note: This chart replaces the Intensity-Duration-Frequency curves used since 1965.

P6	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
Duration	I	I	I	I	I	I	I	I	I	I	I
5	2.63	3.95	5.27	6.59	7.90	9.22	10.54	11.86	13.17	14.49	15.81
7	2.12	3.18	4.24	5.30	6.36	7.42	8.48	9.54	10.60	11.66	12.72
10	1.68	2.53	3.37	4.21	5.05	5.90	6.74	7.58	8.42	9.27	10.11
15	1.30	1.95	2.59	3.24	3.89	4.54	5.19	5.84	6.49	7.13	7.78
20	1.08	1.62	2.15	2.69	3.23	3.77	4.31	4.85	5.39	5.93	6.46
25	0.93	1.40	1.87	2.33	2.80	3.27	3.73	4.20	4.67	5.13	5.60
30	0.83	1.24	1.66	2.07	2.49	2.90	3.32	3.73	4.15	4.56	4.98
40	0.69	1.03	1.38	1.72	2.07	2.41	2.76	3.10	3.45	3.79	4.13
50	0.60	0.90	1.19	1.49	1.79	2.09	2.39	2.69	2.98	3.28	3.58
60	0.53	0.80	1.06	1.33	1.59	1.86	2.12	2.39	2.65	2.92	3.18
90	0.41	0.61	0.82	1.02	1.23	1.43	1.63	1.84	2.04	2.25	2.45
120	0.34	0.51	0.68	0.85	1.02	1.19	1.36	1.53	1.70	1.87	2.04
150	0.29	0.44	0.59	0.73	0.88	1.03	1.18	1.32	1.47	1.62	1.76
180	0.26	0.39	0.52	0.65	0.78	0.91	1.04	1.18	1.31	1.44	1.57
240	0.22	0.33	0.43	0.54	0.65	0.76	0.87	0.98	1.08	1.19	1.30
300	0.19	0.28	0.38	0.47	0.56	0.66	0.75	0.85	0.94	1.03	1.13
360	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	0.84	0.92	1.00

Intensity-Duration Design Chart - Template

FIGURE **3-1**

Directions for Application:

(1) From precipitation maps determine 6 hr and 24 hr amounts for the selected frequency. These maps are included in the County Hydrology Manual (10, 50, and 100 yr maps included in the Design and Procedure Manual).

(2) Adjust 6 hr precipitation (if necessary) so that it is within the range of 45% to 65% of the 24 hr precipitation (not applicaple to Desert).

(3) Plot 6 hr precipitation on the right side of the chart.

(4) Draw a line through the point parallel to the plotted lines.

(5) This line is the intensity-duration curve for the location being analyzed.

Application Form:

(a) Selected frequency 100 year

(b) P_6 = 2.4 in., P_{24} = 4.0, $\frac{P_6}{P_{24}}$ = 60 %[(2)]

(c) Adjusted P_6[(2)] = 2.4 in.

(d) t_x = 5 min.

(e) I = 6.14 in./hr.

Note: This chart replaces the Intensity-Duration-Frequency curves used since 1965.

P6	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
Duration	I	I	I	I	I	I	I	I	I	I	I
5	2.63	3.95	5.27	6.59	7.90	9.22	10.54	11.86	13.17	14.49	15.81
7	2.12	3.18	4.24	5.30	6.36	7.42	8.48	9.54	10.60	11.66	12.72
10	1.68	2.53	3.37	4.21	5.05	5.90	6.74	7.58	8.42	9.27	10.11
15	1.30	1.95	2.59	3.24	3.89	4.54	5.19	5.84	6.49	7.13	7.78
20	1.08	1.62	2.15	2.69	3.23	3.77	4.31	4.85	5.39	5.93	6.46
25	0.93	1.40	1.87	2.33	2.80	3.27	3.73	4.20	4.67	5.13	5.60
30	0.83	1.24	1.66	2.07	2.49	2.90	3.32	3.73	4.15	4.56	4.98
40	0.69	1.03	1.38	1.72	2.07	2.41	2.76	3.10	3.45	3.79	4.13
50	0.60	0.90	1.19	1.49	1.79	2.09	2.39	2.69	2.98	3.28	3.58
60	0.53	0.80	1.06	1.33	1.59	1.86	2.12	2.39	2.65	2.92	3.18
90	0.41	0.61	0.82	1.02	1.23	1.43	1.63	1.84	2.04	2.25	2.45
120	0.34	0.51	0.68	0.85	1.02	1.19	1.36	1.53	1.70	1.87	2.04
150	0.29	0.44	0.59	0.73	0.88	1.03	1.18	1.32	1.47	1.62	1.76
180	0.26	0.39	0.52	0.65	0.78	0.91	1.04	1.18	1.31	1.44	1.57
240	0.22	0.33	0.43	0.54	0.65	0.76	0.87	0.98	1.08	1.19	1.30
300	0.19	0.28	0.38	0.47	0.56	0.66	0.75	0.85	0.94	1.03	1.13
360	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	0.84	0.92	1.00

FIGURE **3-1**

HYDROLOGY AND HYDRAULIC CALCULATIONS

VII. Hydrology Calculations

Calculations have been performed per the Rational Method described in above methodology, per the San Diego Drainage Design Manual. The existing site is 100% impervious with the existing asphalt parking lot and buildings located onsite. Using Table shown in above "Surface Flow Time Curves", with the following:

Existing Conditions

100-YEAR STORM

Runoff Coefficient = C = 0.9 x (100% Impervious) = 0.90
Hydraulic Length = L = 210 feet
ΔE = 67'-62' = 5'
Slope = S = (67' - 62') / (210') = 2.4%
Time of Concentration = Tc = 4.6 minutes (Use 5 minutes as minimum) = 5 min.
Intensity = I_{100} = 6.14 inches/hour (as shown in above Table 3-1)
Area = 0.39 acres
Peak Discharge = Q_{100} = CIA = (0.9)(6.14)(0.39) = 2.16 cfs

50-YEAR STORM

Runoff Coefficient = C = 0.9 x (100% Impervious) = 0.90
Hydraulic Length = L = 210 feet
ΔE = 67'-62' = 5'
Slope = S = (67' - 62') / (210') = 2.4%
Time of Concentration = Tc = 4.6 minutes (Use 5 minutes as minimum) = 5 min.
Intensity = I_{50} = 5.5 inches/hour (as shown in above Table 3-1)
Area = 0.39 acres
Peak Discharge = Q_{50} = CIA = (0.9)(5.5)(0.39) = 1.93 cfs

Proposed Conditions

100-YEAR STORM

C = 0.9 x (97% Impervious) + 0.35 x (3% Pervious) = 0.88
L = 210 feet
S = Building Plumbing Piping per Cal Plumbing Code = 2.0%
V = Velocity = $\frac{1.49}{n}R^{2/3}S^{2/3} = \frac{1.49}{0.02}(0.25)^{2/3}(0.02)^{2/3}$ = 4 ft/sec

Tc = L/V = 210 / 4 = 52.5 seconds = 0.88 minutes = Use 5 minutes minimum.
I_{100} = 6.14 inches/hour (per Table 3-1 above)
A = 0.39 acres
Q_{100} = 2.10 cfs

50-YEAR STORM

C = 0.9 x (97% Impervious) + 0.35 x (3% Pervious) = 0.88
L = 210 feet
S = Building Plumbing Piping per Cal Plumbing Code = 2.0%
V = Velocity = $\frac{1.49}{n}R^{2/3}S^{2/3} = \frac{1.49}{0.02}(0.25)^{2/3}(0.02)^{2/3}$ = 4 ft/sec

Tc = L/V = 210 / 4 = 52.5 seconds = 0.88 minutes = Use 5 minutes minimum.
I_{50} = 5.5 inches/hour (per Table 3-1 above)
A = 0.39 acres
Q_{50} = 1.89 cfs
(SEE DRAINAGE EXHIBIT MAP FOR EACH DRAINAGE AREA WITH SPREADSHEET CALCULATIONS)

VIII. Hydraulic Calculations

Storm Drains

Building Storm Drains are all interior to building and will be designed by the plumbing engineer. However, at the exit point (at SE property line) the plumbing drain will connect into the Curb Outlet at 26th Street.

The calculation for the maximum Q for the rectangular underwalk drain (aka Curb Outlet) is as follows:

Qmax = $\frac{1.49}{n} AR^{2/3}\sqrt{s}$

A = area of rectangle = L x h = 3' x 0.25' = 0.75 ft^2

R = hydraulic radius = Lh/(L+2h) = 3(0.25) / (3+2(0.25)) = 0.214

S = slope = 0.015

n = Manning Roughness Coefficient = 0.015 (concrete)

Qmax = $\frac{1.49}{(0.015)}(0.75)(0.214)^{2/3}\sqrt{0.015}$ = 3.26 cfs

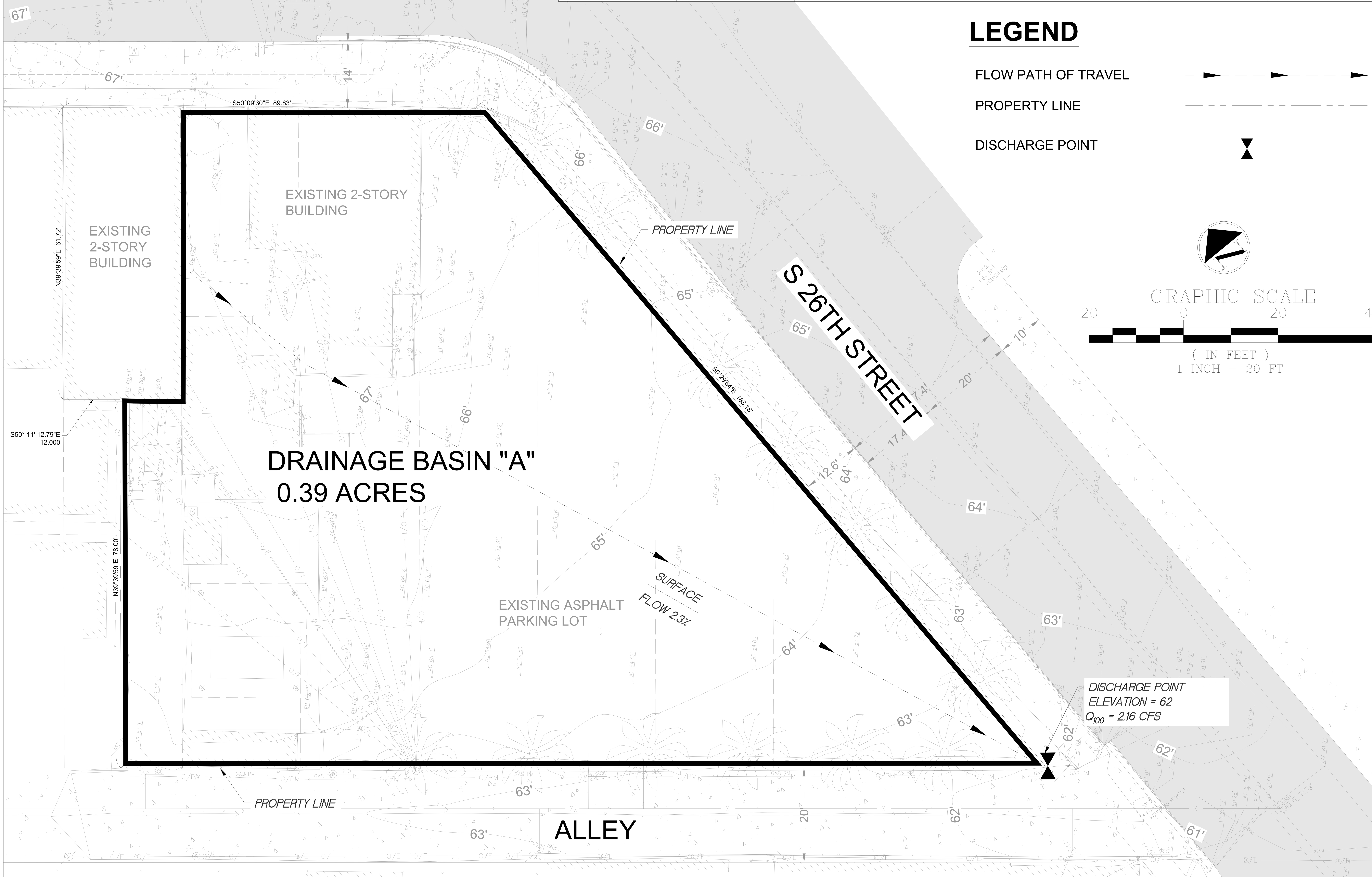
Thus, since maximum flow the underwalk drain can handle (3.26 cfs) is greater than the proposed site Qmax (2.1 cfs), drain size is good.

Velocity at the exit point is determined by piping exiting the building storm drain circular pipe:

A = Area of pipe = $\pi R^2 = \pi(0.33)^2$ = 0.34 ft^2 (assuming 8 inch pipe diameter)

V = Velocity = Q/A = 2.1/0.34 = 6.17 ft/sec

EXISTING DRAINAGE CONDITIONS - THE BARRIO FLATS, LOGAN AVENUE						
DRAINAGE BASIN	AREA (ACRES)	IMPERVIOUSNESS %	RUNOFF COEFFICIENT C	TIME OF CONCENTRATION Tc (MINS)	INTENSITY, I_{100} (IN/HR)	PEAK FLOW RATE Q_{100} (CFS)
A	0.39	100	0.90	5	6.14	2.16



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CROSS CIVIL ENGINEERING

EXISTING DRAINAGE CONDITIONS PLAN

Date Issued

No. REVISIONS

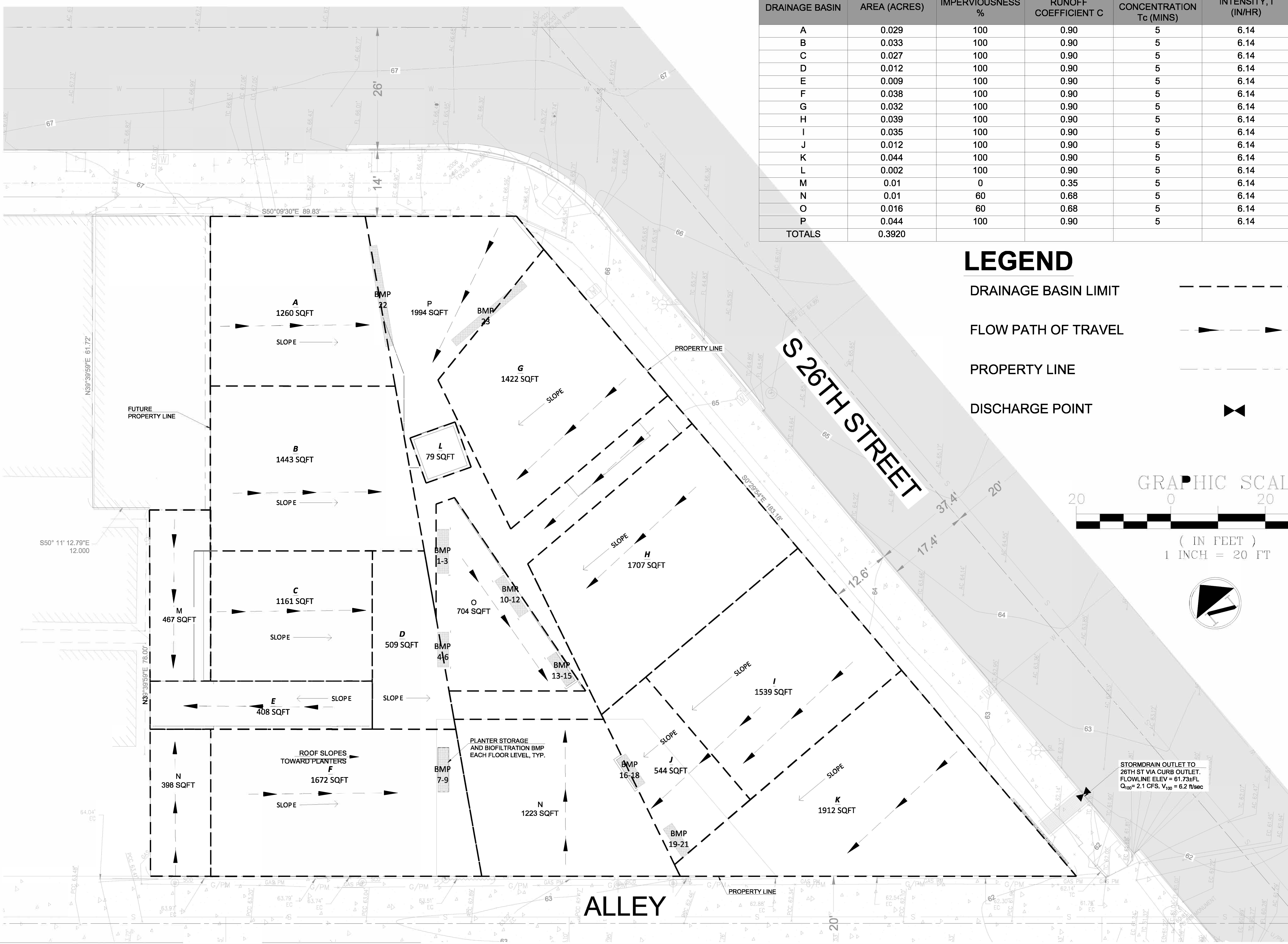
Job No.

Sheet No.

C-100

PROPOSED DRAINAGE CONDITIONS - THE BARRIO FLATS, LOGAN AVENUE

DRAINAGE BASIN	AREA (ACRES)	IMPERVIOUSNESS %	RUNOFF COEFFICIENT C	TIME OF CONCENTRATION Tc (MINS)	INTENSITY, I (IN/HR)	PEAK FLOW RATE Q_{100} (CFS)
A	0.029	100	0.90	5	6.14	0.16
B	0.033	100	0.90	5	6.14	0.18
C	0.027	100	0.90	5	6.14	0.15
D	0.012	100	0.90	5	6.14	0.07
E	0.009	100	0.90	5	6.14	0.05
F	0.038	100	0.90	5	6.14	0.21
G	0.032	100	0.90	5	6.14	0.18
H	0.039	100	0.90	5	6.14	0.22
I	0.035	100	0.90	5	6.14	0.19
J	0.012	100	0.90	5	6.14	0.07
K	0.044	100	0.90	5	6.14	0.24
L	0.002	100	0.90	5	6.14	0.01
M	0.01	0	0.35	5	6.14	0.02
N	0.01	60	0.68	5	6.14	0.04
O	0.016	60	0.68	5	6.14	0.07
P	0.044	100	0.90	5	6.14	0.24
TOTALS	0.3920					2.0973



LEGEND

DRAINAGE BASIN LIMIT

FLOW PATH OF TRAVEL

PROPERTY LINE

DISCHARGE POINT

GRAPHIC SCALE
20 0 20 40
(IN FEET)
1 INCH = 20 FT

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Date Issued

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Job No.

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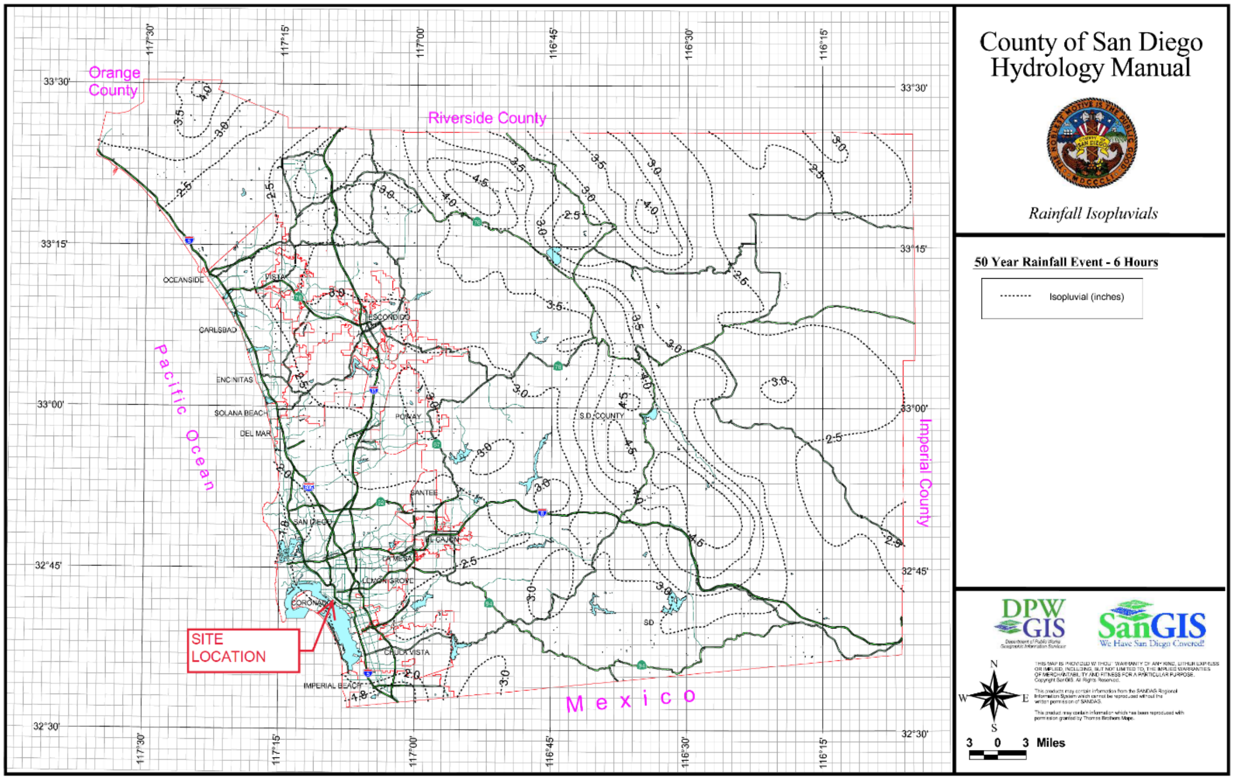
1A

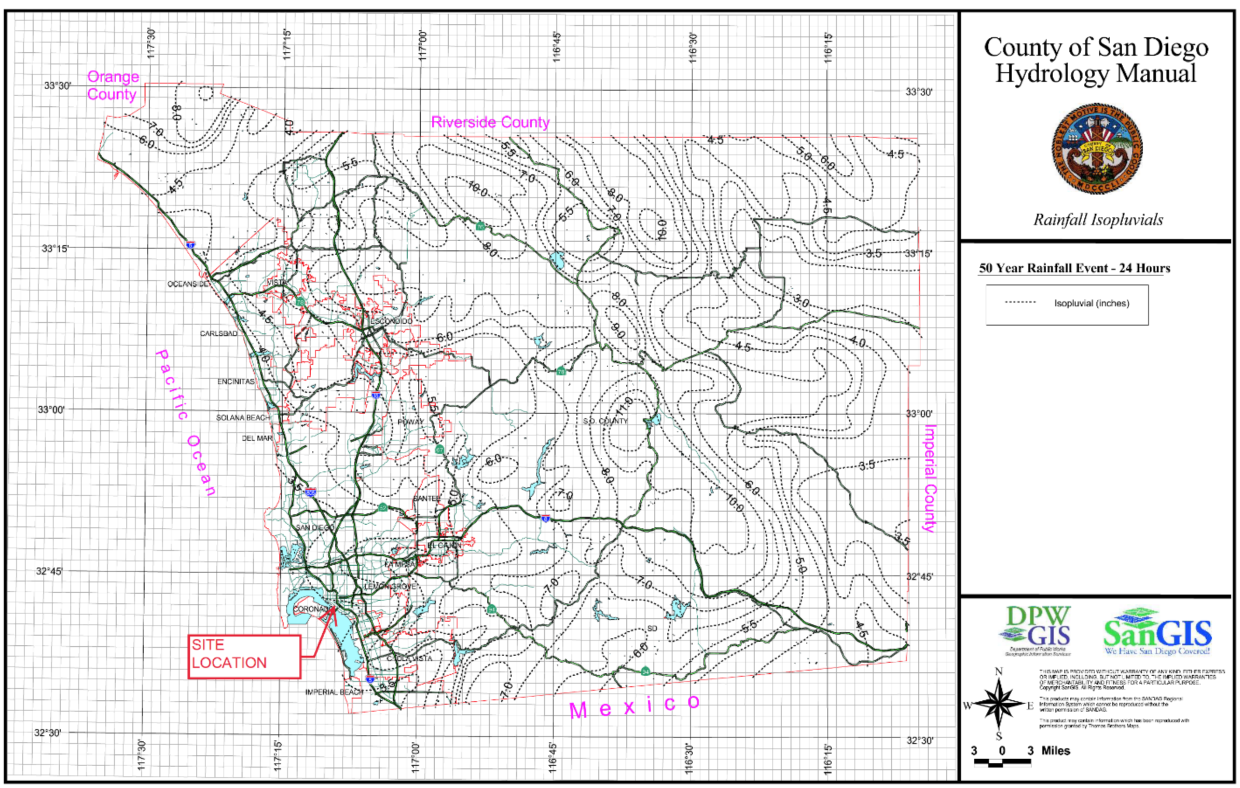
CONCLUSION

The proposed discharge flow rate at 2.1 ft^3/sec is less than existing site 100-year flow rate of 2.2 ft^3/sec. The decrease in flow rate can be attributed to the increased landscaping within the new design. Thus, the proposed improvements will help reduce the overall flow rate from the site.

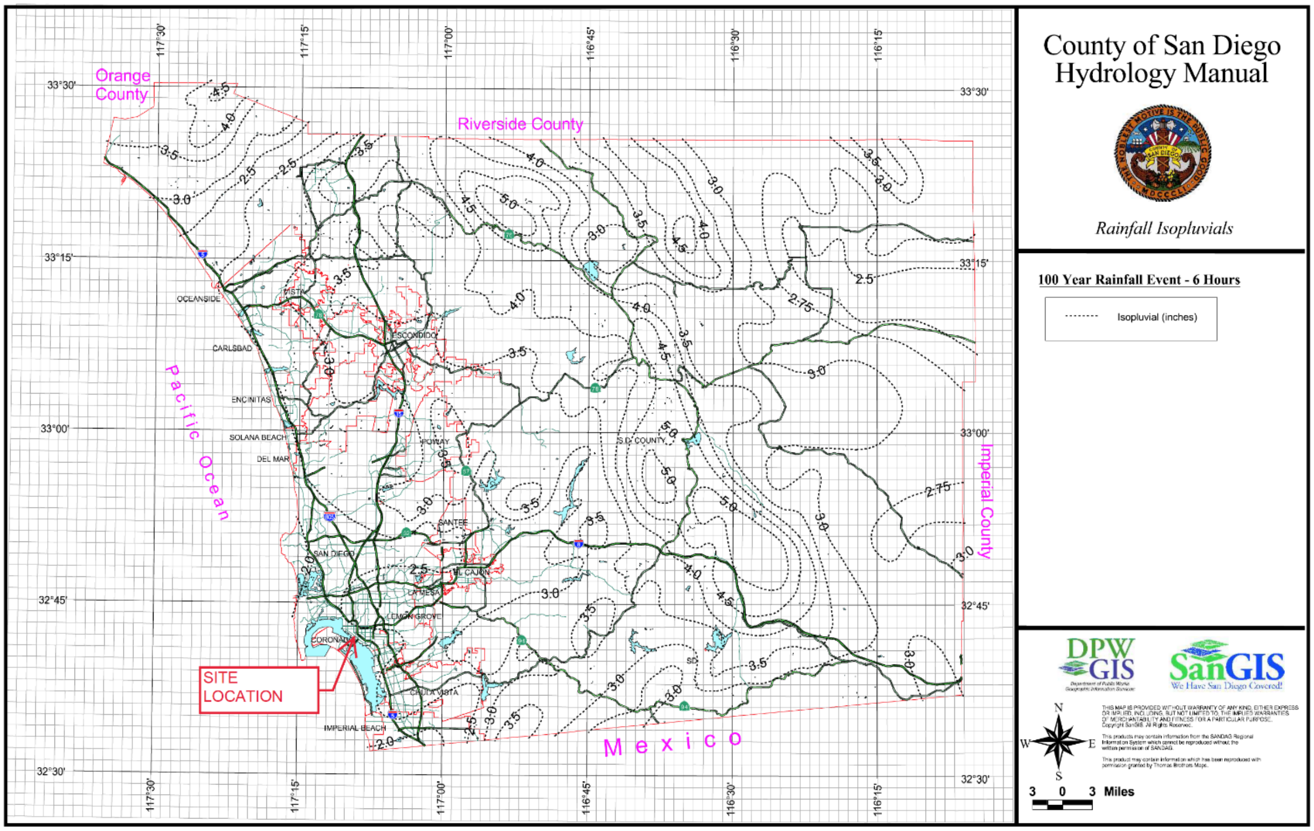
APPENDIX A – ISOPLUVIAL MAPS

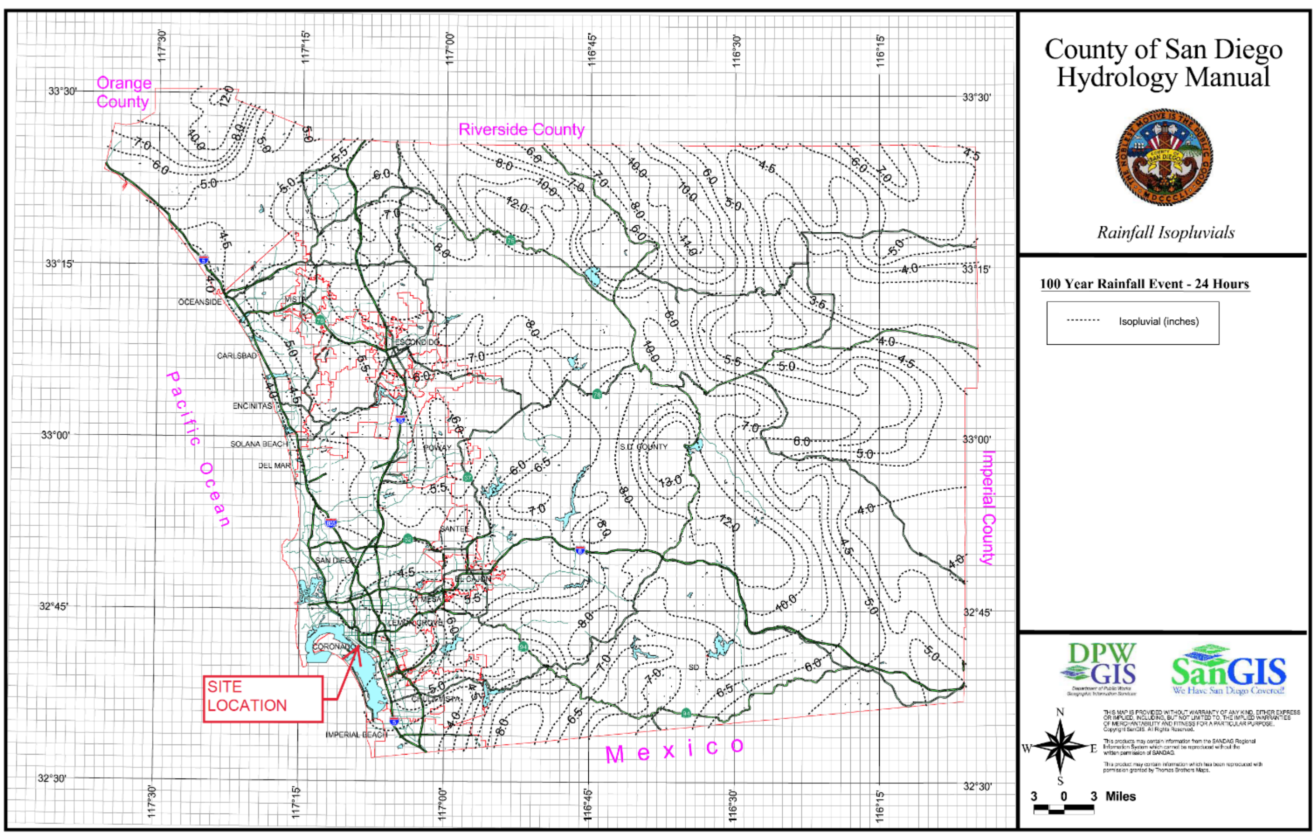
XI. 50 Year Isopluvials





XII. 100 Year Isopluvials





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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GEOTECHNICAL REPORT PROVIDED AS SEPARATE DOCUMENT